(No Model.)

D. JOHNSON.

FORCE PUMP.

No. 371,197. Patented Oct. 11, 1887.

Fig. 1.

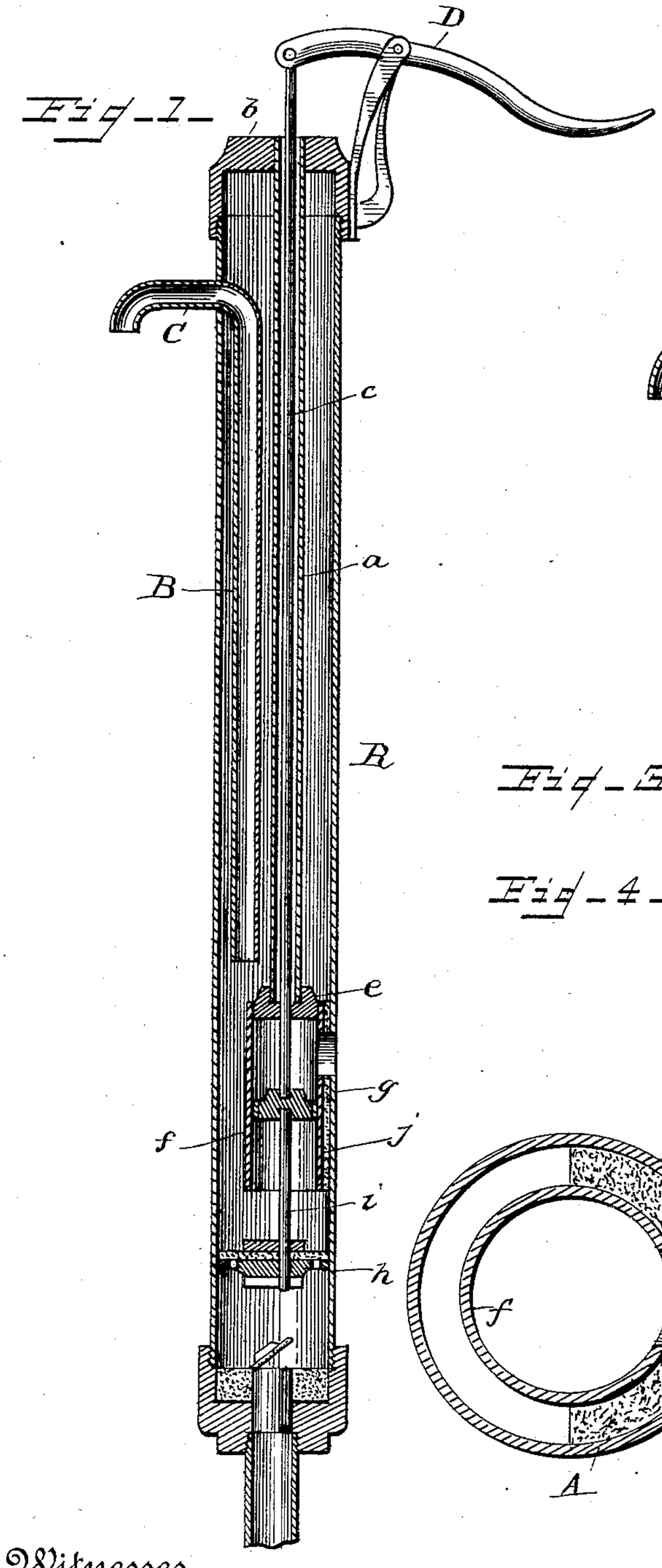

Fig. 2.

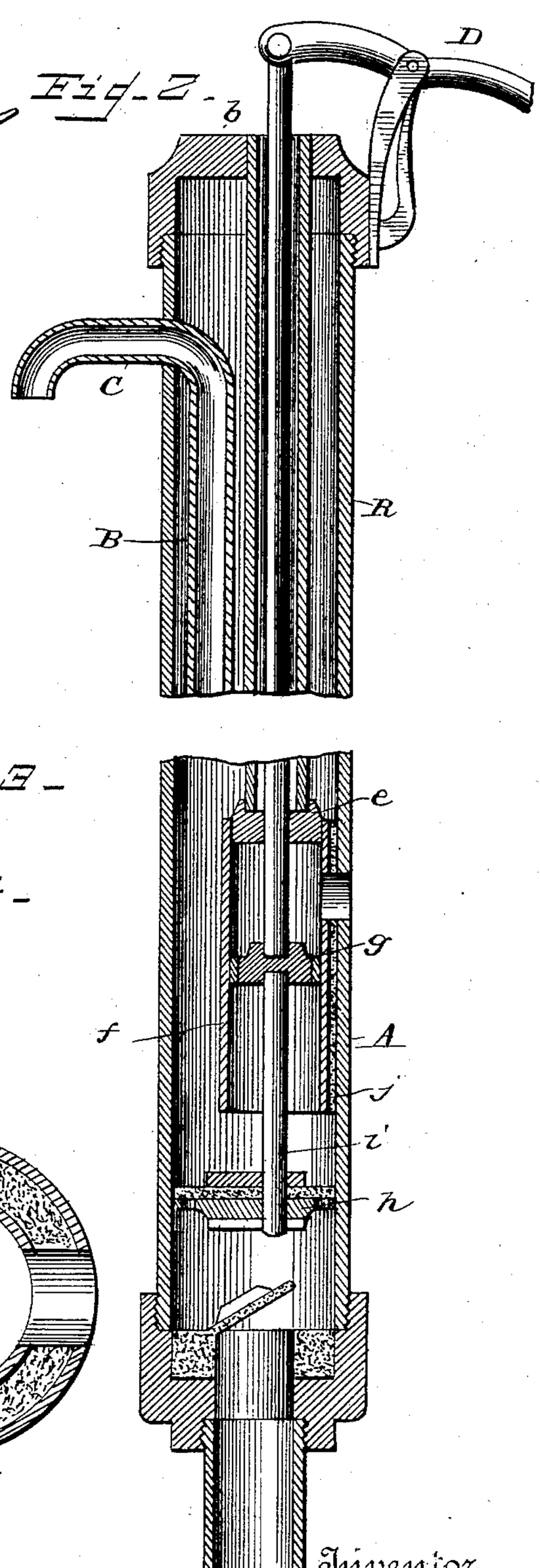

Fig. 3.

Fig. 4.

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FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 371,197, dated October 11, 1887.

Application filed December 24, 1886. Serial No. 222,463. (No model.)

To all whom it may concern:

Be it known that I, DANIEL JOHNSON, a citizen of the United States, residing at Ashland, in the county of Ashland and State of Ohio, have invented certain new and useful Improvements in Force-Pumps; and I 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 and figures of reference marked thereon, which form a part of this specification.

My invention relates to force-pumps, and more particularly to that class of pumps designed for drilled wells, although its use and application are unlimited.

The main objects of the said invention are to present a complete pump of compact and even appearance, to dispense with the use of an upper submerged cylinder for the purpose specified, to increase or extend the capacity of the air-chamber, and to obviate all offsets or like obstructions to the direct discharge of the water and to the free insertion of the pump in a drilled well.

A further feature of the invention consists in the employment of an extended discharge-pipe which is protected within the main barrel or stock and extends down therein to such a depth as to require a small volume of water compared with those pumps wherein the discharge-pipe extends directly from the upper portion of the main barrel or stock.

Another feature connected with the said invention consists in having the cylinder forming the upper portion of the forcing-chamber tapped or provided with an opening which communicates directly through the main barrel or stock for the discharge of waste water without the use of an air-tight tube, as was required in a submerged cylinder.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical central section of a force-pump provided with my improvements. Fig. 2 is a like view showing in detail the upper portion of said force-pump. Fig. 3 is a like view showing the lower portion of the same, and Fig. 4 is a detail section. By reference to Figs. 2 and 3 it will be noted that the parts are illustrated on a larger scale than what they are shown in Fig. 1.

A refers to the main barrel or stock, which may be of any desired size, and within which is located a small central tube, *a*, suspended by its upper end engaging the cap *b*, threaded to engage the upper end of the barrel A. The internal diameter of the pipe *a* is sufficiently large to permit the free play of the piston-rod *c* therein. The lower end of the tube *a* is closed by a cap or head, *e*, which engages the lower end of said tube *a*, and which is connected to a cylinder, *f*. The piston-rod *c* plays through the cap *e*, and serves to operate a piston, *g*, within said cylinder *f*.

A valved piston, *h*, is located in the main pipe or barrel A below the cylinder *f*, and is designed to be operated simultaneously with the piston *g* by means of a piston-rod, *i*, which connects said pistons *g* and *h* together.

By reference to the drawings it will be seen that the cylinder *f* bears against a packing, *j*, which is interposed between said cylinder *f* and the barrel A, the said cylinder *f* being tapped at one side to provide a communication through the packing *j* and the cylinder A. It will be readily seen that the main pipe or barrel may have the inner cylinder, *f*, cast solid therewith, as seen in the detail plan view, Fig. 4.

The advantages resulting from having the inner cylinder bear directly against the packing and main pipe or barrel, or by being cast solid therewith, insures, first, a firm and solid bearing for said inner cylinder to hold it rigidly; second, it affords a ready means for tapping the inner cylinder to draw off the waste water through the main pipe or barrel that may leak from around the upper piston, and which might otherwise pass up around the piston-rod and overflow from the top of the pump, and, third, causes the main volume of water to pass direct to the discharge-pipe at one side of said inner cylinder to give it a straight course to the spout.

B refers to the discharge-pipe, which is formed at its upper end to present the discharge-spout C, extending through and projecting from the barrel A, while the major portion of the said pipe B is located within the barrel and extends down vertically to a point adjacent to

the cylinder *f*. The piston-rod *c* is operated by means of a suitable handle, D, mounted on the upper end of the barrel or stock A.

In operation the reciprocation of the piston causes the conjoint action of the pistons *g* and *h* to force water upward at each stroke. The water passing up a passage on the side of the cylinder *f* compresses the air in the barrel A above the cylinder *f*, thereby tending to cause an even discharge of water through the pipe B. It will be apparent that the extended air-chamber formed by the barrel A insures a more extended and regular pressure effect than in pumps having small or short air-chambers.

By extending the discharge-pipe above and below the platform-line of the pump less water is required to be lifted by the piston to fill said discharge-pipe than heretofore.

By providing the cylinder *f* with a communication through the side of the barrel or stock the accumulation of waste water from around the upper piston is prevented, as it is effectively discharged through said opening.

Another advantage resulting from having the discharge-pipe extend down to an unusual depth is the fact that the water can ordinarily occupy a level below freezing-point, and in such case it will only be necessary to effect a few strokes of the piston to raise the water to and fill the discharge-pipe, whereas in the common forms of pumps, where the end of the discharge-pipe is located so high, when the water is below freezing-line, it is necessary to pump up a large quantity before it reaches the discharge-pipe.

By having the discharge-pipe extend down within the cylinder or stock the stock and discharge-pipe may extend down any desired distance within a drilled or bored well, whereas in pumps having the discharge-pipe located on the outside the said discharge-pipe can only extend down to the offset.

From the foregoing it will be obvious that a pump constructed in accordance with my invention is of compact and even appearance, and of such convenient diameter as to adapt it for wells of small bore. It will be further seen that inasmuch as the lifting and forcing action of the pistons insures the direct passage of water up through the discharge-pipe the retarding action of offsets and bends, so objectionable in other constructions of pumps, is not experienced in my improved construction.

It will be understood that by arranging the cylinder *f* so that its upper end is within the main stock, or barrel and having only a lateral opening in its side extending laterally through said stock, no dirt or gravel can drop or work down into the cylinder to cause the wear or injury of the piston therein.

It has been an object for years to so construct pumps of the type to which my invention relates by securing the nearest approach to a complete and compact incasement of all the parts within the pump-stock. My invention attains the object stated and furnishes a pump of compact and even appearance and construction, and in which all the parts below the spout are located and protected within the main stock or barrel.

My improved pump, therefore, is of simple and durable construction, effective in operation, and can be readily produced at as low a grade of cost as any of the similar well-known forms of pumps.

It will be seen that the cylinder *f* is so located within the stock as to be inclosed and protected therein. This is an important feature, for it has heretofore been attempted to use a cylinder having its upper end open; but in such case the dirt or gravel would drop into the same and damage and wear the upper piston therein.

I claim—

1. In a pump having all its parts below the spout arranged within the main stock, the combination, with said stock, of a cylinder, *f*, located therein, for containing the upper forcing-piston, a tube in said stock having an air-tight joint at its upper end and connected to the cylinder *f* at its lower end, a piston-rod working within said tube, upper and lower forcing-pistons, and a discharge-pipe having a spout extending through an air-tight joint in the stock, said discharge-pipe extending down adjacent to the forcing-pistons and below the freezing-line of the pump, the arrangement being such that the main barrel or stock in itself forms an extended air-chamber and envelops the discharge-pipe with a protecting body of air, substantially as described, and for the purpose set forth.

2. In a force-pump, the combination, with the main stock or barrel, of a cylinder secured rigidly in said stock or barrel and having its upper end as well as its body entirely inclosed within the main stock, a lateral outlet for said cylinder through the main stock or barrel, a piston working within said main stock and in said cylinder, and piston for the same, and a discharge-pipe extending down within said stock adjacent to said cylinder below the freezing-line of the pump, substantially as set forth.

3. The combination, in a force-pump, of a main pipe or barrel having a discharge-pipe, piston-rod, and piston therefor, of an inner cylinder secured to the main pipe or barrel and having a discharge-outlet therethrough, and a suitable packing interposed between said main pipe and inner cylinder, substantially as set forth.

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

DANIEL JOHNSON.

Witnesses:

PHILIP MAURO,

A. M. PAXTON.