(No Model.) 2 Sheets—Sheet 1.

# M. H. MORRIS.

## PUMP CYLINDER AND VALVE MECHANISM THEREFOR.

No. 433,019. Patented July 29, 1890.

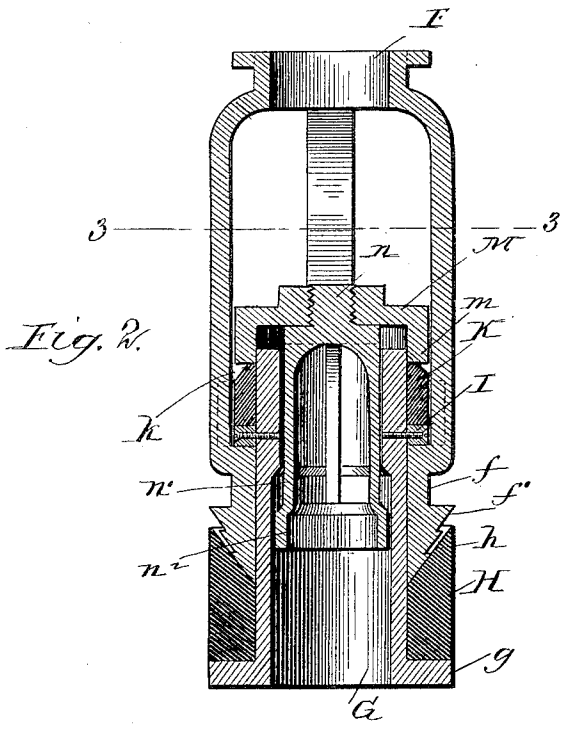



Fig. 2.

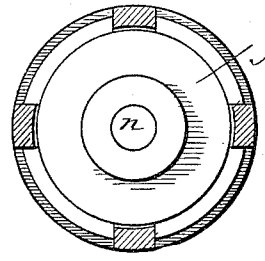



Fig. 3.

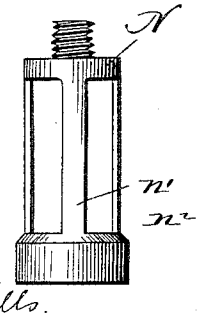



Fig. 4.

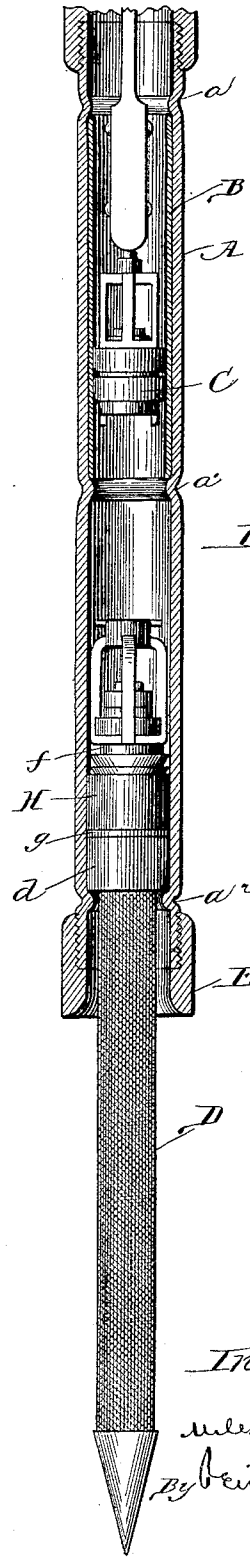



Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

# M. H. MORRIS.

## PUMP CYLINDER AND VALVE MECHANISM THEREFOR.

No. 433,019. Patented July 29, 1890.

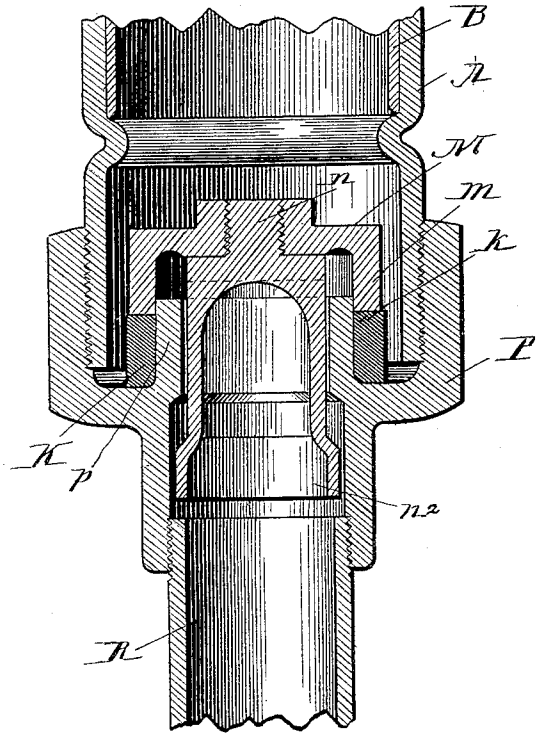



Fig. 5.

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# UNITED STATES PATENT OFFICE.

MILES H. MORRIS, OF CHICAGO, ILLINOIS.

## PUMP-CYLINDER AND VALVE MECHANISM THEREFOR.

SPECIFICATION forming part of Letters Patent No. 433,019, dated July 29, 1890.

Application filed October 7, 1889. Serial No. 326,180. (No model.)

*To all whom it may concern:*

Be it known that I, MILES H. MORRIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pump-Cylinders and Valve Mechanism Therefor, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My present invention has relation more particularly to the manufacture of tubular wells, and has for its object to provide an improved construction of cylinder, whereby the lining of the cylinder can be applied thereto before the cylinder is placed within the well, and to so improve the construction of the cylinder also that the well-point can be readily placed and retained therein, and, finally, to improve the construction of check-valve mechanism for the cylinder.

To this end my invention consists in the several novel features of construction hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in central vertical section through a pump-cylinder having my invention applied thereto, the pump-bucket, the valve mechanism, and the well-point being shown in elevation. Fig. 2 is an enlarged detail view, in vertical section, of the valve mechanism. Fig. 3 is a view in transverse section on line 3 3 of Fig. 2. Fig. 4 is a detail view, in side elevation, of the valve-stem. Fig. 5 is an enlarged view, in vertical section, showing my improved valve mechanism as applied to the cylinder of an open well.

In making tubular wells it is the common practice to provide the cylinder or section of the tubing immediately above the well-point with a lining, in order to insure the easy and accurate operation of the pump-piston or bucket. Inasmuch, however, as the inner wall of the pump-cylinder is invariably more or less injured about its lower portion by the operation of the drilling-tools, it is the common practice to apply the brass lining to the pump-cylinders after the drilling of the well is completed, the more general practice being to insert the lining within the cylinder at the same time that the check-valve and its cage are placed therein and to connect the cylinder therewith. This method of lining the pump-cylinder after it has been placed in position is objectionable, for the reason that while the lower portion of the cylinder is securely retained in place the upper portion is left unsupported, and in the operation of the pump is apt to become more or less loosened or worn. Moreover, this matter of connecting the lining with the valve mechanism and holding it within the pump by the frictional gripping devices that are commonly used to retain the valve mechanism is a somewhat difficult operation and necessitates a somewhat expensive construction. In order to overcome these objections, I provide the pump-cylinder with a lining throughout its upper portion—that is to say, throughout that portion within which the pump-piston works and where only a lining is of advantage—and this lining I apply to the cylinder before the latter is placed in position for use, this being possible, since I have found in practice that in the drilling operation the upper portion of the pump-cylinder is not injured by the tools.

In order to securely retain the lining within the cylinder, which is preferably of wrought-iron, I first place the lining therein and afterward indent the body of the cylinder, preferably by circumferential grooves, at points adjacent each end of the lining, so that the lining is thereby guarded against longitudinal movement.

In order to securely retain the well-point within the lower end of the cylinder and to avoid the necessity of forming the upper end of the point with screw-threads or of forming the cylinder-shoe with a shoulder, I indent the body of the cylinder adjacent its lower end preferably with a circumferential indentation, in order to form an interior offset or shoulder, against which the head of the point shall rest.

The check-valve within the cylinder is of the puppet-valve type, and is so constructed that an easy vertical lifting of the valve from its seat can be secured as the pump-piston is lifted and a firm and accurate closing of the

valve upon its seat can be secured on the downward stroke of the pump-piston in order to effectively check the backflow of water.

Referring to the accompanying drawings, A designates the main body of the pump-cylinder, the upper and lower ends of which are screw-threaded for connection, respectively, to the tube and cylinder-shoe in the usual manner, and B denotes the lining of the cylinder. The pump-cylinder A is preferably of wrought-iron and its lining B of brass, and the lining is extended only throughout the upper portion of the cylinder—that is to say, throughout that portion within which the piston C is moved in the pumping operation.

In order to retain the lining B within the upper portion of the cylinder and against vertical movement, I indent the cylinder A at points adjacent the ends of the lining B, the indentations $a$ and $a'$ being preferably extended around the cylinder, as shown, and being readily formed by suitable tool after the lining has been placed in proper position within the cylinder. When thus lined throughout its upper portion, the cylinder can be attached to the well-tubing in the usual manner, and it will be found that the lining will terminate at such distance about the bottom of the cylinder that all danger of injury to the lining during the drilling operation will be avoided.

In order to retain the well-point D within the lower portion of the cylinder, I prefer to provide such portion of the cylinder with an indentation $a^2$, preferably extending entirely around the cylinder, against which will rest the head $d$ of the well-point. This indentation $a^2$ will be formed in the same manner as the indentations $a$ and $a'$, and will avoid the necessity of threading the lower end of the cylinder and correspondingly threading the head of the well-point or of providing the shoe E of the cylinder with an interior shoulder to sustain the head of the well-point.

My improved valve mechanism for pump-cylinders comprises a cage F, of usual or suitable construction, provided at its lower portion with a sleeve $f$, adapted to encircle the tubular body G of the valve mechanism, this tubular body G being provided at its bottom with a peripheral flange or shoulder $g$, upon which rests the rubber packing H. This rubber packing H has its upper portion interiorly beveled, as at $h$, to receive the beveled lower portion of the sleeve $f$, and by preference the lower portion of the sleeve $f$ has its exterior beveled face furnished with a series of annular ribs or notches adapted to engage with the rubber packing and better retain the same in expanded position after the parts have been seated within the cylinder of the pump. The body G has attached to its upper portion the peripheral ring I, upon which will rest the rubber seat K, whereon will bear the depending edge $m$ of the valve M, and by preference the upper or bearing edge of this rubber seat K will be beveled, as shown at $k$, in order to prevent any sand or grit from lodging upon the edge of the seat. The valve M has a central perforation, preferably screw-threaded, to receive the corresponding reduced portion $n$ of the valve-stem N, this stem N being by preference formed, as shown, with the arms $n'$, to the lower ends of which are attached the guard-ring $n^2$, that is formed sufficiently larger than the reduced upper portion of the body G to limit the upward movement of the valve. From this construction it will be seen that when the well-point D has been placed in position for use, with its head $d$ resting upon the annular indentation $a^2$ of the cylinder, the valve mechanism will be set within the cylinder and the cage F will be forced downward until its beveled lower portion $f'$ has so far expanded the packing-ring H as to cause this ring to tightly bind against the wall of the cylinder, so as to guard against all danger of the lifting of the body of the valve mechanism and the cage in the pumping operation. It is plain, also, that as the pump-piston C is operated the lifting of this piston will cause the valve M to be raised, thereby permitting the flow of water through the body G of the valve mechanism and through the open stem M of the valve into and through the cage F, while on the downward stroke of the piston the valve M will fall to and securely seat itself upon the upper edge of the rubber seat K, so that the backflow of water shall be effectively prevented. By this means the easy and accurate vertical movement of the valve M is secured, and it will be found in practice that the flow of water over the upper edge of the body G will cause any sand carried upward with the water to be washed off the upper or bearing edge of the seat K.

It will be observed that the upper edge of the valve-seat K terminates at a distance below the upper edge of the body G of the valve mechanism, my purpose in thus locating the valve-seat being, primarily, to save the edge of this seat from wear incident to the flow of the water and of the sand frequently carried therewith, for while there is a flow of water over the edge of the valve-seat, still this seat is saved from the impact of the direct flow, and is consequently relieved from excessive wear incident thereto.

In Fig. 5 of the drawings my invention is shown as applied to the cylinder of an open-well pump. In this construction the seat K of the valve encircles an upwardly-extending flange $p$ of the coupling P, by which the cylinder A and the suction-pipe R are united. So, also, in this form of my invention the cage of the valve mechanism is omitted; but the valve M is provided with the overhanging flange $m$, that rests against the beveled edge $k$ of the seat K, the body of the valve being attached to the reduced portion $n$ of the stem N, the construction of which is similar to that illustrated in Figs. 1, 2, 3, and 4 of the drawings. Instead, however, of employing the body G of

the mechanism illustrated in said last-mentioned figures, the coupling P forms the body of the valve mechanism, the upper reduced portion or ring $p$ of this coupling serving to coact with the ring $n^2$ at the bottom of the valve-stem to limit the upward movement of the valve.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A metal cylinder for drive-well pumps provided at its lower end with means for connection with the well-point and provided with a lining B of uniform diameter in its upper portion, in which the pump-piston works, and provided, also, with annular indentations or ridges $a$ and $a'$, raised from the inner surface of the cylinder adjacent the ends of the lining by forcing inwardly the body of the cylinder at such points, said cylinder having its lower portion unlined where subjected to contact with the drilling-tools, all substantially as described, and for the purpose set forth.

2. The combination, with a well-point having the heads $d$, of the cylinder $a$, adjacent its bottom, provided with the indentation or ridge $a^2$, projecting inwardly from the inner face of the cylinder to sustain the head of the well-point, substantially as described.

3. A valve mechanism for pump-cylinders, comprising a tubular body portion, a valve-seat encircling said body portion and terminating at a distance below its upper edge, a puppet-valve provided with an overhanging flange or rim adapted to fit over said body portion and rest upon said seat, and a stem for said valve extending within said body portion, substantially as described.

4. A valve mechanism for pump-cylinders, comprising a tubular body portion, an elastic valve-seat encircling the upper part of said body portion and terminating at a distance below the upper edge thereof and having a beveled bearing-edge, and a puppet-valve provided with a depending flange or rim adapted to encircle said tubular body portion and rest upon said valve-seat, substantially as described.

5. A valve mechanism for pump-cylinders, comprising a tubular body portion, a valve-seat encircling said body portion and terminating at a distance below its edge, a puppet-valve having a depending flange or rim adapted to encircle said body portion and rest upon said seat, and a stem for said valve extending within said body portion and having an enlarged lower part to limit the upward movement of said valve, substantially as described.

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