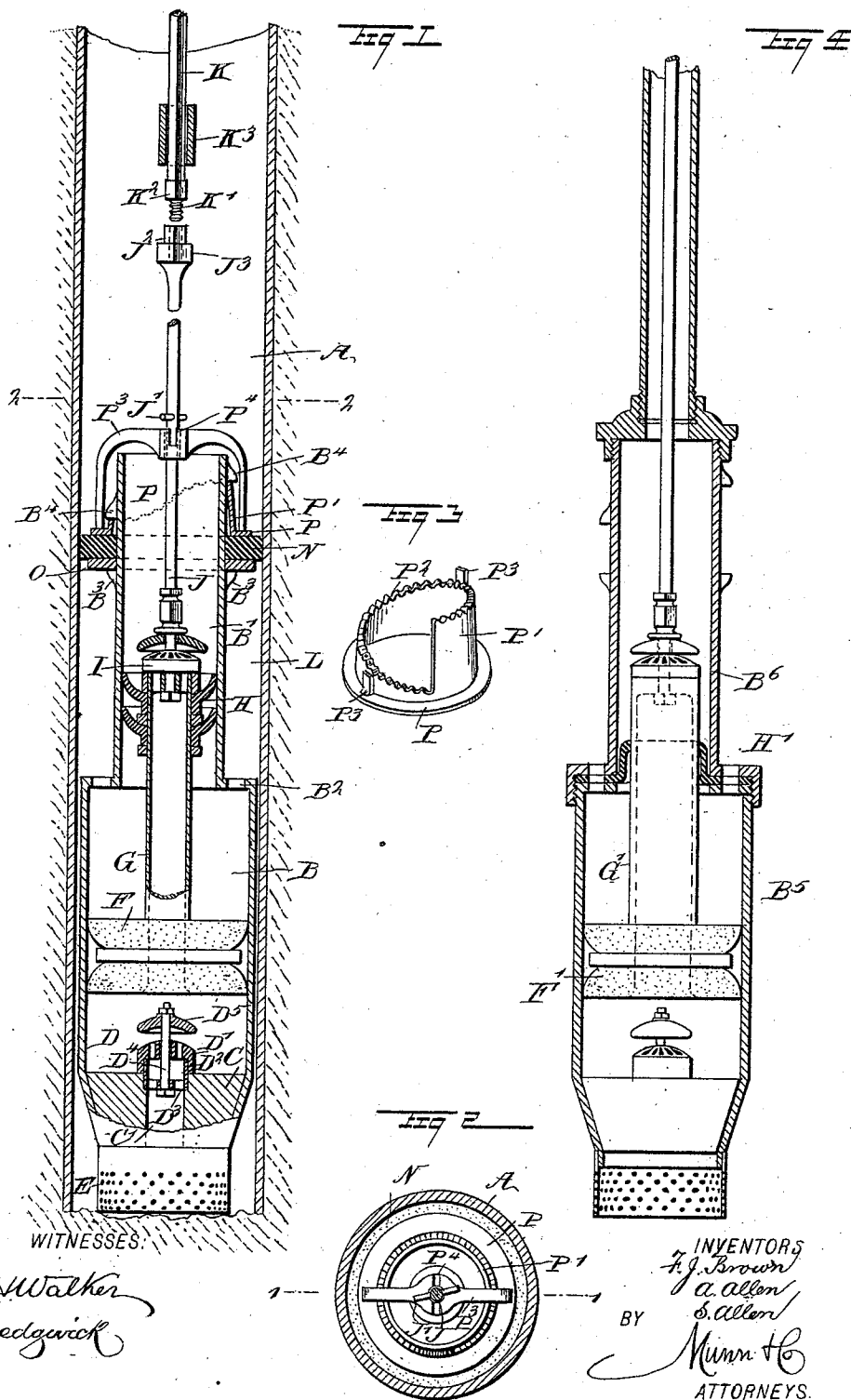


(No Model.)

F. J. BROWN & A. & S. ALLEN.
DOUBLE ACTING PUMP.

No. 530,922.

Patented Dec. 18, 1894.



UNITED STATES PATENT OFFICE.

FRANK J. BROWN, ALFRED ALLEN, AND SOLOMON ALLEN, OF HALSTEAD,
KANSAS.

DOUBLE-ACTING PUMP.

SPECIFICATION forming part of Letters Patent No. 530,922, dated December 18, 1894.

Application filed October 24, 1893. Serial No. 483,987. (No model.)

To all whom it may concern:

Be it known that we, FRANK J. BROWN, ALFRED ALLEN, and SOLOMON ALLEN, all of Halstead, in the county of Harvey and State of Kansas, have invented a new and Improved Double-Acting Pump, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved double-acting pump, which is simple and durable in construction, and very effective in operation.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a sectional plan view of the same on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of the tightening flange; and Fig. 4 is a sectional side elevation of a modified form of the improvement.

In the lower end of the tubular well casing A is held a double cylinder B, B', formed with two differential bores, of which the upper end of the cylinder B' discharges into the casing A, while in the bottom of the other cylinder B is secured a plug C formed with an inlet opening C' controlled by a suction valve D extending into the cylinder B. The lower end of the suction opening C' leads to a perforated cap E somewhat less in diameter than the casing A, as plainly illustrated in the drawings, the said cap resting on the bottom of the well, the water passing through the perforations into the cap and through the opening C' past the valve D into the lower end of the cylinder B whenever the pump is on the up-stroke.

In the cylinder B is arranged a plunger F connected by the hollow stem G with a plunger H fitted to slide in the other cylinder B', the said stem being open throughout its length from the bottom of the plunger F to the upper end of the plunger H. On the upper end of this stem G is arranged a valve I which permits the water passing up the stem to dis-

charge into the upper end of the cylinder B'. A rod J is connected with the hollow stem G and is coupled at its upper end to the lifting rod K connected with suitable machinery at the mouth of the well, so as to impart a reciprocating motion to the rod J, stem G and plungers F and H reciprocating in the cylinders B and B' respectively.

The valves D and I above mentioned are preferably of the construction shown in section in Fig. 1, the valve D being provided with a perforated valve seat D' having its upper face convex and resting with its bottom on a collar D² set on top of the plug C and secured on the valve casing D³.

On the seat D' is secured a stem D⁴ on which is fitted to slide loosely the valve D⁵ concave at its bottom so as to snugly fit over the convex top surface of the seat D'. By this arrangement, any foreign substance seated between the valve seat and valve D⁵ is dislocated at the next up-stroke of the plunger F, when water is sucked into the lower end of the cylinder B, as the said foreign substance is washed down the convex surface of the seat D' to be finally located on the plug C arranged a suitable distance below the said top surface of the seat D'. The valve I previously mentioned is of the same construction as the valve D, so that further description of the same is not deemed necessary.

In the top of the larger cylinder B are arranged a series of apertures B² opening into a space L formed between the cylinder B', the casing A, the top of cylinder B and a ring N made of rubber or other suitable compressible material. This ring N is fitted on the cylinder B' near its upper end and rests on a washer O supported on lugs B³ cast or secured on the outside of the cylinder B'.

On the top of the ring N presses a circular ring or flange P, formed with a cylinder or sleeve P' extending upwardly and having its upper edge arranged spirally and notched as at P², as plainly indicated in Fig. 3. This notched edge P² extends under lugs B⁴ formed integral with the outside of the cylinder B', so that when the flange P is turned, it will be forced downward owing to the spiral edge P² passing under the lugs B⁴. These lugs form

an abutment for the upper edge of the sleeve P'. By this means the ring N is compressed so as to firmly engage, with its outer peripheral surface, the inner face of the tubing A to form a tight joint, and to securely hold the double cylinder firmly in place in the lower end of the casing A.

In order to turn the flange P from above we provide the latter with a yoke P³ formed in its middle with a notch P⁴ adapted to be engaged by a transversely-extending pin J' held on the rod J, so that when the latter is forced downward and turned, the said pin engages the said notch P⁴ and on further turning of the rod J, the yoke P³ is turned and with it, the flange P to compress the ring N, as above described.

The coupling of the rod J and rod K is preferably arranged as follows: On the upper end of the rod J is formed a square offset J² having a threaded aperture engaged by the threaded end K' of the rod K. The head K² of the threaded end K' is made similar to the offset J² so that when the two rods are screwed together, the sides of the said head K² register with the sides of the offset J² and then a square sleeve K³ is slipped down over the said registering heads and offsets to securely lock the same in place. The lower end of the sleeve K³ rests on a shoulder J³ formed on the rod J, directly below the offset J². It will be seen that by this arrangement, the two rods J and K will be securely coupled together, and the rod K can be turned from above to turn the rod J in either direction for the purpose above described, without danger of uncoupling the two rods.

The operation is as follows: When a reciprocating motion is given to the plungers F and H, and stem G, then the plunger F on the up-stroke draws in water from the bottom of the casing past the suction valve D, as above described, to fill the lower part of the cylinder B. Water on top of the lower plunger F is forced through the openings B² into the space L so as to fill the same. Now, when the plungers move downward, the suction valve D is closed and all the water in the lower cylinder B is discharged through the stem G into the upper end of the cylinder B', and as the lower cylinder B is approximately twice the size of the upper cylinder B', one-half of the water raised into the said upper cylinder B' will be retained, while the other half flows into the casing A above the ring N. Now, when the plungers are again moved upward, the upper valve I is seated and the upper cylinder B' is emptied of its water and the lower cylinder is filled by the opening of the suction valve D and the entrance of water from the lower part of the casing A to the cylinder B.

As illustrated in Fig. 4, the upper plunger

is formed by the upper end of the stem G' carrying the lower plunger F' operating in the larger cylinder B⁵ between which and the small cylinder B⁶ is arranged a stuffing box H' made of leather or other suitable material, and taking the place of the plunger H. Otherwise the construction and operation are the same as shown in Fig. 1 and described above.

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

1. The combination, with the cylinder, the plunger, the pump rod for operating the plunger, and the compressible ring encircling the cylinder and supported thereon, of a sleeve loosely mounted on the cylinder, means for moving the sleeve longitudinally of the cylinder when it is turned thereon, to press on the said ring and expand the same, and a connection between the sleeve and the pump rod to couple them for simultaneous rotation, substantially as described.

2. In a pump, the combination, with the cylinder having two sets of lugs on its outer surface, the lugs of one set being arranged in transverse alignment with each other, and those of the second set being located out of the line of the first named set, of a compressible ring surrounding the cylinder between the two sets of lugs, and adapted to be supported on the set of transversely aligning lugs, a flange encircling the cylinder between the said sets of lugs and adapted for engagement with one side of the compressible ring to press it toward its support, and a sleeve interposed between the said flange and the said second set of lugs, and formed with an inclined edge adapted for engagement with the said set of lugs, the sleeve being loosely mounted on the cylinder, as and for the purpose set forth.

3. The combination, with the pump cylinder having projections on its outer surface, the plunger, the pump rod for operating the plunger, and the compressible ring encircling the cylinder and supported thereon, of a flange engaging the said compressible ring, a sleeve loosely mounted on the cylinder and provided with an inclined edge engaging the projections of the cylinder, said sleeve being adapted to press the said flange onto the compressible ring, a yoke connected to the sleeve to turn therewith, and provided with a notch, and a pin secured to the pump rod and adapted for engagement with the said notch to couple the yoke and the pump rod for simultaneous rotation, substantially as described.

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Witnesses:

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