

(No Model.)

R. BEAN.

PUMP.

No. 348,881.

Patented Sept. 7, 1886.

Fig. 2.

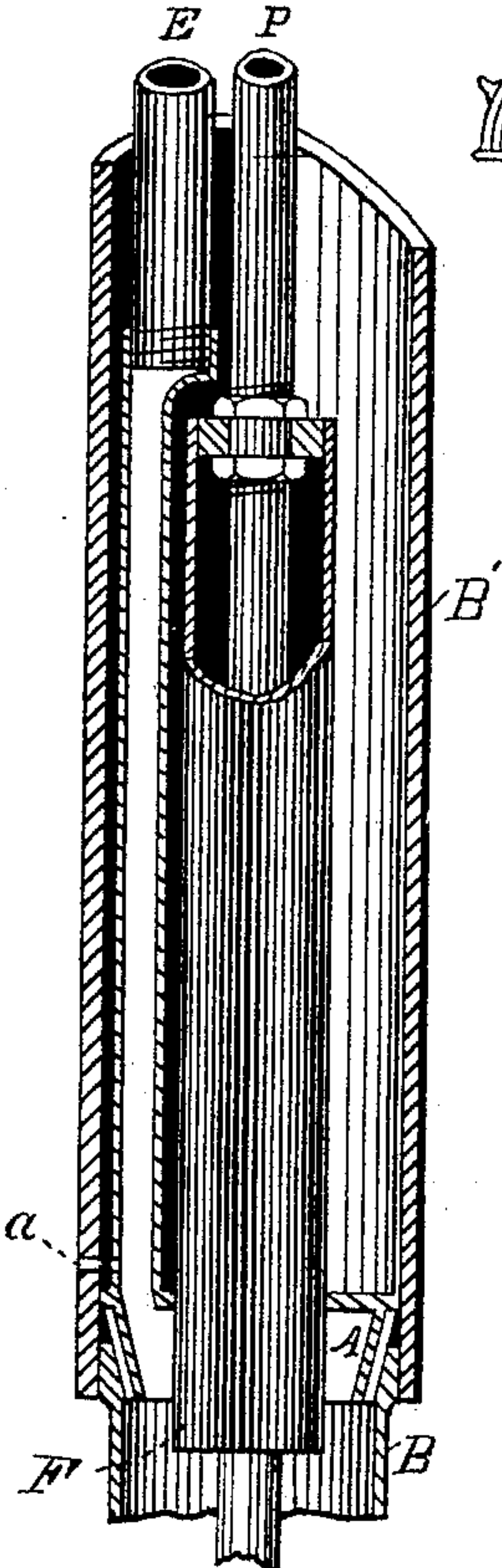


Fig. 1.

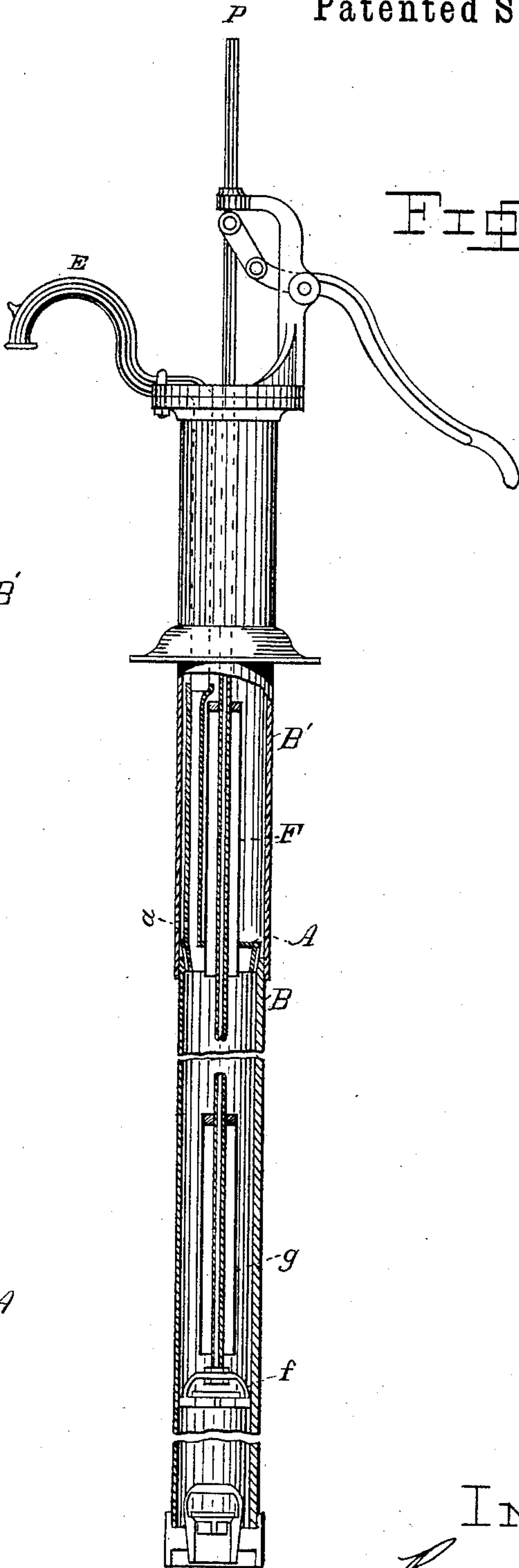
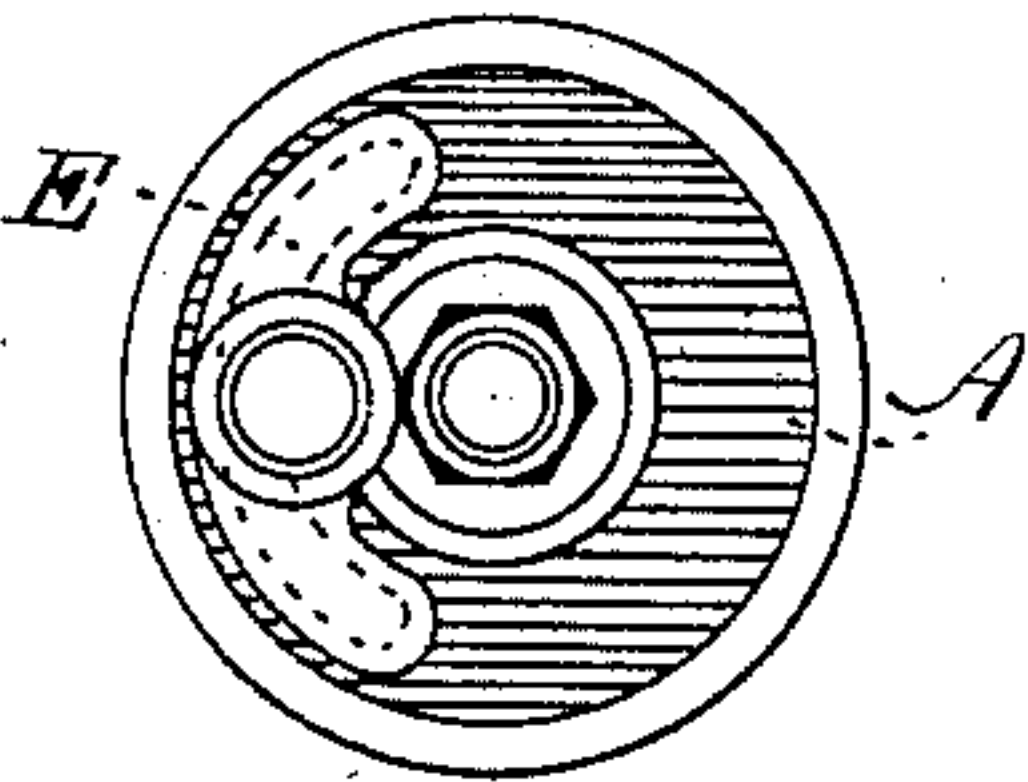


Fig. 3.



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# UNITED STATES PATENT OFFICE.

ROSCOE BEAN, OF SPRINGFIELD, OHIO.

## PUMP.

SPECIFICATION forming part of Letters Patent No. 348,881, dated September 7, 1886.

Application filed February 24, 1885. Serial No. 156,912. (No model.)

*To all whom it may concern:*

Be it known that I, ROSCOE BEAN, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have  
5 invented certain new and useful Improvements in Pumps, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has relation, mainly, to the  
10 novel construction and arrangement of the working parts of a force and lift pump for deep wells and other purposes, whereby the entire internal working mechanism may be removed for repairs without disturbing the case or  
15 pump-stock. Furthermore, it is rendered anti-freezing and dirt-proof, and by the new and novel construction the labor of raising water is materially lessened.

In the drawings, Figure 1 represents a side  
20 elevation showing a vertical section of that portion of the pump which is below the platform or well-cover. Fig. 2 is an enlarged view of a portion of the same. Fig. 3 is a plan view of the removable head and internally-located discharge-pipe.  
25

Serious difficulties have heretofore attended the use of the various kinds of pumps, inasmuch as it became necessary to remove the entire pump from the well in order to repair  
30 or replace any broken or defective part of the internal working mechanism. Another source of serious trouble was the readiness and ease with which gravel, dirt, or other obstructions could get into the pump. These, dropping  
35 down into the working parts, would seriously interfere with the working of the pumps, and in some cases render it inoperative. Still another trouble was their liability to freeze and burst. These and other difficulties—such as  
40 the irregular spurting flow of water and the rigid heavy movement of the working parts—have rendered the use, especially of deep-well pumps, very difficult, and in many cases quite unsatisfactory.

45 To overcome these various difficulties and objections has been the principal object of my invention.

By reference to the accompanying drawings, and the following description the construction and arrangement of the several parts,  
50

with the advantages claimed, will be readily understood.

Referring by letter to the accompanying drawings, A designates the removable head which is, from preference, made somewhat tapering, adapting it to fit closely in a suitable  
55 seat or bearing provided in the upper end of case B. The outer face of the removable head, being provided with leather or other suitable packing, is placed in position by lowering it  
60 from the top of the pump by means of the discharge-pipe E, with which it is connected, as shown in Figs. 1 and 2. Being forced down into place it is firmly held in position by the discharge-pipe E, which is, in  
65 turn, secured to the upper part of the pump by any suitable means, and which is of easy access. Consequently, when it is necessary to remove the working parts for repairs, it is  
70 unnecessary to either go into the well or remove the pump. I do not wish, however, to confine myself to the tapered head and bearing provided for it, as shown, as it may be made with little or no taper, and forced down  
75 the case or pump-stock and held in position without the seat or bearing described. A portion of the discharge-pipe may be semi-circular in form, as shown in Fig. 3, thus  
80 adapting it to the space it is to occupy, and at the same time affording ample passage for the water, converging to a cylindrical form suitable for the attachment of an ordinary discharge-pipe. The plunger-rod P (which may  
85 be either a solid rod or a tube) is designed to extend from the top of the pump to any desired depth, and to its lower extremity valve f is attached. The air-chamber F is connected to the plunger-rod P at a point which will cause it to move vertically through a suitable  
90 opening in the head A, in such manner as to bring its lower end even with or slightly below the head when the plunger-rod is elevated to the highest point. The opening in the head, through which the air-chamber and plunger-rod passes, is provided with a suitable  
95 packing, thus preventing the water from being forced up past the head at the side of the air-chamber. The air-chamber F is of such dimensions as to occupy but half the space  
100 that is required to hold the water lifted at each



motion of the plunger. Therefore, when the air-chamber moves upward through the head and its space is filled with half of the water lifted at that motion of the plunger the remaining half of the water must also find an outlet. Consequently it is forced through the discharge-pipe, and vice versa. When the air-chamber again descends, it displaces an equal amount, which is necessarily forced out at the discharge-pipe. The air-chamber thus performs a double function—that of dividing the stream and equalizing it; hence a steady unbroken flow of water is the result, since the upward and downward movements of the plunger-rod discharge an equal amount.

In all deep-well pumps constructed in the ordinary manner the entire column of water is lifted as so much dead weight, and as much force must be applied to move any great weight suddenly, the result is that at each reverse motion of the plunger a thud or shock is experienced, thus not only greatly increasing the labor of operating the pump, but also greatly augmenting the wear. In order to overcome this serious objection, I employ the submerged air-chamber G, (shown in Fig. 1,) which is located above and near the plunger-valve, and, like chamber F, is connected to the plunger-rod and moves up and down with it. This air-chamber may, if preferred, be of such form and dimensions as to adapt it to be located at the side of the plunger-rod and connected with and operated thereby. The elasticity of the compressed air in this chamber produces an effect similar to that of starting a heavy load by means of a strong spring, thereby overcoming the sudden jar and shock and producing an elastic easy reverse motion of the plunger-rod, greatly lessening both labor and wear, and in conjunction with or without the upper moving cylinder produces an unbroken flow of water.

It will be observed that all the working parts of the pump are below freezing-point. A small drain-cock, *a*, placed in the discharge-pipe at a point above the head, serves to free the pipe from water, and thus prevent freezing; but the first motion of the plunger will force the water out of the discharge-pipe. That portion of the case or pump-stock which is below the removable head is preferably of less diameter than the upper section, being adapted to fit inside, thus furnishing a suitable seat or bearing for the head, and of proper size to receive the plunger and valves. Under this construction it will readily be seen that in case of accident to any of the internal working parts of the pump I have only to remove that part of the pump to which the fastenings are secured, and the working parts can then be withdrawn without in any way molesting the case or pump-stock, leaving it in its fixed position. I do not limit myself to the use of a smaller tube or pump-stock below the head. A tube of uniform size may be employed, and the head secured in position, as has already

been fully explained; but from preference I use the construction as shown in the drawings. Thus it will be seen that I have a pump adapted to all purposes, the advantages of which may be summed up as follows, viz:

First. I can by the means shown and described withdraw the entire working mechanism without dismounting the pump.

Second. By the employment of the air-chamber F, in combination with the removable head, I divide the water and secure an even steady flow. The discharge-pipe may be either internally or externally located, and the removable head is adapted to be used with any ordinary plunger-rod passing through it.

Third. The advantages secured by the employment of the submerged air-chamber are of marked importance. Being located as it is in close proximity to the plunger-valve or "sucker," as it is usually called, and which is near the bottom of the well, a slight rise of the water reaches the top of the air-chamber, and instantly the desired result is attained—viz., the easy, elastic reverse motion of the plunger-rod—and, furthermore, the continuous steady flow of water, while in other pumps the water has to be raised to or near the discharge-pipe before any benefit is derived from the air-chamber, located, as it usually is, at or near the top of the pump, and in many cases no benefit is realized, except when a hose-pipe is used.

Fourth. The arrangement and construction of the working parts of the pump, being such as to preclude the possibility of dirt or gravel getting into it from above, is of obvious value.

I hereby disclaim the discharge-pipe, *per se*, when constructed with an enlarged segmental lower end, in that the same is embodied in applications filed by me March 24, 1885, Serial No. 159,976, and May 28, 1885, Serial No. 166,976, both for improvements in pumps.

Having thus fully described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. In a force or lift pump, the submerged air-chamber located within the pump-stock, and so located as to be enveloped by the water in the water-passage to the outlet.

2. In a force or lift pump, the movable submerged air-chamber connected with and operated by the plunger-rod.

3. In a force-pump, the combination, with the plunger-rod and the submerged air-chamber supported thereby, of the movable air-chamber and the removable head through which said latter chamber works.

4. In a pump, the combination, with the plunger-rod and the two air-chambers secured thereto, one of which also acts to displace water in the lower part of the stock and the other of which is located so as to be submerged or enveloped by the water in its passage to the outlet, of the removable head and the internally-located discharge-pipe secured thereto.

5. In a pump, the combination, with the

removable head having an opening therein  
and the discharge-pipe secured thereto by an  
enlarged and segmental connection partially  
encircling said opening, of the movable air-  
5 chamber adapted to work in said opening,  
the form of the connection admitting of the  
movement of the chamber.

In testimony whereof I affix my signature in  
presence of two witnesses.

ROSCOE BEAN.

Witnesses:

CHAS. L. BOGLE,  
J. L. BOGLE.