

E. GERSTENBERG.

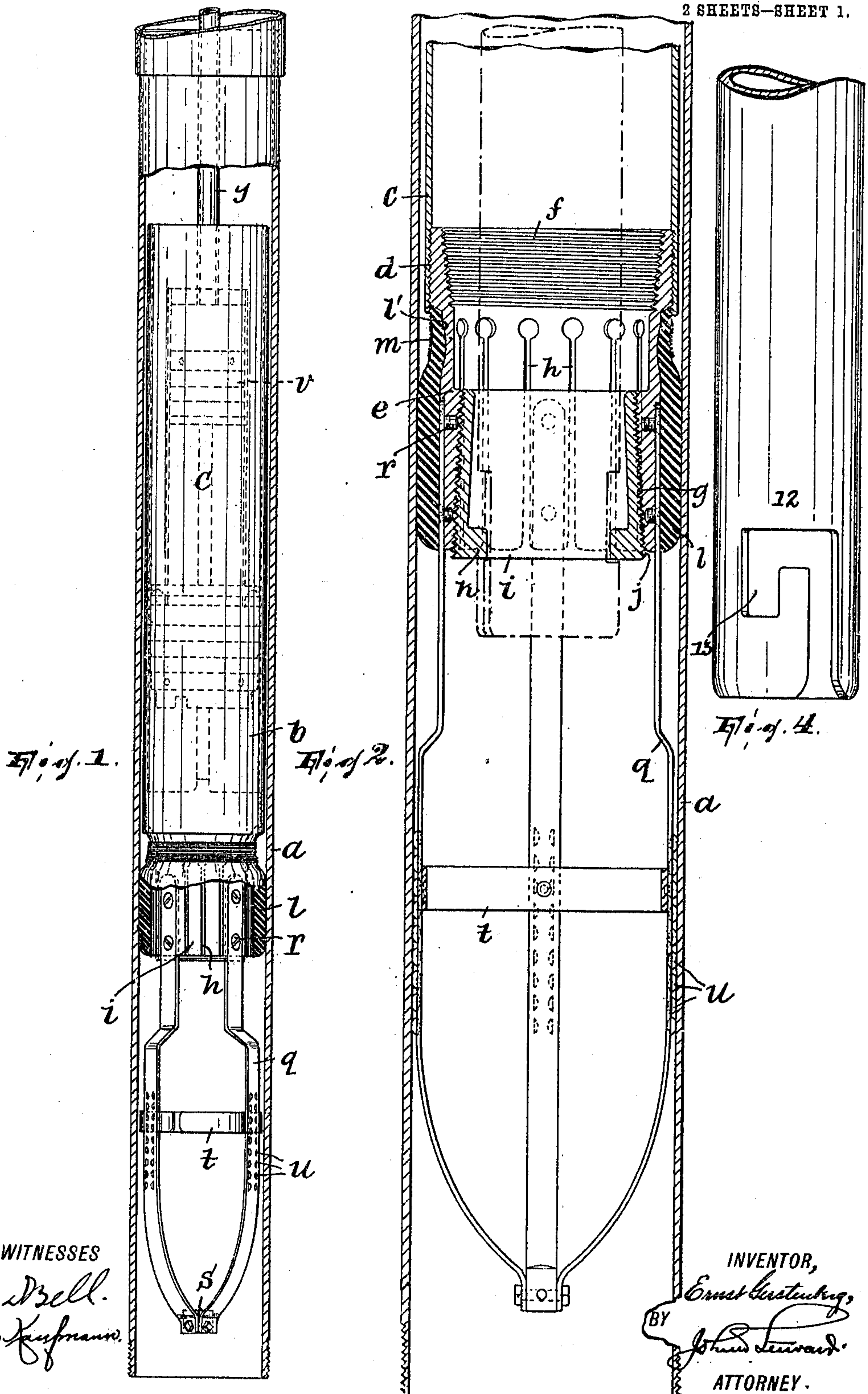
PUMP.

APPLICATION FILED DEC. 10, 1908.

955,960.

Patented Apr. 26, 1910.

2 SHEETS—SHEET 1.



WITNESSES
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2 SHEETS—SHEET 2.

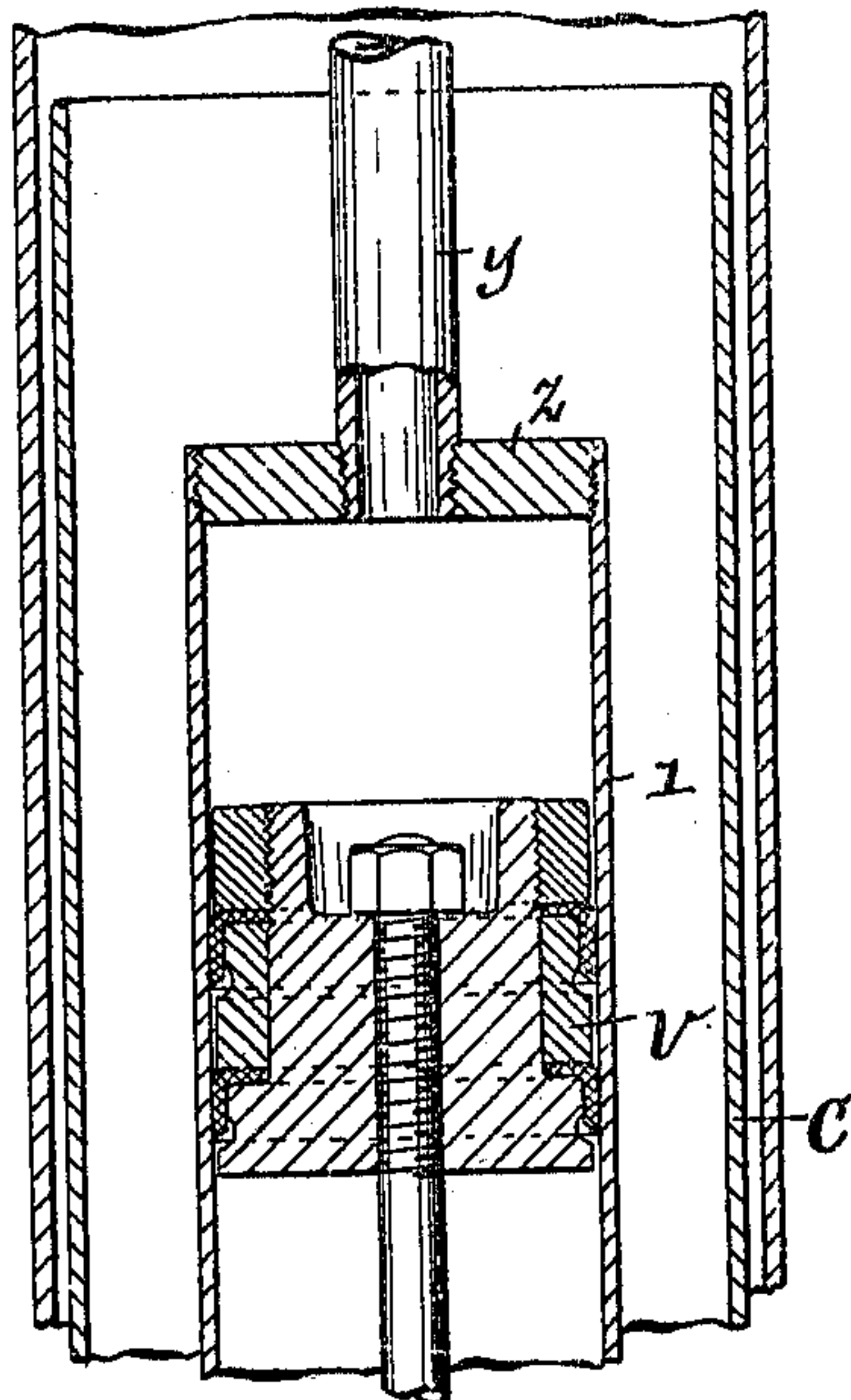
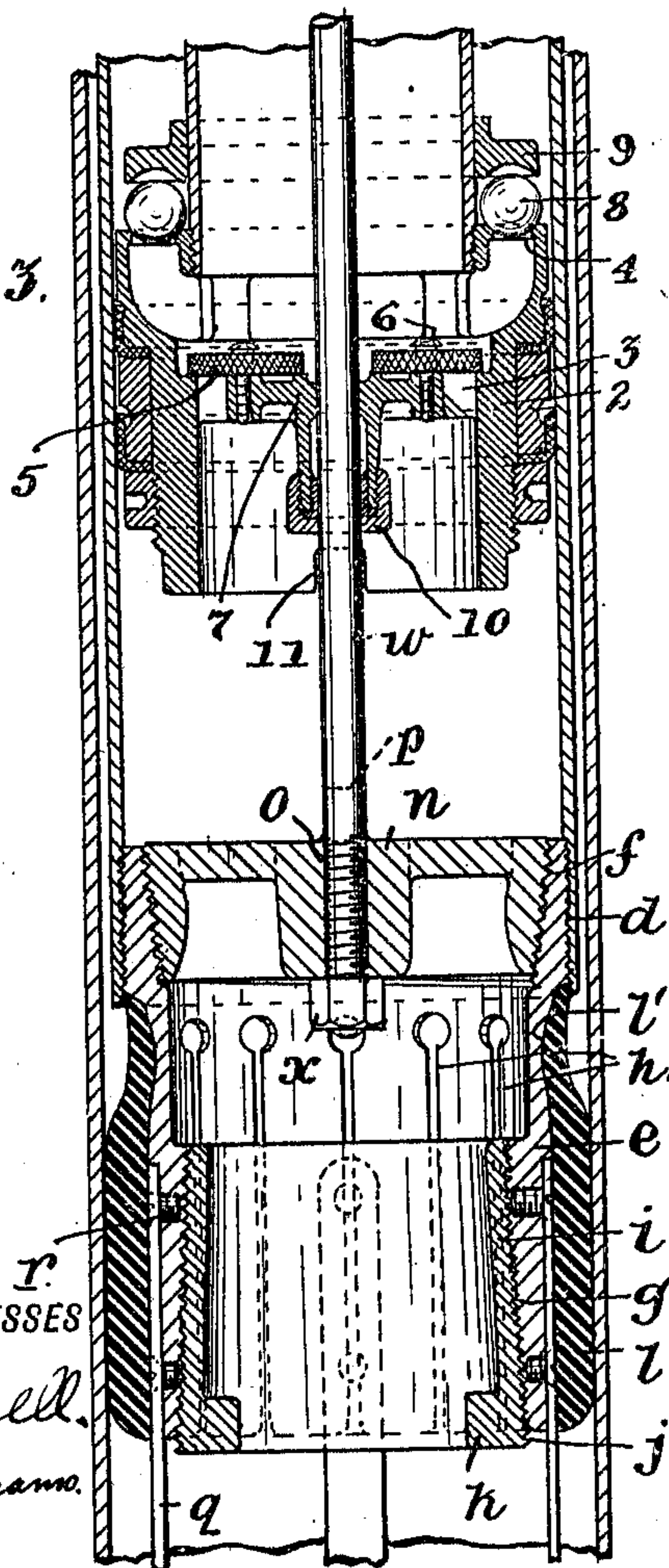


Fig. 3.



WITNESSES

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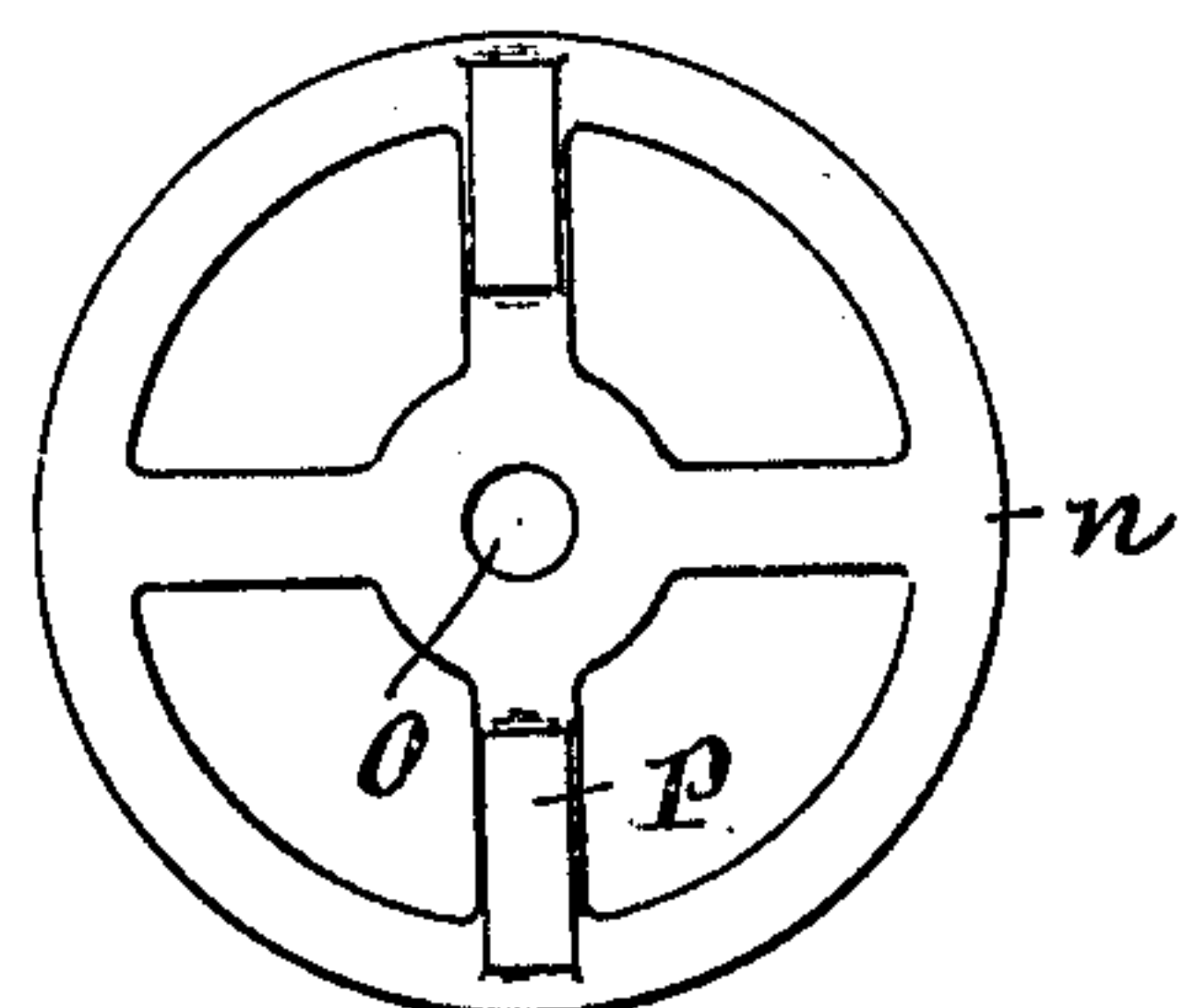
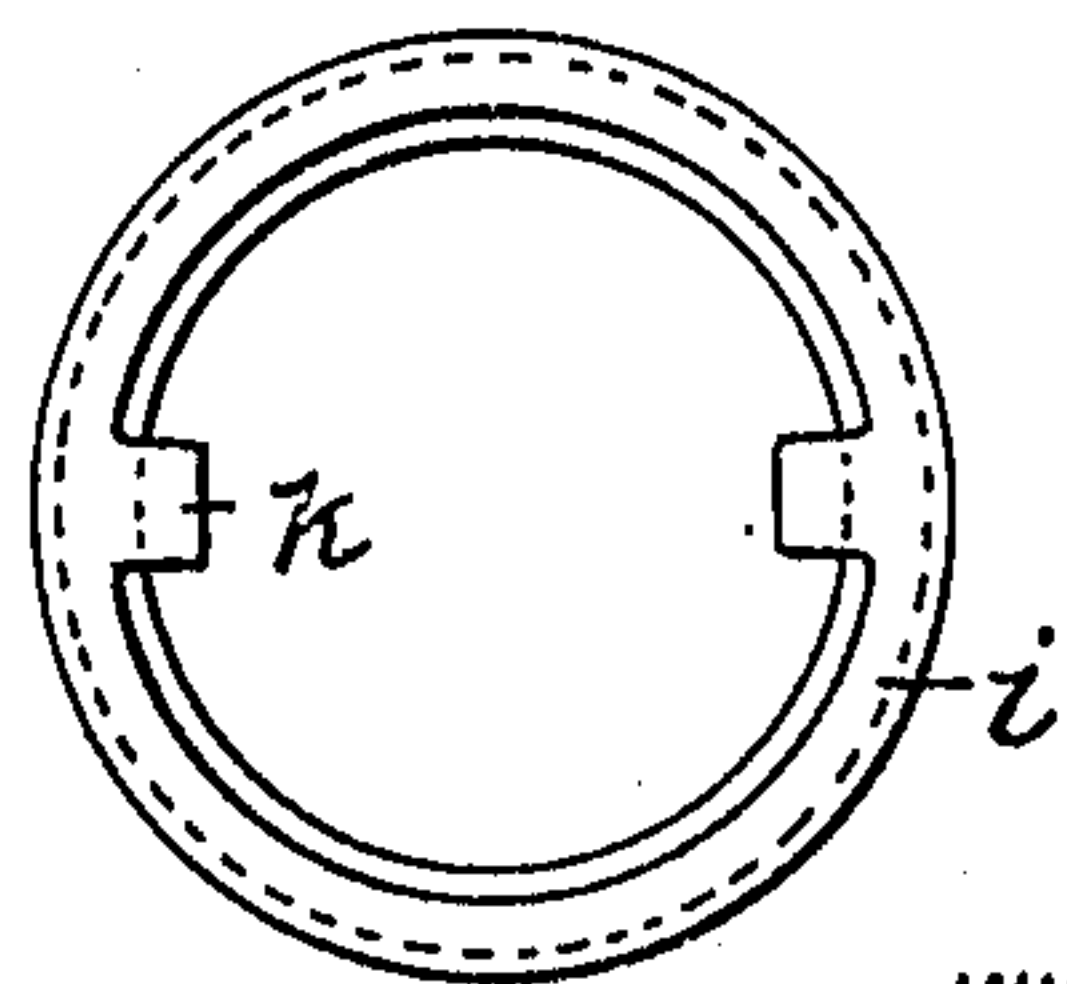


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PUMP.

955,960.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed December 10, 1908. Serial No. 466,844.

To all whom it may concern:

Be it known that I, ERNST GERSTENBERG, a citizen of the United States, residing in Washington, District of Columbia, have invented a certain new and useful Improvement in Pumps; and I do hereby 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 characters of reference marked thereon, which form a part of this specification.

This invention relates to pumps and it consists in certain improvements in pumps, of the nature of that patented to Philip H. Deis, under U. S. Letters Patent No. 840,919, dated January 8, 1907.

The principal object of the invention is so to construct the pump that, firstly, when used in a well of the driven type, the part corresponding to part *b* ("well-pipe") in said patent need only be sufficiently long so as properly to guide the lifting means, the water, once it clears said part, being in such case conducted upwardly by the well-casing, as is the usual custom; and that, secondly, the assembling and disassembling of the pump parts in operative condition may be effected with facility and expedition, regardless of the depth which the working part of the pump is required to assume.

Although I have devised the present invention with particular reference to a water-drawing medium of the kind particularly indicated above, it will be understood that I am not correspondingly limited, as several of the novel features of my invention are applicable in other adaptations.

Referring to the accompanying drawing, Figure 1 is a view showing the improved pump, a part of the well casing and a part of the tubular member in which the plunger works being in section; Figs. 2 and 3 are vertical sectional views, on a larger scale, the first showing the upper portion and the second the lower portion of the principal mechanism of the pump, Fig. 3 showing also in dot-and-dash outline a certain key employed in assembling and disassembling the parts; Fig. 4 illustrates the key; and, Figs. 5 and 6 are a top and an underneath

plan view of the anchor plug for the piston and the expander for the tubular member 55 above-mentioned.

In said drawings, *a* designates the tubular well casing.

b is the tubular member above referred to which is formed relatively short, has a part 60 thereof adapted to be expanded to seal off communication as between said member and the well casing, is the part in which the plunger works, and affords an anchorage for the pump piston. This tubular member is 65 constructed substantially as follows: Referring to Fig. 2 *c* is a sleeve having a length approximating that of the throw of the plunger. It is threaded interiorly, at *d*, at its lower end. Into it is screwed a cylindrical extension *e* having conical or tapering interior threading *f* in its upper end and conical or tapering interior threading *g* in its lower end. This extension is split 70 from its lower end upwardly a suitable distance, as indicated at *h*, so that its lower portion is expansible, and in its lower portion it receives a conical expander *i* having threading *j* engaging the threading *g*; this expander also has internal lugs *k* which receive a suitable key (to be described) for 80 turning the expander.

The extension is surrounded by a packing *l*, preferably of rubber, in its split portion, and if necessary, this may be secured on the 85 extension by having its upper portion, which is received by an annular channel *l'* in the extension, wrapped with wire *m* (Fig. 2). Into the upper end of the extension is screwed a conical plug *n*, in the form of a 90 spider, the same having a threaded hole *o* tapped centrally therein and lugs *p* whereby to turn it by means of the pump plunger, as hereinafter explained. The plug is conical so that it may the more readily be entered 95 and then screwed into the upper threaded end of the extension. Spring blades *q* attached by screws *r* to the lower end of the extension *e*, depend from said extension and converge at their lower ends, where they are 100 suitably secured to a block *s*; these blades are normally held expanded to a diameter greater than the interior diameter of the well casing by a split ring *t*, and they have vertically disposed projecting teeth *u* which, 105 when member *b* is driven into the well cas-

ing, grip the latter and hold the member *b* against turning.

v designates the pump piston and *w* is its stem, the same having its lower end threaded and screwed into the tapped hole *o* of the anchor plug *n*, a nut *x* being screwed onto downwardly protruding end of the stem and bearing against the under side of the nut to reinforce the threaded connection between parts *w* and *n*.

The plunger of the pump is preferably constructed as follows: *y* is a plunger rod made tubular for the purpose clearly indicated in the Deis patent referred to. It is screwed into a plug *z* in turn screwed into the upper end of a cylinder 1 which at its lower end is screwed into the upper end of the hollow plunger head 2 which is provided with ports 3 allowing the liquid admission to the plunger from below and with ports 4 allowing liquid discharge from the plunger upwardly; the ports 3 are preferably controlled by disk valves 5 arranged on headed stems 6 screwed into the spider portion 7 of the head 2, and allowing slight vertical movement of the valves, while the ports 4 are controlled by ball valves 8 having limited upward movement by virtue of a ring 9 shrunk onto or otherwise secured to the cylinder 1. The spider 7 is penetrated by stem *w* and may have a gland 10 to seal off liquid passage between the stem and the spider. Recesses 11 are formed in the plunger head 2 to receive the lugs *p* of plug *n* in assembling the pump.

In assembling the improved pump, the member *b*, with the expander only partly introduced thereinto, is forced down into the well casing *a* by means of the key 12 shown in Fig. 4, which may be a pipe having an angular slot 13 of the form shown in said figure cut therein. As member *b* is forced down into the casing, the blades *q* grip the same by means of their teeth *u*. The key, now receiving the lugs *k* of the expander in its slots 13, is made to turn the expander until the extension *e* expands sufficiently to compress the packing *l* tightly between said extension and the well casing, the extension being at this time held against turning by the blades *q*. The assembled plunger and piston, with the plug *n* attached to the latter, are now introduced into the well casing, being finally received by the sleeve *c* of member *b*, the plug entering the upper end of extension *e*; the plug having several of the threads thereof at its entering end of less diameter than the corresponding threads at the mouth of the threaded interior *f* of the extension *e*, the plug may be entered into said extension and its threading caused to engage the threading *f* without difficulty. The piston coming to rest at this time, the plunger is depressed relatively thereto and then turned

until the lugs *p* enter the recesses 11, whereby the plunger is further turned to cause the plug to be screwed into the upper end of the extension *e* and thus secure the necessary anchorage therein.

The pump is now ready for operation, which may be briefly explained as follows: On the up stroke of the plunger the water which has found its way into the space thereof between the piston and valves 5 is forced out of the plunger past valves 8. On the next down stroke, the return of this water is prevented by valves 8, and the consequent tendency toward reduction of pressure within the plunger results in water entering through the lower part of member *b* past valves 5 into the plunger. And so on.

It will be observed that by the improved construction a pump is provided which can be assembled and disassembled at any depth, while offering means serving as a positive anchorage for the piston as well as to seal off water which, having once been elevated above sleeve *c*, might otherwise find its way back to the well water.

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

1. The combination of a tubular conducting member for the liquid to be elevated, another and shorter tubular member secured therein, an anchor plug screwed into the second member, a stem attached to the plug, a valved tubular plunger, and a piston in the plunger carried by the stem, said plunger confining the piston against withdrawal therefrom and said anchor plug and the plunger having the one a projection and the other a recess adapted to receive the projection, whereby to turn the anchor plug in the second member by means of the plunger, substantially as described.

2. The combination of a tubular member, a tubular part inclosed in said member and having an expansible end-portion, a packing surrounding said part, an expander in said end-portion of said part, and an elastic gripping member depending from the tubular part, said gripping member having a normal diameter greater than the interior diameter of the tubular member and comprising blades and a split elastic annular part exerting an expanding influence on said blades, substantially as described.

3. The combination of a tubular conducting member for the liquid to be elevated, another and relatively shorter tubular member secured in the first member and having an upwardly opening hollow threaded portion, an exteriorly threaded conical anchor plug screwed into the hollow portion of the second member and having several of its threads at its entering or smaller end of less diameter than the corresponding threads at the

mouth of the hollow portion of the second member, a stem attached to the plug and extending upwardly, a piston connected with the stem, and a tubular plunger receiving
5 the piston and having two sets of relatively upwardly opening valved ports, substantially as described.

In testimony, that I claim the foregoing, I have hereunto set my hand this fifth day of December, 1908.

ERNST GERSTENBERG.

Witnesses:

BENJAMIN S. MINOR,
HUGH B. ROWLAND.