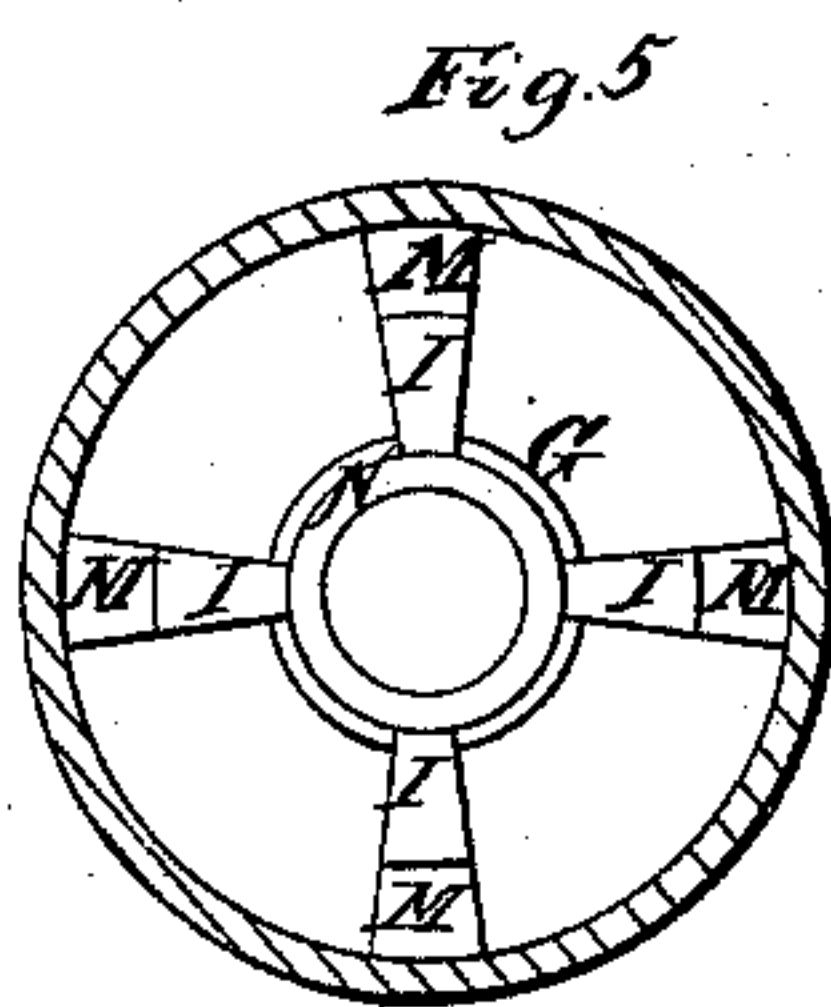
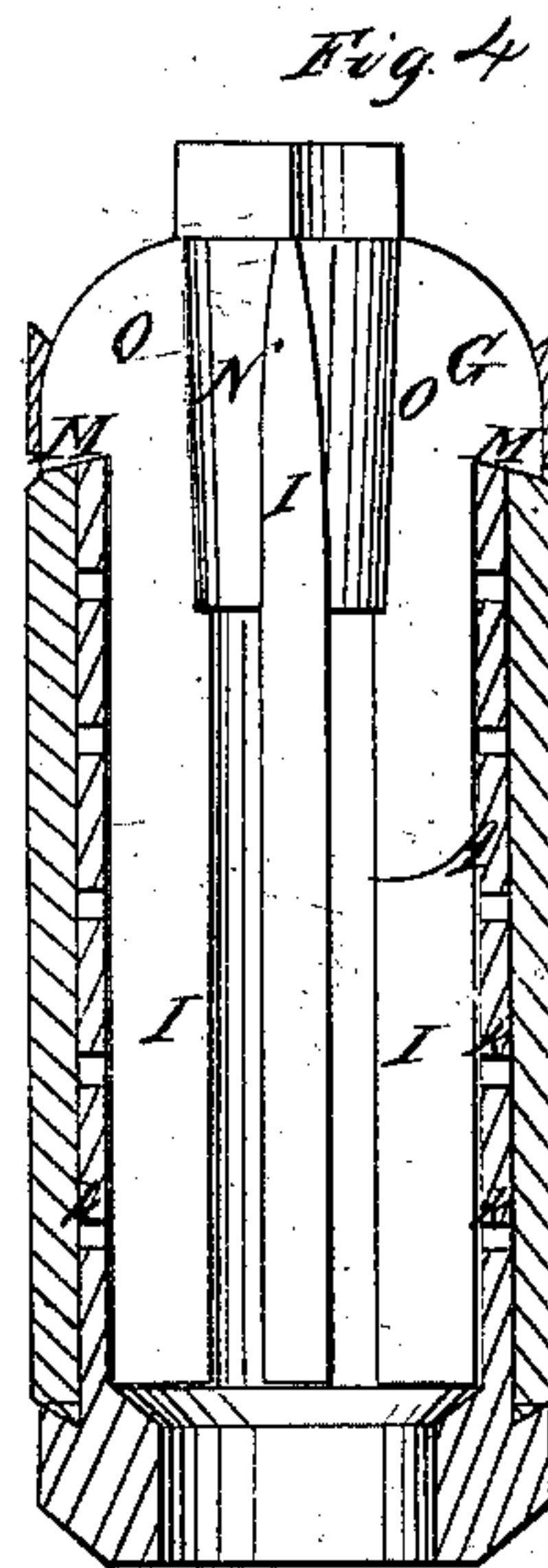
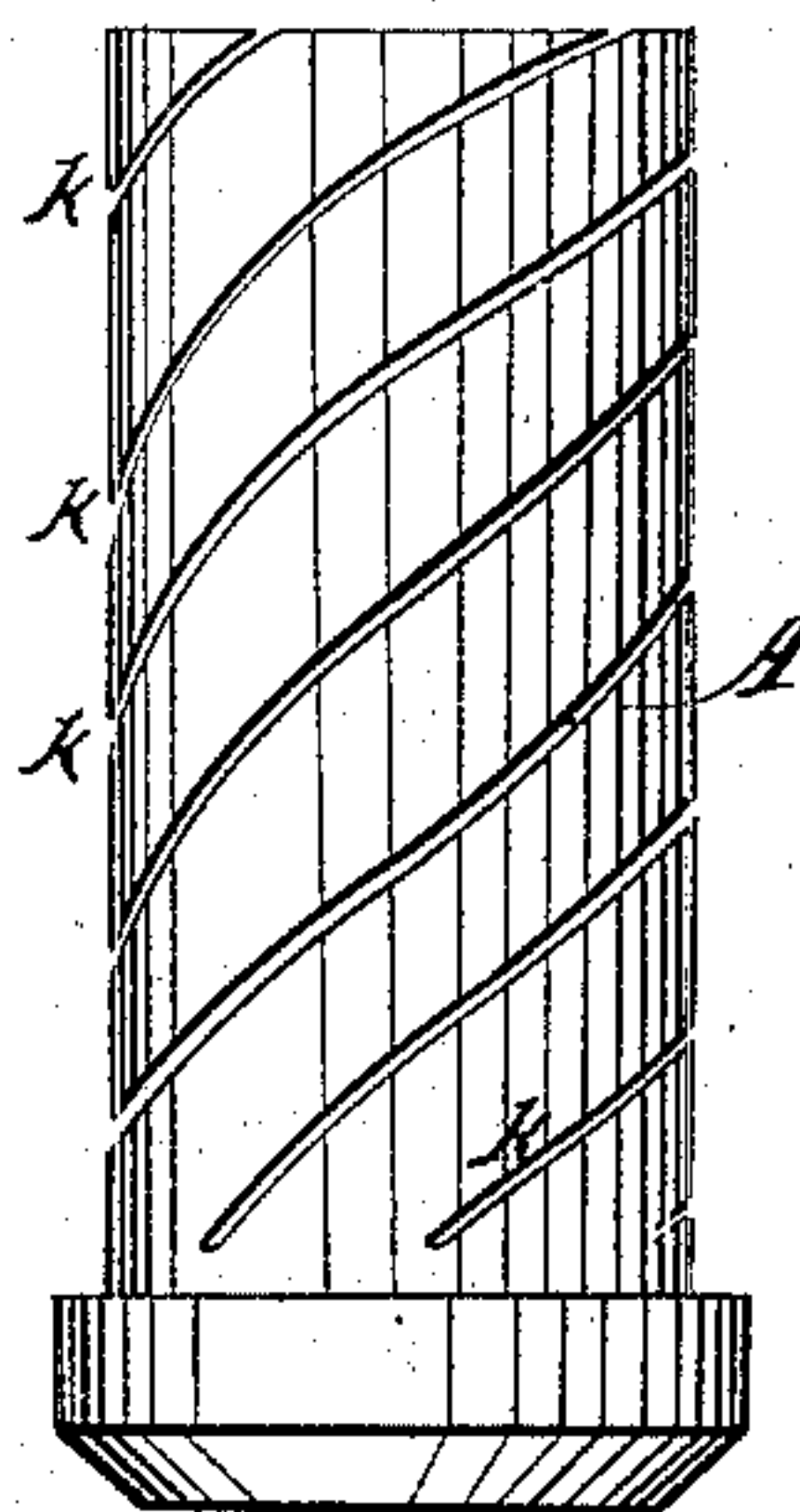
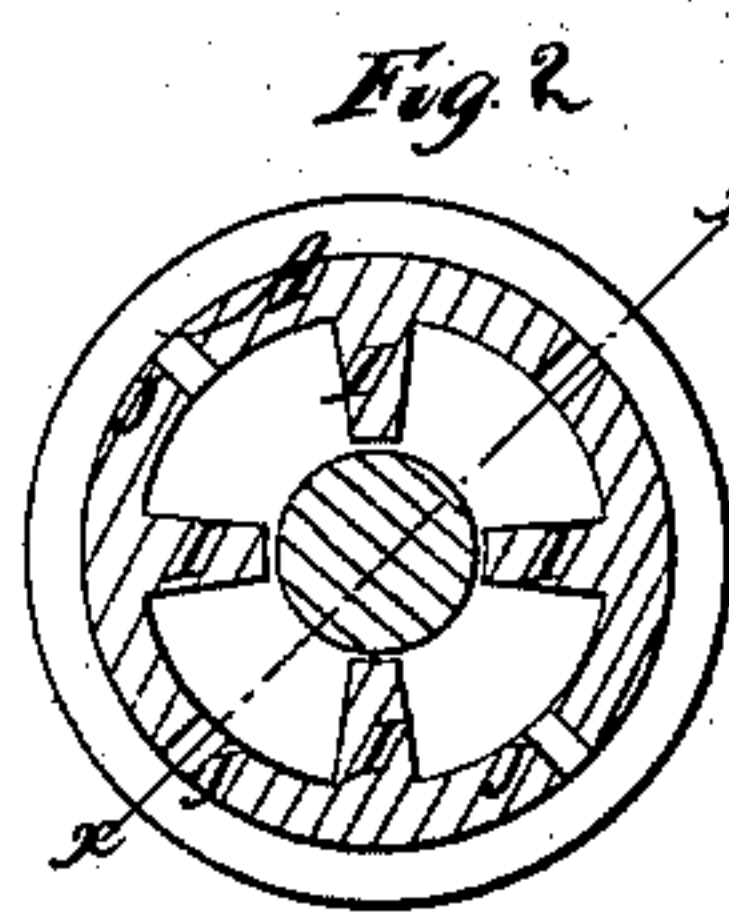
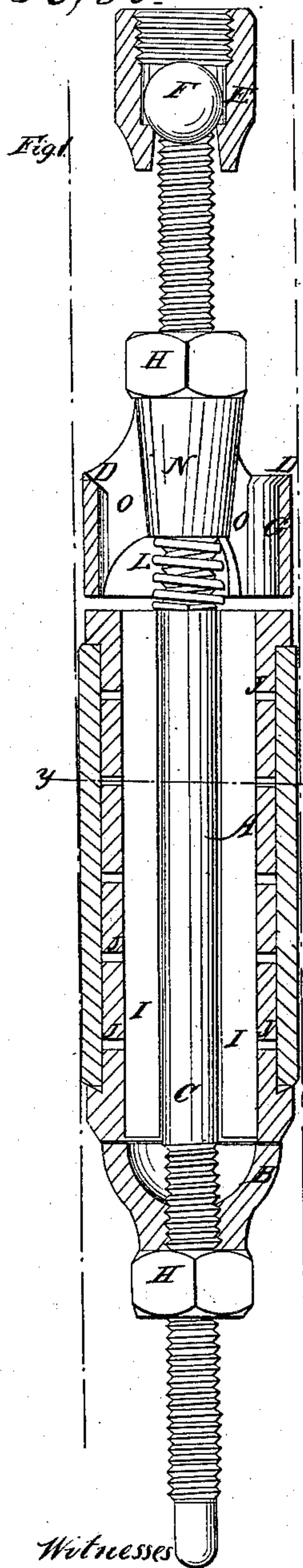


J. W. Summers,

Oil Pump.

N^o 58/50.

Patented Sep. 18, 1866.



Witnesses
J. H. B. Carrington
Wm. Frewin

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UNITED STATES PATENT OFFICE.

J. W. SUMMERS, OF TARR FARM, PENNSYLVANIA.

IMPROVEMENT IN DEEP-WELL PUMPS.

Specification forming part of Letters Patent No. 58,150, dated September 18, 1866.

To all whom it may concern:

Be it known that I, J. W. SUMMERS, of Tarr Farm, Venango county, State of Pennsylvania, have invented a new and useful Improvement in Pumps for Deep Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an axial section of the piston of a pump, the plane of section being seen at *x*, Fig. 2. Fig. 2 is a cross-section at *y*, Fig. 1. Fig. 3 is a peripheral view of the body of a piston, which is made elastic by dividing it into spiral divisions. Fig. 4 is an axial section thereof, the cap-piece or stop *G* and the guides *I* having been applied thereto. Fig. 5 is an inverted view of the cap-piece *G* and guides *I*.

Similar letters of reference indicate like parts.

This invention consists, among other things, in suspending or attaching the piston of a pump to its rod by means of a ball-and-socket joint in contradistinction from a rigid or fixed joint, whereby the piston is allowed lateral play in the pump-cylinder, so that it can easily yield in any direction when the pump-tube or the cylinder is deflected from a right line.

It also consists in making the stop hollow and open, so that it will catch any rivets or other foreign articles or substances which may fall down the pump-tube, and prevent them from passing outside of the piston, no matter how small they may be. The said stop is also adjustable on the spindle, so that its position may be changed to regulate the amount of inlet opening into the piston.

The case or body of the piston is movable, and is placed loosely on a spindle, and has radial wings, which guide it on the spindle.

The valve is an inverted cap, independent of the movable body of the piston, and screwed on the spindle below it.

The lifting of the movable case or body causes an inlet-opening to be formed between it and the fixed valve *B*.

When the piston is inverted it will answer as a standing valve. In that case the cylin-

drical body *A* is fixed and the spindle and valve move.

This construction and arrangement prevent clogging from sand and mud, because the passages through the body of the piston are always open, the placing of the movable body or case of the piston loosely on its spindle enabling it to turn thereon and dislodge the sand or mud.

The piston herein described has no ball or other valve inclosed within it, but its valvular character is owing to the movements of its body toward and away from the lower part of the piston, which is fixed on a solid spindle which passes centrally through the entire piston, such fixed part performing the office of a valve, since it closes the inlet to the piston.

The letter *A* designates the case or body of the piston. It is a hollow cylinder, open at each end, and its sides have numerous holes, *J*, which receive the wooden pegs with which the packing (here shown in red outline) is fastened. From its inner circumference extend three or more radial wings, *I*, whose width is such as to bring their edges close to the spindle *C*, on which the said body *A* is placed; but the wings *I* do not come in close contact with the spindle, for the reason that the body *A* is to be free to rise and fall on the spindle without hinderance from friction.

On the lower part of the spindle is screwed the lower part, *B*, of the piston. It is entirely separate from the body *A*, and may be semi-spherical, as here shown, or solid, if desired. It is secured at any desired height on the spindle by a jam-nut, *H*, or other suitable device. When the body *A* is raised the interior of the piston is open to the access of oil or other liquid from the well, and when it is down, in contact with the part *B*, the piston is closed. The part *B* therefore fulfills the office of a valve to the movable case *A*.

The extent of motion allowed to the case *A* is determined by the position of the hollow cylindrical stop *G* on the spindle. This stop has a central hub, *N*, which screws upon the spindle above the piston, which hub is connected to the circumference of the stop by radial wings *O*. This stop is also held to its place on the spindle by a jam-nut, *H*.

The upper edge, *D*, of the stop along its cir-

cumference is beveled inward in order to facilitate the entrance into it of any object which may fall from the top of the well or from the pump-rod—as, for instance, a rivet from one of the joints of the rod.

The top of the spindle is fitted with a round head, F, in any convenient manner, which, with the socket-coupling E, forms a ball-and-socket joint. The pump-rod is screwed into the top of the coupling. The object of the ball-and-socket joint is to let the piston hang free from the pump-rod, so that when the piston is lowered into a well it can adjust itself to the deflections in the pump-tube as it descends, and when it has reached its place in the cylinder of the pump can adapt itself thereto and move easily therein without binding in case the cylinder is not perfectly straight with the pump-tube. Any other free joint may be substituted for the ball-and-socket joint.

When the piston is in operation in the pump-cylinder (here indicated by red lines) the stop G will strike with more or less force against the top of the movable case A, and both of them will be liable to become bruised and battered. In order to prevent such injuries I interpose a spring, L, between these parts, in this example placing a spring of spiral form around the spindle.

When any object falls into the well it will be caught by the stop G, and so prevented from getting between the piston and the cylinder, being held in the stop or in the piston, if it falls therein from the stop, so that it can be recovered by merely drawing up the piston.

It will be observed that this piston is not liable to become clogged or choked with sand or mud, its passages being plain and its rotary motion serving to dislodge any mud and also paraffine from the spindle by means of the wings I. The wings I also guide the movable part A of the spindle and hold it straight thereon.

The movable case A may be made with elastic sides by making a spiral cut, K, through it from a point near its bottom up to, or nearly to, its top. One or more such spiral cuts may be made therein. In this example I have shown several, the number being according to the degree of strength and stiffness required in the spiral divisions formed by the cuts. When the case A is made in this way I place the guides or wings I on the stop G, forming shoulders M thereon at the line where the wings I join the radial wings O of the stop.

These shoulders come in contact with the top of the movable part A of the piston.

My invention can be used also as a standing or lower pump-valve by inverting it. In that case the ball F and coupling E are removed, and the stop G may or may not be made with an outer ring, as shown in Fig. 1. One of its advantages and points of value as a standing or lower pump-valve is found in the application of the spring L, which partially closes the valve by drawing the valve B down toward the cylindrical body or case A after each lift of the piston, the only changes required in the arrangement of the parts being that the cylindrical case A is fixed in the box of the pump, while the spindle with its valve B and stop G are movable.

The stop G enables one to increase or diminish the inlet-opening of this valve by altering its position on the spindle and thereby allowing the cylindrical case A to move a longer or shorter distance.

In cases where the invention is used for a standing box-valve the principle of action of the stop is the same, although the spindle will then be movable and the cylindrical part A fixed.

In Figs. 4 and 5 the cylindrical part of the stop G is left off, but its place is shown by red outline. When its cylindrical part is left off the upper edge of the cylinder A can be beveled, so as to direct falling objects into the cylinder.

In the operation of the valve when used as a piston the liquid enters between the parts B A and passes upward through the case A to the upper part of the pump-barrel, and thence into the pump-tube.

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

1. Suspending the piston of a pump from the pump-rod by means of a ball-and-socket joint, substantially as described.
2. The cylindrical stop G, having its upper edge beveled, as shown, for the purpose of catching rivets and other objects and directing them into the piston, substantially as described.

The above specification of my invention signed by me this 22d day of December, 1865.

J. W. SUMMERS.

Witnesses:

M. M. LIVINGSTON,
C. L. TOPLIFF.