A. S. BAKER.
Pump.

No. 204,280. Patented May 28, 1878.

Fig 1.

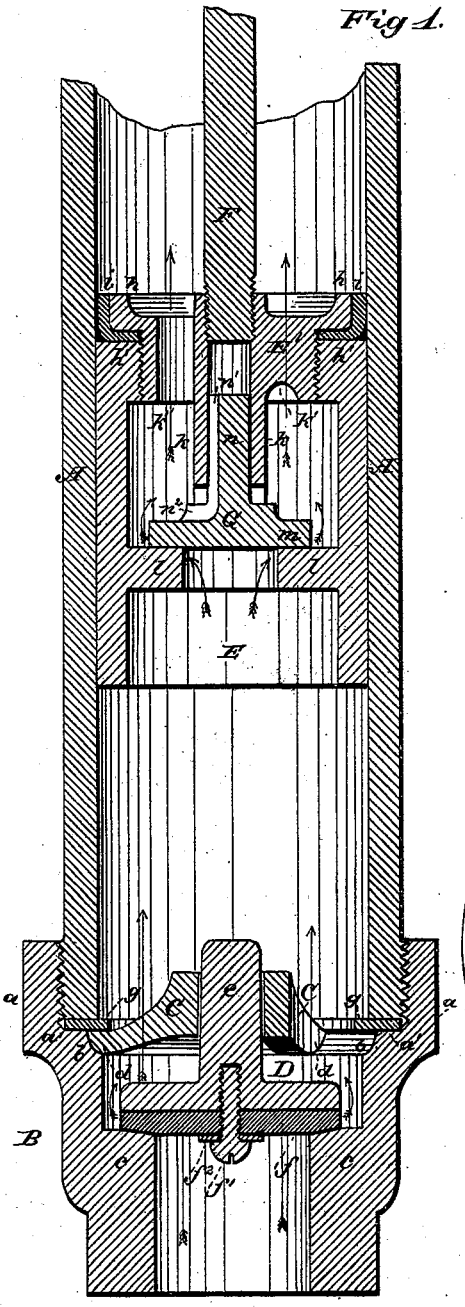


Fig. 3.

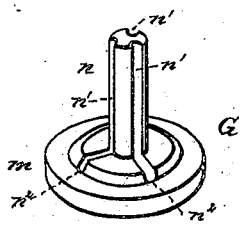
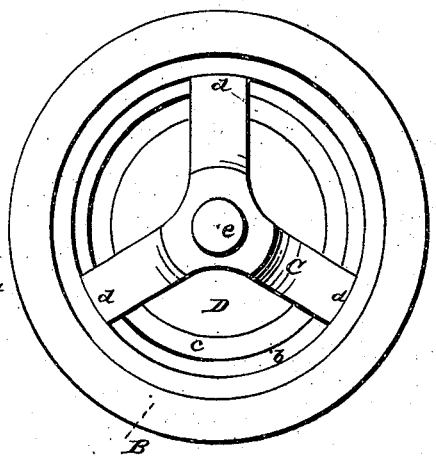


Fig. 2.



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UNITED STATES PATENT OFFICE.

ALLEN S. BAKER, OF EVANSVILLE, WISCONSIN.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. **204,280**, dated May 28, 1878; application filed February 5, 1878.

To all whom it may concern:

Be it known that I, ALLEN S. BAKER, of Evansville, in the county of Rock and State of Wisconsin, have invented a new and useful Improvement in Pumps; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Heretofore great difficulty has been experienced in the working of the pump-cylinders of iron pumps in wells troubled with loose sand, as is frequently the case in drilled wells, since the hinged leather check-valve, now generally used in the lower end of the cylinder, soon becomes stiff and hard, and does not close well on its seat, and prevents the water from passing into the cylinder on one side, where the hinge is situated, thus allowing the sand to collect under and around the hinge, and preventing the valve from closing. The hinged valves also frequently break off and have to be replaced. The plunger-valves, being constructed so as to come in close contact with the arms of the cage or plunger, are liable to catch or miss strokes by the working of any small obstructions, such as particles of sand, between the edge of the valve and the arms of the spider, all of which render the working of the pump uncertain, necessitating frequent repairs.

The object, therefore, I have in view is the production of a well-cylinder for iron pumps, more especially designed for deep wells, and such as are troubled with sand, which will have valves constructed so as to make a sufficiently large opening for the water to pass them freely with the minimum rise, thus allowing the valves to close quickly with but little jar; and also constructed so that the water will flow equally on all sides of the valves, and so that they will stand when raised entirely clear of the valve-seat, the opening below the valve, and the sides of the cage, and cannot be disarranged by sand or other small obstructions. The lower or check valve is made of cast-iron, and its leather facing is secured to the valve by a screw, which is arranged so that it requires no rubber or other packing at its head to prevent leakage around the screw.

My invention therein consists in constructing the plunger in two parts, screwed together, the upper part or yoke having a hollow hub, in combination with the plunger-valve working on a seat in the plunger below this hub, and provided with an upwardly-projecting stem sliding in the said hub; and, further, in the combination, with the yoke forming the upper part of the plunger and its hollow hub, of the peculiar plunger-valve, as fully hereinafter explained.

To enable others skilled in the art to use my invention, I proceed to describe the same, having reference to the drawings, in which—

Figure 1 is a central vertical section of the cylinder, the valves, plunger, and rod; Fig. 2, a top view of the screw-cap which fits on the lower end of the cylinder, with the packing removed, showing the lower valve and its guiding-spider; and Fig. 3, a separate perspective view of the plunger-valve.

Like letters denote corresponding parts in all the figures.

A is the shell of the cylinder, made of cast-iron, and of sufficient length to allow the plunger to work freely within it. Its upper end is provided with a cap, (not shown,) which is connected by tubing when the cylinder is in use with the pump-standard. The lower end of the cylinder is screw-threaded externally to receive the screw cap or nut B. The upper portion *a* of this cap B is enlarged, to allow it to screw over the lower end of the cylinder, forming on the inside of the cap a shoulder, *a'*, the internal screw-thread of the cap extending down to this shoulder. The interior of the cap is beveled inwardly and downwardly from the shoulder *a'* to form an inclined bearing-suface, *b*, for the ends of the spider-arms. From this bearing-surface the bore of the cap extends down to the valve-seat *c*, which is slightly beveled inwardly toward the hole through the bottom of the cap. The cap B is connected with tubing running to the bottom of the well in the usual manner, and has its lower exterior cast in a hexagonal or other angular form, whereby it can be grasped with a wrench to turn it into place on the end of the cylinder A.

C is a three-arm spider, having the ends of its arms *d* beveled and resting on the bearing-

surface *b*. Below this spider is the lower or check valve D, whose stem *e* passes upwardly through the center of the spider. This valve is made of cast metal, in the form shown, and has no stem or other projection on its lower side or face. Upon the face of the valve is placed a circular piece of leather packing, *f*, which is secured in place by a small brass screw, f^1, having a metal washer, f^2, under its head to give sufficient bearing on the packing. The hole bored for this screw f^1 does not go through the valve, as heretofore, but extends up into the center of the stem *e*, so that the valve can be made as light as desired without danger of leakage around the screw, and without the necessity of packing the head of the screw with rubber or other packing to prevent such leakage. After the spider C and valve D are placed in position in the cap B a packing-ring, *g*, is dropped onto the shoulder *a'*, and in screwing the parts together the lower end of the cylinder presses upon this packing, making a water-tight joint, and at the same time holding the spider rigidly in position, insuring the certain action of the valve.

It will be observed that this valve D works entirely clear of the sides of the cap, and allows the water to enter the cylinder equally on all sides of the valve; and the space below and on the sides of the valve being entirely clear and free, the valve can be made with the least possible amount of rise, so as to work quickly and with but little jar. The working of this valve cannot be impaired by any small obstructions which may pass through the strainer, since the spider always maintains the valve in a vertical position, and, in addition, the obstructions would pass the valve, the space below and around it being clear, as before stated.

E is the plunger, cast in cylindrical form, and fitted to the bore of the cylinder A. In the top of the plunger is screwed the brass yoke E', having a flange, *h*, between which and the upper end *h'* of the plunger the leather packing *i* is securely held. The yoke E' has a central hub, *k*, supported by arms *k'*, around which the water passes on the downstroke of the plunger, as shown by arrows in Fig. 1. Into the hub *k*, from the top, is screwed the sucker-rod F.

The interior of the plunger is cast with an annular valve-seat, *l*, directly below the brass yoke, which valve-seat is ground smooth, and may be beveled slightly inwardly. Upon this valve-seat rests the plunger-valve G. This valve is constructed of a flat circular disk, *m*, which is ground to rest closely on the seat *l*, and has a stem, *n*, rising upwardly from its center. The hub *k* of the yoke E' is extended downwardly, and is bored out to receive this stem *n*, which works therein. The valve-stem *n* is fluted, or has grooves n^1 in its sides, connecting with grooves n^2 in the raised central portion of the valve around the base of the stem, so that the water will pass freely into and out of the hub *k* around the stem, permitting such stem to work easily in the hub. This valve G has no projection or obstruction on its under side, and is supported by its stem in a vertical position free of the sides of the plunger. The water passes freely by this valve equally on all sides, and it cannot be tipped or disarranged by obstructions. By the construction of this valve G it is only required to have a small rise to allow the water to pass, and can be moved from one position to the other quickly and without appreciable jar.

As thus constructed, my deep-well cylinder is not liable to get out of order, lasts long, and is certain and efficient in its operation.

Having thus fully described my device and explained some of its advantages, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination, with the brass yoke E', screwed into the top of the plunger E, and having the central hollow hub *k*, of the plunger-valve G, having its stem *n* projecting into such hollow hub, the said valve working between the lower end of the hub and the valve-seat *l*, directly below in the plunger, constructed and arranged substantially as described and shown.

2. The combination, with the hub *k* of the brass yoke E', of the plunger-valve G, having stem *n*, provided with grooves $n^1 n^2$, constructed and arranged substantially as described and shown.

This specification signed and witnessed this 21st day of January, 1878.

ALLEN S. BAKER.

Witnesses:
J. S. McKENNEY,
J. W. PHIFER.