No. 658,325 Patented Sept. 18, 1900.

J. M. STUKES & E. K. SMITH.

DOUBLE ACTING PUMP.

(Application filed Dec. 13, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

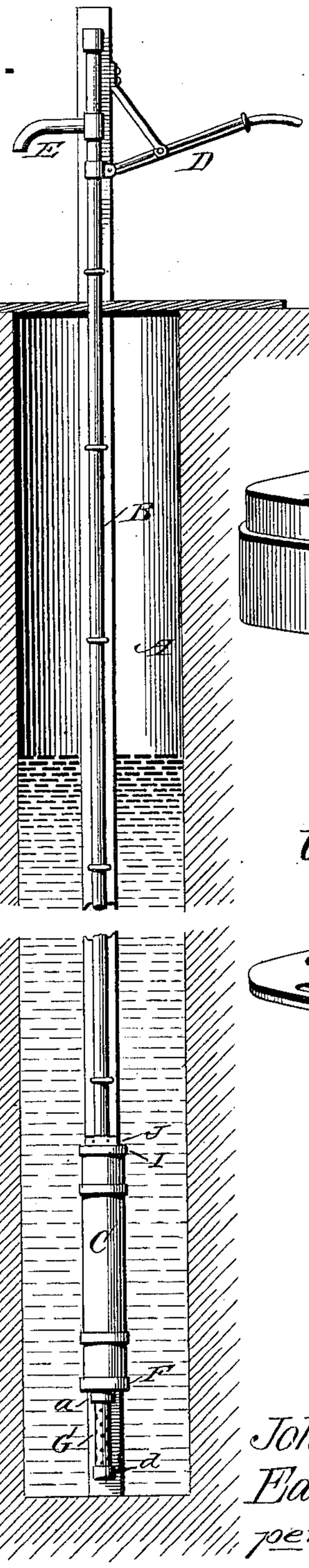


Fig. 5.

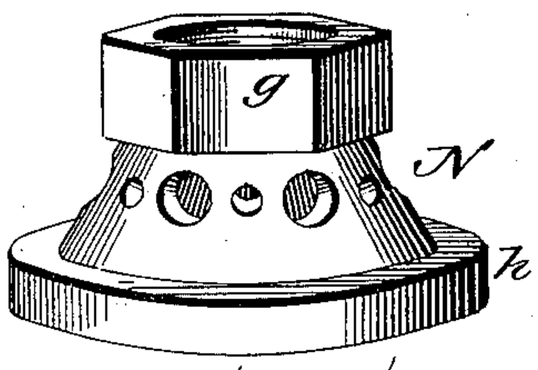
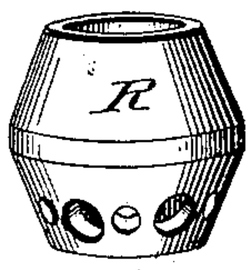


Fig. 6.



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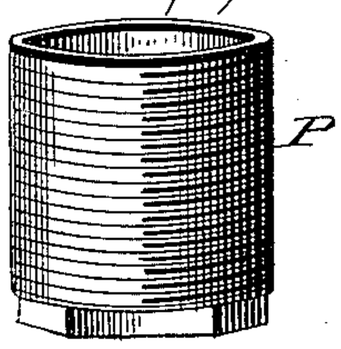

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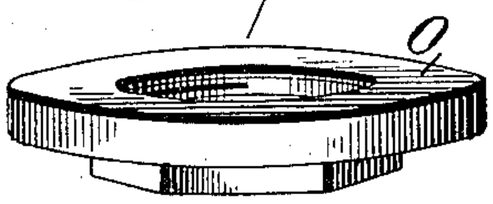


Fig. 9.

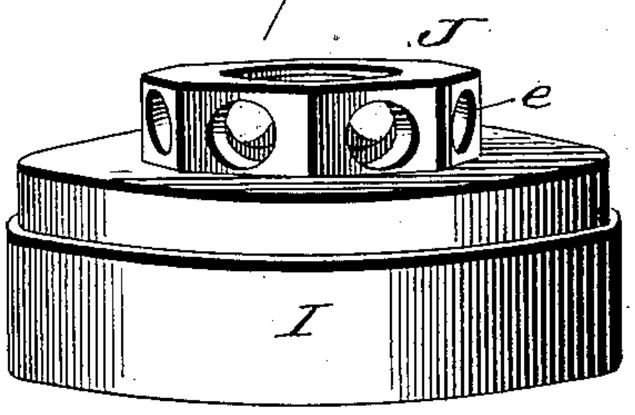


Fig. 10.

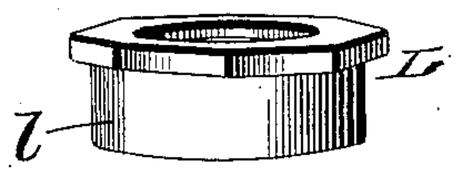


Fig. 11.

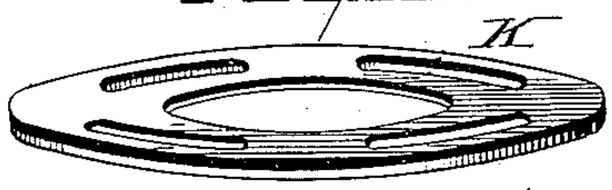


Fig. 12.

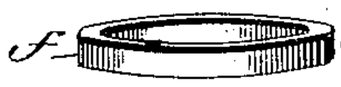
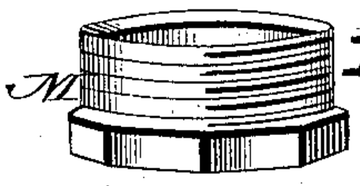


Fig. 13.



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DOUBLE ACTING PUMP.

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Fig. 2.

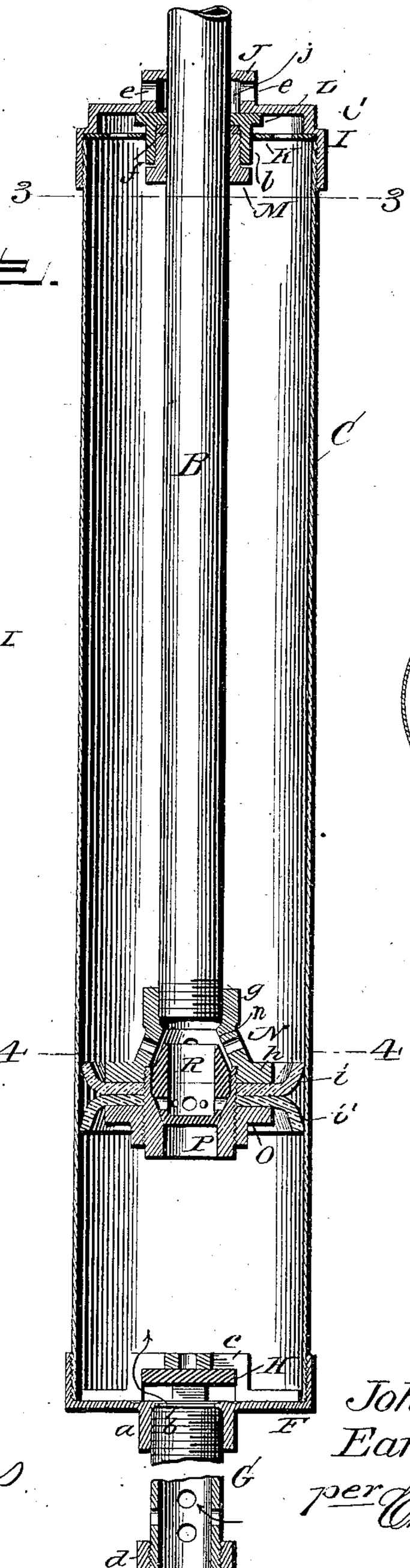


Fig. 3.

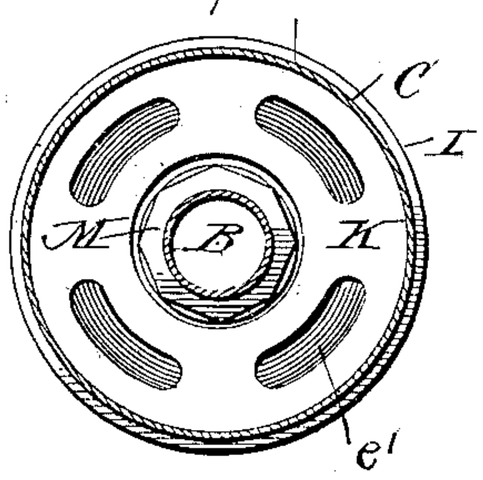
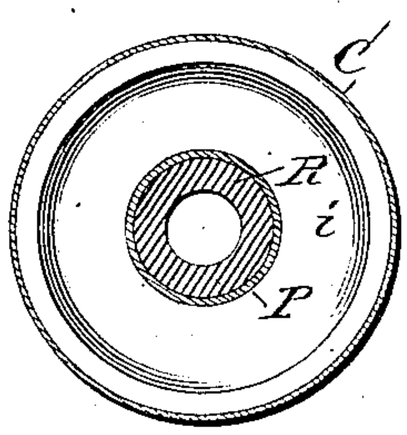


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN M. STUKES AND EARNEST K. SMITH, OF SNYDER, TEXAS.

DOUBLE-ACTING PUMP.

SPECIFICATION forming part of Letters Patent No. 658,325, dated September 18, 1900.

Application filed December 13, 1899. Serial No. 740,211. (No model.)

To all whom it may concern:

Be it known that we, JOHN M. STUKES and EARNEST K. SMITH, citizens of the United States, residing at Snyder, in the county of Scurry and State of Texas, have invented certain new and useful Improvements in Double-Acting Pumps; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

The present invention has relation to that class of deep-well double-acting pumps in which a single cylinder and piston are used; and the object thereof is to improve the pump in the several details of construction, whereby the same is rendered more effective in operation, possessing strength and durability, and the several parts so combined and arranged with relation to each other that economy of space is obtained to adapt the pump to small-bored wells.

The invention therefore consists in a pump of the class above referred to constructed substantially as shown in the drawings and hereinafter described and claimed.

Figure 1 of the drawings is a side elevation of our improved pump, showing it in position in a bored well; Fig. 2, a sectional elevation, on an enlarged scale, of the pump-cylinder and its operating parts; Fig. 3, a horizontal section taken on line 3 3 of Fig. 2, looking from the under side; Fig. 4, a horizontal section taken on line 4 4 of Fig. 2, looking from the upper side of the plunger; Fig. 5, a detail perspective view, on an enlarged scale, of the upper section of the plunger; Fig. 6, a similar view of the double frusto-conical valve; Fig. 7, a perspective view of the lower section of the plunger which forms the lower seat for the valve; Fig. 8, a perspective view of the clamping-nut; Fig. 9, a perspective view of the cap for attachment to the upper end of the cylinder; Fig. 10, the upper section of the packing-box valve; Fig. 11, a perspective view of the perforated supporting-plate; Fig. 12, a perspective view of the packing-ring, and Fig. 13 a perspective view of the lower section for holding the packing-ring in place.

In the accompanying drawings, A represents a sectional view of a deep well to illustrate the application of our improved pump thereto, and B the usual pump-tube, through which the water is drawn from the pump-cylinder C, said pump-tube having the usual lever-handle D for operating it and the usual nozzle E, through which the water is discharged, all of which may be of the usual construction.

The pump-cylinder C has secured to its lower end a screw-cap F, having a downwardly-extending interior screw-threaded collar *a* for attaching thereto a suitable perforated tube G. This screw-cap F has a valve-seat *b* to receive the valve H in closing the cylinder against the water entering at its lower end, the upward movement of the valve being limited by the cage *c* or other like device. The lower end of the perforated tube G, which is designed to prevent large bodies entering the pump-cylinder, is closed by a screw-cap *d* or by any other preferred means. The upper end of the pump-cylinder C is closed by a three-stepped screw-cap I, which cap has radial inlet water-passages *e*, formed in the sides of a dome J, which is formed integral with the screw-cap and forms the upper step thereof. A perforated valve-supporting plate K is held in place upon the upper end of the cylinder C by means of the lower step of the screw-cap I, and within the intermediate step is a valve-chamber *e'*. L is a valve located in the valve-chamber, having a pendent flange *l* working through the perforated plate K. This valve forms one section of a stuffing-box for the pump-tube B, the lower section of said stuffing-box being shown at M, and between these sections is the usual packing-ring *f*. It will be understood that the valve L is lowered and raised by the movement of the pump-tube which lowers and raises the stuffing-box which has frictional contact therewith.

Between the pump-tube B and the interior wall of the dome J is an annular water-space *j* to admit the water to the pump-cylinder through the passages *e*, valve-chamber *e'*, and perforated supporting-plate K when the valve is open.

The construction and form of the screw-cap with perforated dome, the valve L, the perforated supporting-plate K, the packing-ring

f, and the lower section M of the stuffing-box are also shown in detail perspective in Figs. 9, 10, 11, 12, and 13, respectively. The pump-tube B, which acts as a plunger, has connected to its lower end a plunger-head which consists of the following parts: A frusto-conical perforated valve-section N is provided with a frusto-conical valve-seat *n* (in which the perforations are located) and an interior screw-threaded neck *g*, by which the valve-section may be detachably connected to the screw-threaded end of the pump-tube B. This frusto-conical valve-section is formed with a circumferential clamping-flange *h*, and between this flange and the flanged clamping-nut O are securely held the two cup-shaped packings *i i'*. The flanged end of the valve-section N and also the clamping-nut O are formed with interior screw-threads for connecting thereto an annulus P, having a frusto-conical imperforated valve-seat intermediate of its ends, and between the two valve-seats operates a double frusto-conical valve R, which is closed at its lower end and operated between the valve-seats during the action of the plunger or pump tube. This double frusto-conical valve consists of a bottom imperforate disk, a lower part having radial perforations, an imperforate cylindrical central part, (adapted to slide in the upper cylindrical part of the annulus,) an upper imperforate part, and open top.

The several parts above described which constitute the plunger-head consisting of the frusto-conical perforated valve-section, the double frusto-conical valve, the annulus having the lower valve-seat, and the clamping-nut are each shown in detail perspective in Figs. 5, 6, 7, and 8 of the drawings, the peculiar construction and form of the valve-seats and valve rendering a perfect action of the plunger when the pump is in operation.

In the operation of the pump as the pump-tube B is on its upward stroke the valve H at the bottom of the cylinder C is forced off its seat by the upward pressure of the water, admitting the water into the cylinder below the plunger-head and at the same time forcing the water which is in the cylinder above the plunger-head through the perforations in the valve-seat *n* and up through the pump-tube B and out through the usual nozzle of the pump. As the pump-tube is on its upward stroke, as above described, the frictional contact of the tube against the valve L will draw said valve up against the under side of the screw-cap I, which forms a seat therefor, thus preventing the water from passing out through the perforations in the dome J at the top of the cylinder C. When this action takes place, the valves H, R, and L will assume the position indicated in Fig. 2 of the drawings. Upon the downward stroke of the pump-tube B the valve H will be forced down upon its seat by the pressure of water thereon and will raise the valve R in the plunger-head, the upper portion of said valve being brought against the valve-seat *n* and closing the perforations therein, allowing the water to pass through the perforations of the valve R and directly up through the pump-tube and out through the nozzle of the pump. While the pump-tube B is on its downward stroke, the valve L is carried with it by frictional contact therewith a sufficient distance to form a passage for the water in the well, which will pass into the pump-cylinder through the perforations or passages *e* of the dome J and through the perforations in the supporting-plate K and keeps the pump-cylinder above the plunger-head full of water for the next upward stroke, when the water will pass into the pump-tube, as hereinbefore described, thereby securing a continuous flow of water at either stroke of the pump-tube and plunger-head.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A double-acting pump comprising a pump-cylinder, valves located at the lower and upper ends of the cylinder respectively, a reciprocating combined pump and plunger tube, a plunger-head having lower and upper sections providing a valve-chamber formed with lower and upper frusto-conical valve-seats and a cylindrical part between the valve-seats and a double valve formed with a frusto-conical lower part having lateral perforations and an imperforate lower end, a frusto-conical upper part having an open upper end, and an intermediate cylindrical part of less height than the cylindrical part of the valve-chamber.

2. A double-acting pump comprising a pump-cylinder, valves located at the lower and upper ends of the cylinder respectively, a reciprocating combined pump and plunger tube, a plunger-head constructed with an annulus formed with a lower frusto-conical valve-seat and a cylindrical part above the valve-seat, a lower clamping-flange adjustable on the annulus, an upper section formed with an upper clamping-flange, with which the annulus is connected, a frusto-conical valve-seat having lateral perforations, and a neck with which the tube is connected, and a double valve formed with a frusto-conical lower part having lateral perforations and an imperforate lower end, a frusto-conical upper part having an open upper end, and an intermediate cylindrical part whereby the double valve is guided to the valve-seats.

3. A double-acting pump comprising a pump-cylinder, having a valve, at its lower end, the three-stepped cap, having a valve-chamber beneath the intermediate step, and a dome having lateral passages and an upper valve-chamber within the dome, the perforated plate secured to the cylinder by the lower step of the cap, the stuffing-box working in the perforated plate, and having a

lower section, and an upper section formed with an upper valve, a reciprocating combined pump and plunger tube having frictional contact with the stuffing-box to raise and lower the latter, and the plunger-head having a valve and carried by the tube.

In testimony that we claim the above we have hereunto subscribed our names in the presence of two witnesses.

JOHN M. STUKES.
EARNEST K. SMITH.

Witnesses:
L. C. HILLS,
W. R. TAYLOR.