(No Model.) 2 Sheets—Sheet 1.

H. C. TAFT & L. DAY.

PUMP.

No. 422,461. Patented Mar. 4, 1890.

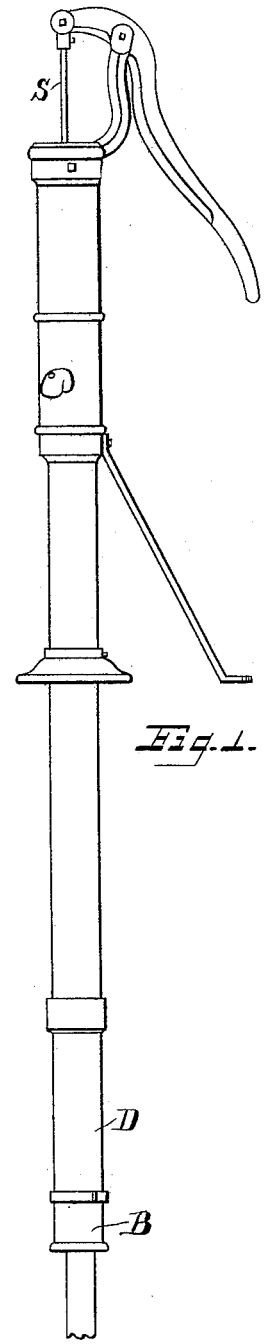

Fig. 1.

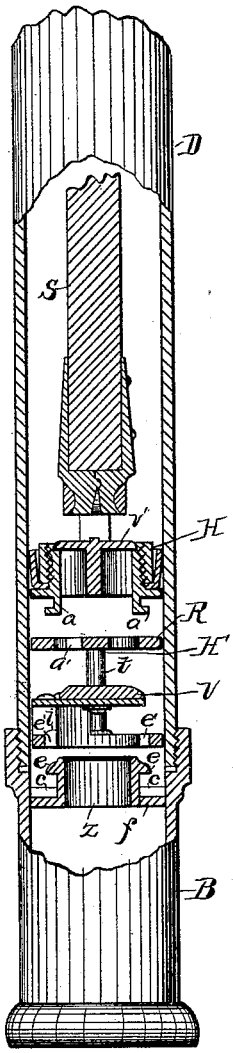

Fig. 2.

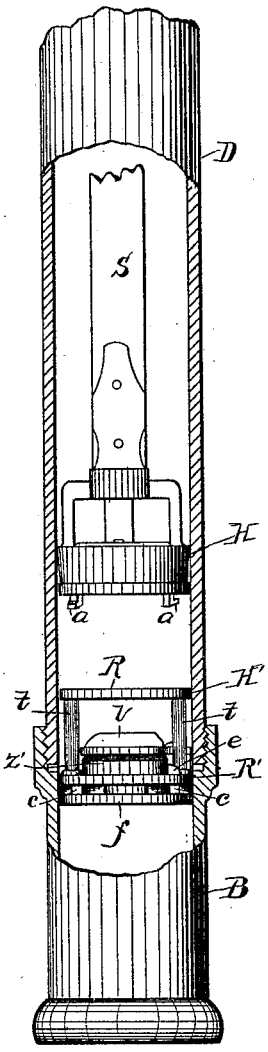

Fig. 3.

WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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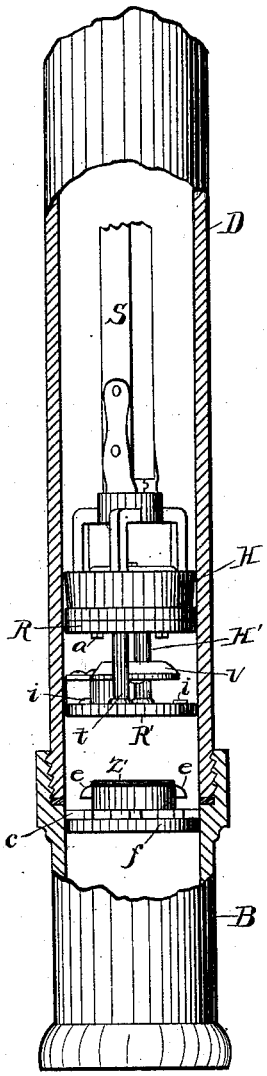

Fig. 4.

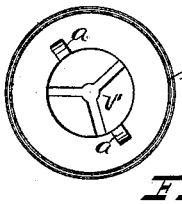

Fig. 6.

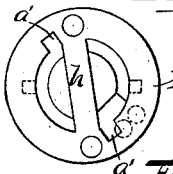

Fig. 7.

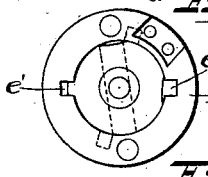

Fig. 8.

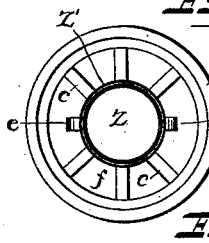

Fig. 9.

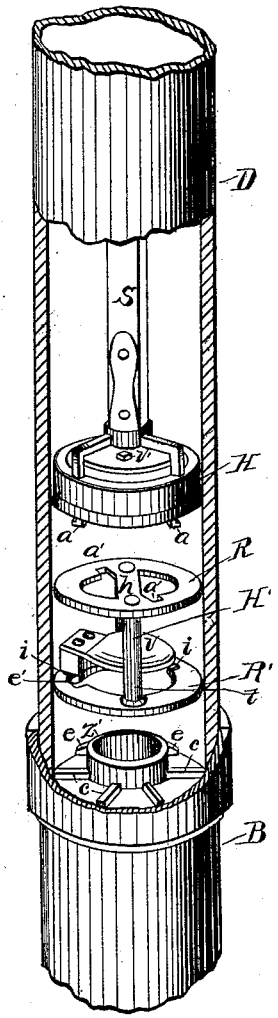

Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

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PUMP.

SPECIFICATION forming part of Letters Patent No. 422,461, dated March 4, 1890.

Application filed October 30, 1889. Serial No. 328,727. (No model.)

To all whom it may concern:

Be it known that we, HARVEY C. TAFT and LORENZO DAY, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Pumps; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to pumps in which the check-valve is located in a valve-cage, said valve-cage being engaged with and disengaged from the elevated valve-seat in the base of the pump-cylinder by a rotation of the valve-cage, the object being to provide means whereby the check-valve may be extracted from the pump for repair or other purposes and replaced therein without removing the pump from the well or detaching pipe or stock from the pump-cylinder.

The check-valve in most pumps in common use is permanently secured over the valve-seat, and in order to remove said valve, which often becomes necessary for the purpose of repair or to clean the valve of matter that collects under it and prevents its operation, the pump is withdrawn from the well and the pipe detached at the point of location of the valve, which operation is often very difficult and requires much time and labor. Pumps have been constructed so as to remove the check-valve; but in such cases the valve-seat is also extracted.

The essential features of this invention consist in the particular construction and combination of the operative parts as defined in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a view in elevation of a pump embodying our improved features. Fig. 2 is a view in elevation of the pump-cylinder, a portion of the side of which is broken away, showing a central vertical section through the piston-head, valve-cage, and valve-seat located within the cylinder, all of said parts being disengaged. Fig. 3 is a like view of the pump-cylinder, the interior parts being in elevation, showing the valve-cage locked to the valve-seat in the base of the cylinder as in position when the pump is in operation. Fig. 4 is a view of the pump-cylinder, a portion of the side being broken out, the inner parts being in elevation, showing the check-valve cage detached from the valve-seat and engaged with the piston-head as in position when the check-valve is being removed from the pump. Fig. 5 is a perspective view of the pump-cylinder and its interior parts, the side of said cylinder being broken away, showing said parts detached. Fig. 6 is an inverted plan of the piston-head. Fig. 7 is a top plan of the valve-cage. Fig. 8 is an inverted plan of the valve-cage. Fig. 9 is a top plan of the diaphragm and valve-seat located in the base of the pump-cylinder.

As indicated in the drawings, D represents the pump-cylinder, and B the base thereof.

H represents the piston-head, and H′ the valve-cage.

The pump-cylinder D does not differ materially from those in common use, and is externally screw-threaded at its lower end to receive the base B, said base being provided near its upper end with the diaphragm *f*, having the diverging ribs *c*, induct-port Z, and valve-seat Z′, provided with the lugs *e e*, as clearly shown in Figs. 2, 4, and 5, said diaphragm being formed integral with the base B of the pump-cylinder.

The valve-cage H′ is composed of the upper ring R, the lower ring R′, and the vertical standards *t t*, the upper ring R having the cross-piece *h* and the recesses *a′* in the inner circle of said ring, the lower ring R′ having the check-valve *v* secured thereto and the recesses *e′* in the inner circle thereof. The standards *t t* couple said rings together.

The piston-head H is supplied with the ordinary puppet-valve *v″*, and is provided with the hooked lugs *a*, depending from the under face of said head.

The valve-cage H′ is secured to the raised

valve-seat Z′ in the base of the cylinder by placing said cage over the valve-seat so that the recesses *e′* in the lower ring R′ of the cage will register with the lugs *e* on the periphery of the valve-seat, (this position is clearly shown in Fig. 2,) when said valve-cage will pass down over the valve-seat Z′, the under face of the ring R′ resting on the ribs *c* of the diaphragm *f*, there being sufficient space between the upper face of said ribs and the under shoulder of the lugs *e* to receive the thickness of the ring R′. Then by rotating the cage to the right the lugs *e* will engage with the upper face of the ring R′, thus locking the cage to the base of the cylinder, with the valve V thereof resting on the valve-seat Z′, as clearly shown in Fig. 3, in which position of parts the pump is ready for operation.

When it is desired to remove the check-valve from the pump, the pump-rod S, carrying the piston-head H at its lower end, is uncoupled from the handle and let down in the pump until the hooked lugs *a*, extending from the under face of the piston-head, strike the upper ring R of the valve-cage. The pump-rod is then rotated until the hooked lugs *a* of the piston-head register with the recesses *a′* in the inner circle of the ring R, when said lugs will pass through said recesses *a′*. Then by rotating the pump-rod to the left the hooked ends of the lugs *a* engage under the under face of the ring R, and the stems of said lugs strike the shoulder of the cross-piece *h*. A further rotation of the pump-rod to the left will then turn the valve-cage until the lugs *e* of the valve-seat strike the stops *i i* at the side of the recesses *e′* in the inner circle of the lower ring R′ of the valve-cage, when said lugs *e* will register with the recesses *e′* in said ring and the valve-cage will be unlocked. Then by an upward pull on the pump-rod the valve-cage and valve may be lifted from the valve-seat and removed from the well, as clearly shown in Fig. 4.

To replace the check-valve in the pump, the valve-cage containing said valve is attached to the piston-head by passing the hooked lugs *a* of said head through the recesses *a′* in the upper ring R of the valve-cage and rotating the cage until the hooked ends of said lugs engage under the under face of said ring. The valve-cage is then placed in the pump by lowering the piston-head until the lower ring R′ of said cage strikes the lugs *e* of the valve-seat Z′. Then by rotating the pump-rod to the left the lugs *a* are brought in contact with the shoulders of the cross-piece *h* next to the recesses *a′* in the ring R, whereby the valve-cage is turned until the recesses *e′* in the lower ring of said cage will register with the lugs *e* on the valve-seat, when the valve-cage will drop over said valve-seat, the lugs *e* passing through the recesses *e′*. Then by a further rotation of the pump-rod to the right the valve-cage will be turned, causing the lugs *e* to engage with the upper face of the ring R′ of the valve-cage, thereby locking said cage to the valve-seat.

In locking the valve-cage to the valve-seat the stems of the lugs *a* bear against the shoulders of the cross-piece *h* next to the recesses *a′* in the ring R, causing the hooked ends of said lugs to register with said recesses. Therefore when the valve-cage is locked to the valve-seat the piston-head becomes disengaged from said cage and may be withdrawn, leaving the cage in the locked position, as shown in Fig. 2.

It will be seen on looking at Fig. 5 that the recesses *a′* in the ring R and the recesses *e′* in the ring R′ of the valve-cage stand nearly at right angles to each other, and the arrangement of the lugs and stops is such that when the valve-cage is in the locked position on the valve-seat it will be unlocked from the piston-head, Fig. 3, and when it is locked to the piston-head it will be unlocked from the valve-seat, Fig. 4.

When the valve-cage, with its check-valve, is locked to the valve-seat in the base of the pump-cylinder, and the pump-rod is coupled to the pump-handle, the downward stroke of the pump-rod does not carry the piston-head quite to the upper ring of the valve-cage, so that said parts work free and without contact, and when it is desired to engage the valve-cage the pump-rod is uncoupled from the handle and let down, as before described.

Having thus fully set forth our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In combination with the pump-cylinder, the base screw-threaded thereto, said base having the induct-port, the diaphragm, the ribs *c* thereon, the raised valve-seat and the lugs projecting therefrom, and the valve-cage carrying a check-valve, the lower ring of said valve-cage having the recesses in the inner face of its circle, whereby said valve-cage is adapted to be detachably coupled to the base of the pump, substantially as specified.

2. In combination with the pump-cylinder, the base, said base having the induct-port, the diaphragm, the diverging ribs, the raised valve-seat, the lugs projecting therefrom, the check-valve cage carrying a check-valve, said cage consisting of an upper and an under ring connected by the standards *t*, the lower ring having the recesses *e′*, the upper ring having the cross-bar *h* and recesses *a′*, and the piston-head having the depending hooked lugs, whereby the valve-cage is adapted to be locked to the piston-head or to the base, and to be unlocked from either or both, as and for the purposes specified.

3. In combination with the cylinder, the base, said base having the diaphragm, the raised valve-seat, the lugs projecting therefrom, the valve-cage consisting of two rings coupled by upright standards, the recesses in

the lower ring, said recesses adapted to receive the lugs on the base of the pump, the upper ring having the cross-bar h and recesses a', and the piston-head carrying the hooked lugs, said lugs adapted to enter the recesses of the upper ring and by rotation of the piston-head engage with the valve-cage, as and for the purposes set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

HARVEY C. TAFT.
LORENZO DAY.

Witnesses:
W. H. FOWLER,
WM. DUNHAM.