

(No Model.)

2 Sheets—Sheet 1.

A. ANNIBALE.

FORCE PUMP.

No. 272,616.

Patented Feb. 20, 1883.

Fig. 1.

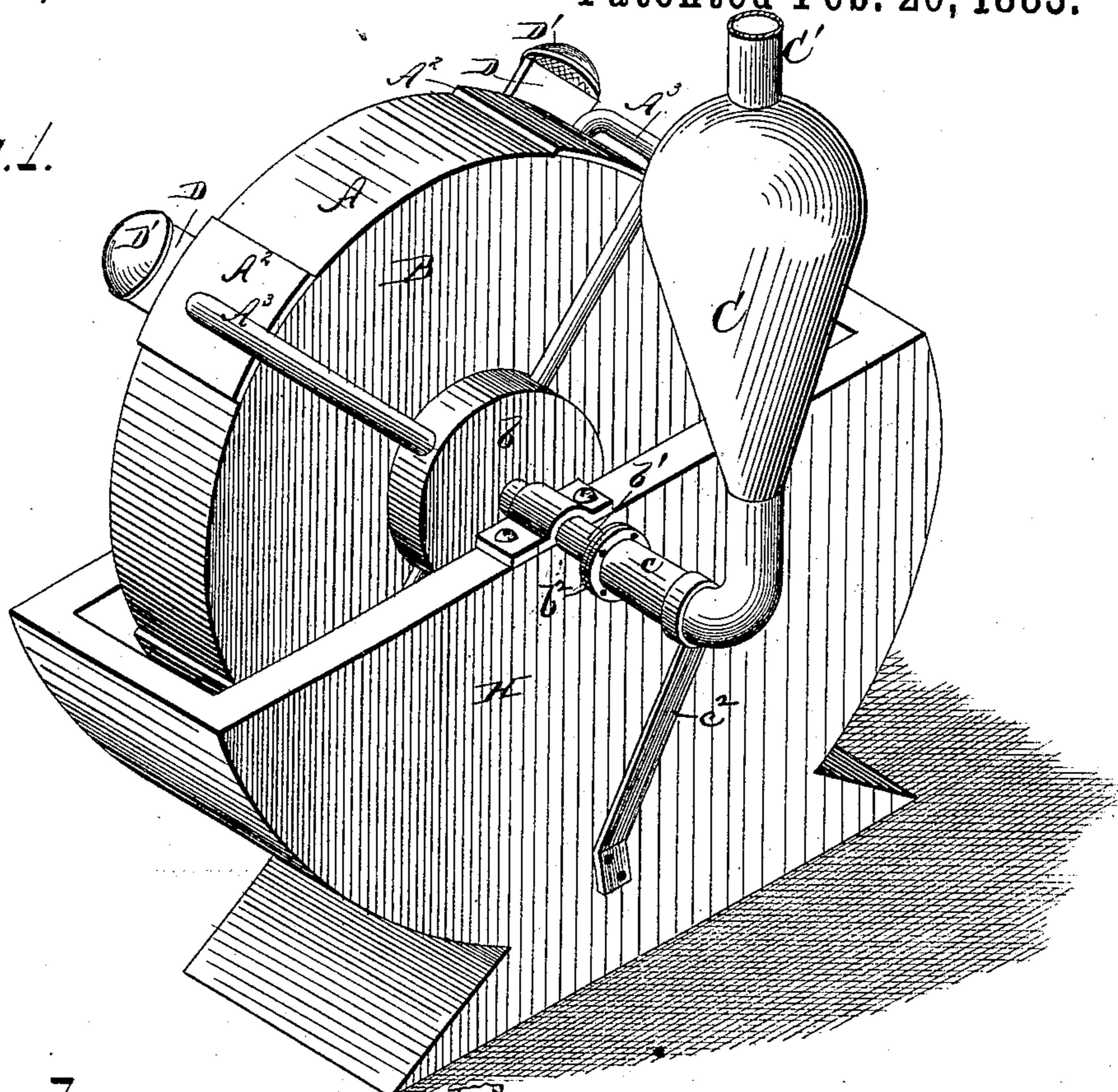
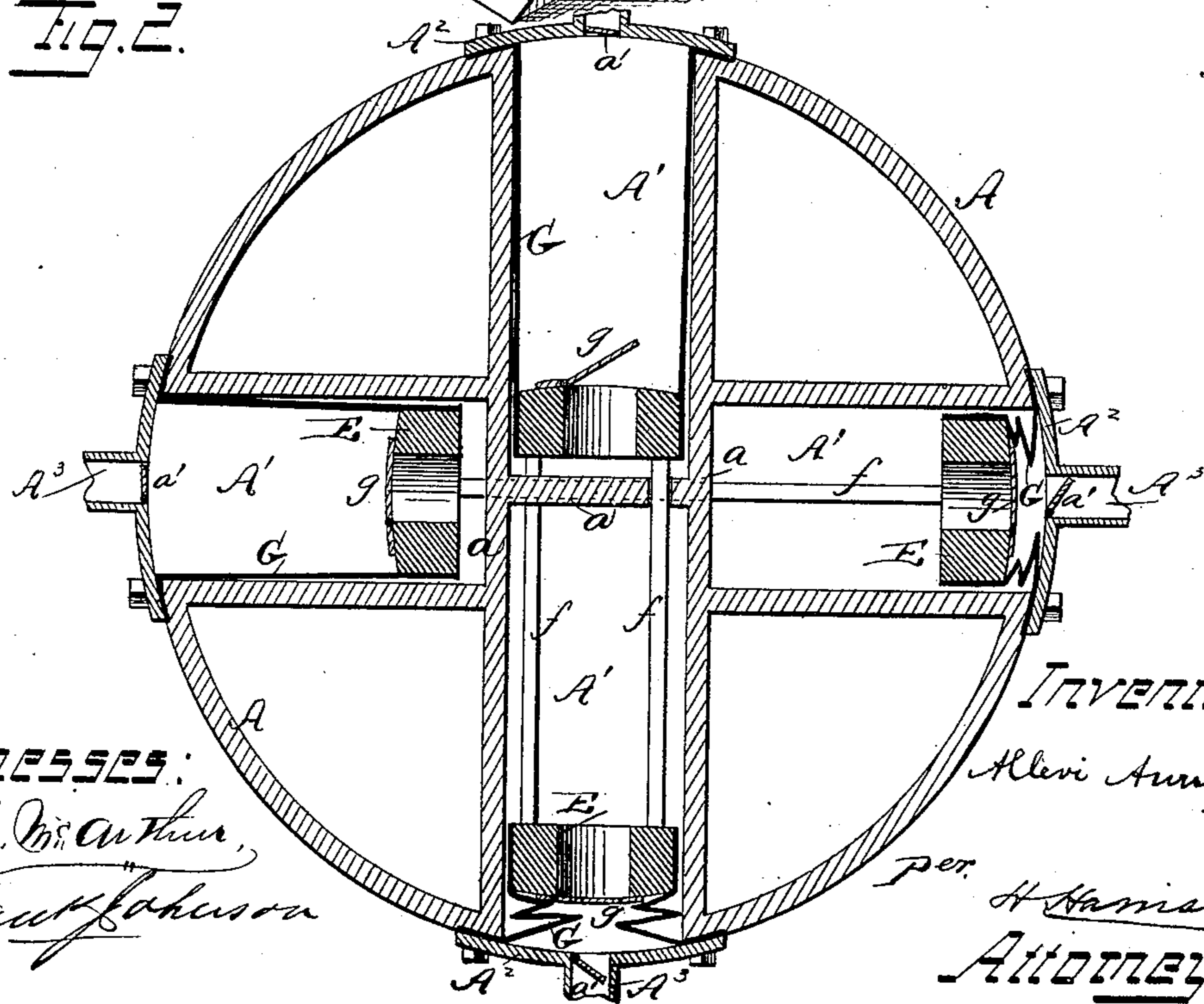


Fig. 2.



Witnesses:

H. C. Arthur,  
Frank Johnson

Inventor.

Alevis Annibale

per. H. Harrison  
Attorney.

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FIG. 3.

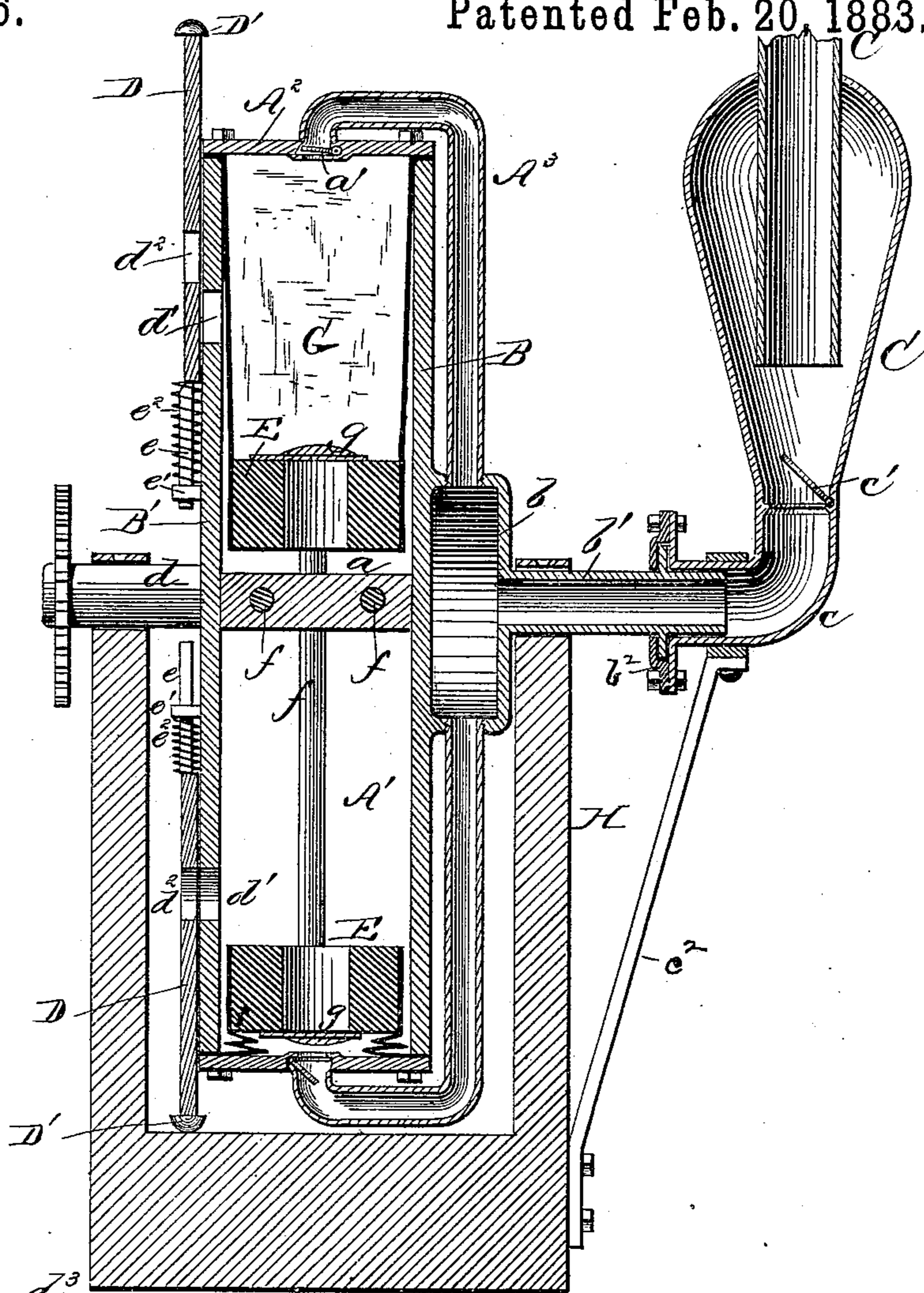
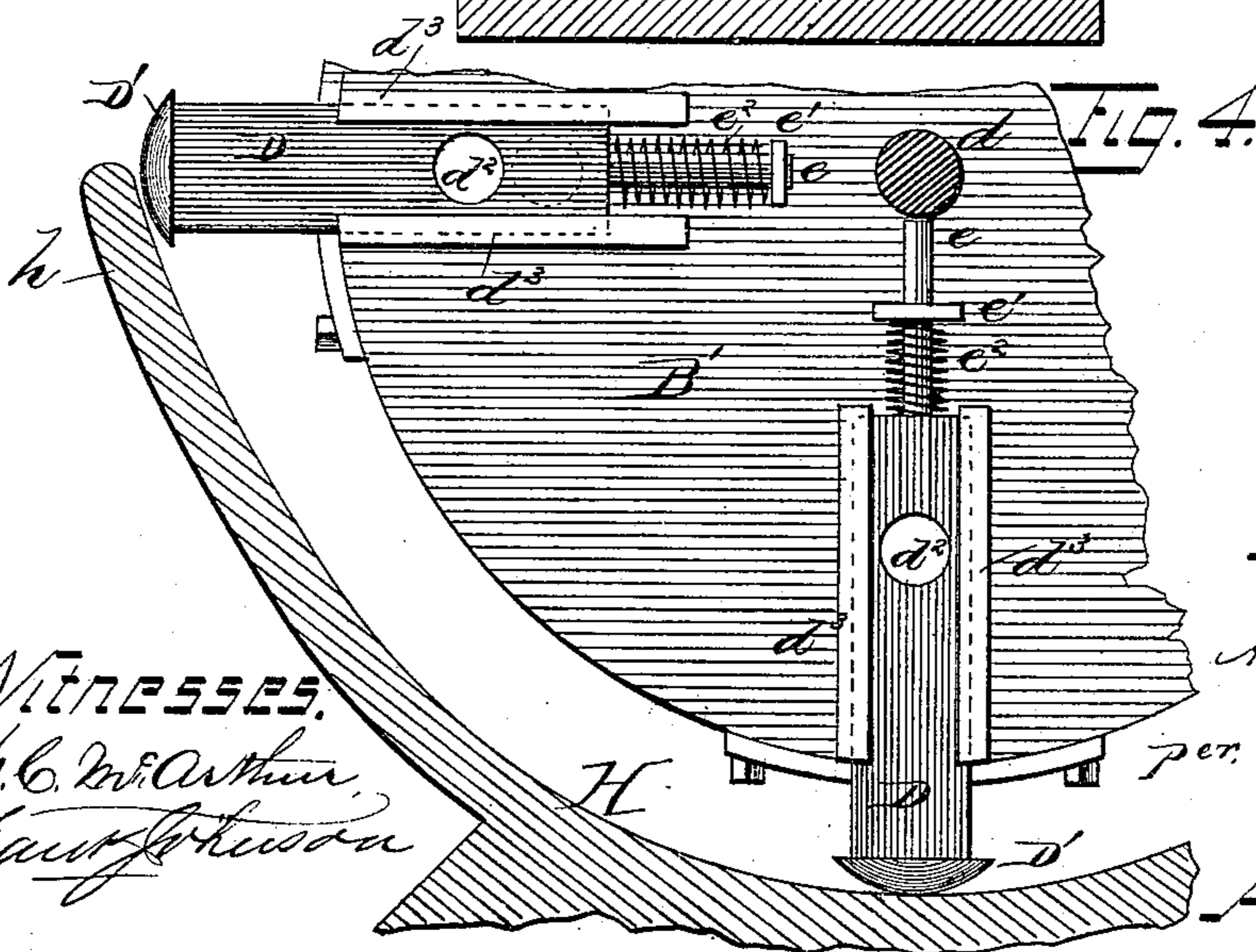


FIG. 4.



WITNESSES.

W. C. McArthur,  
Thos. Johnson

Inventor.

Allevi Annibale

per. H. Harrison

Attorney.

# UNITED STATES PATENT OFFICE.

ALLEVI ANNIBALE, OF CHICAGO, ILLINOIS.

## FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 272,616, dated February 20, 1883.

Application filed September 4, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ALLEVI ANNIBALE, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Force-Pumps, of which the following is a specification.

My invention relates to force-pumps; and it consists in a pump of peculiar construction, whereby I force the water from the pump by gravitating pistons working in chambers revolving around a common axis; and, also, in certain novel details of construction, which will be more fully described hereinafter.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved force-pump. Fig. 2 is a longitudinal section through the wheel containing the piston-chambers. Fig. 3 is a vertical cross-section of my pump; and Fig. 4 is a detail side view of part of the cylinder-wheel, showing the mode of operating the inlet-valves.

A represents a circular casting or wheel, having four radial chambers,  $A'$ , separated at their inner ends by webs  $a$ .

$B$   $B'$  are plates covering the sides of the wheel  $A$ , and secured thereto by any suitable means. The plate  $B$  is provided on its outer surface at the center with a chamber,  $b$ , which has cast with or secured to it the hollow shaft  $b'$ . This shaft  $b'$  is passed through a stuffing-box,  $b^2$ , of any desired form, into the end of a pipe,  $c$ , which is bent upward and carries the air-chamber  $C$ . From the top of this air-chamber extends the outlet-pipe  $C'$ . The pipe  $c$  is, just below the air-chamber, provided with a valve,  $c'$ , and is supported and kept in place by a brace,  $c^2$ , as shown.

The outer ends of the radial pump chambers or cylinders  $A'$  are closed by plates  $A^2$ , secured to the periphery of the wheel  $A$ , and provided in their centers with openings connected by pipes  $A^3$  with the chamber  $b$ . These pipes are each supplied with a valve,  $a'$ , opening outward.

The plate  $B'$ , secured to the opposite face of

the wheel  $A$ , is provided in its center with a shaft,  $d$ . The plate is also pierced by openings  $d'$ , communicating with each of the radial chambers  $A'$ , and over each opening is a sliding plate,  $D$ , having a beveled head,  $D'$ , and an opening,  $d^2$ , corresponding in size and shape with the opening  $d'$  in the plate  $B'$ . This valve or cut-off plate  $D$  slides in guides  $d^3$   $d^3$  upon the plate  $B'$ , and is provided on its rear end with an arm,  $e$ , sliding in a guide,  $e'$ , and surrounded by a coiled spring,  $e^2$ , as shown in Figs. 3 and 4, which operates to force the cut-off outward and project it considerably beyond the periphery of the wheel  $A$ .

Each of the radial chambers  $A'$  is provided with a piston-head,  $E$ , fitted loosely therein, and these pistons are connected in pairs by rods  $f$   $f$ , as seen in Figs. 2 and 3, passing through the webs  $a$ .

$G$  is a bag or casing of canvas, rubber, or any suitable flexible material, secured to the edges of the pistons  $E$  at one end, and at the other end under the overlapping edges of the caps or plates  $A^2$ . Each piston is pierced through its center, and provided with an outwardly-opening valve,  $g$ , as seen in the drawings.

The shafts  $b'$   $d$  rest in journal-boxes on the upper edge of a trough or box,  $H$ , as shown, in which the wheel  $A$  revolves. One end of this box is flared outward, as seen at  $h$ , Fig. 4, in order to form a camway for opening the cut-off valves  $D$ .

In operation the whole device is immersed in water, in a well or any place from which water is to be drawn. The water, entirely covering the box  $H$  and surrounding the wheel  $A$  within said box, enters the lowest chamber  $A'$ , behind the piston, (which is at its lowest point,) through the openings in the cut-off  $D$  and plate  $B'$ , which now register. The wheel  $A$  being now caused to revolve, the slide-valve  $D$ , when it is clear of the box  $H$ , will be thrown out, cutting off all further entrance of water, and as the wheel revolves till the piston-chamber is at forty-five degrees inclination, the piston  $E$ , by its own weight, begins to slide back, the valve  $g$  opens, and the water is admitted to the bag  $G$ . The chamber passes its highest point and begins to descend, and when it

reaches the angle named in its downward motion the piston E falls again, forcing the water in the bag G, through the pipe A<sup>3</sup>, chamber b, hollow shaft b', and pipe c, into the air-chamber C, whence it passes off through the outlet C'. In the meantime the slide D has been forced back again by the cam-surface h, and the piston-chamber refills. This process takes place in all of the piston-chambers, and causes a continuous volume of water to be forced from the pump. The force of the water driven from the pump and its volume are only limited by the size of the chambers A' and the weight of the pistons E.

It will be seen that the water is forced out by a power equal to the combined weight of the two piston-heads E coupled together, and as these pistons are made a little smaller than the chambers in which they work they will move with the smallest degree of friction, while at the same time no leakage of water occurs, by reason of its being admitted to the bags G before being forced out. Greater power may be obtained by increasing the weight of the pistons, either by enlarging them or by forming them hollow and filling them with lead.

As all of the radial water-chambers A' are always filled with water, either before or behind the piston-heads, the wheel is balanced and always revolves with a steady motion.

The shaft d is provided with a gear or chain wheel, to which power may be transmitted from any motor found most convenient or desirable.

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

1. In a rotary force-pump having two or more piston-chambers, the gravitating pistons connected together in pairs, substantially as shown and described.

2. In a rotary force-pump, the combination,

with the wheel A, having ports d', of the cut-offs D, adapted to slide in guides on said wheel, and having heads D', openings d<sup>2</sup>, and springs e<sup>2</sup>, substantially as and for the purpose described.

3. In a rotary force-pump, the combination of the box H, having cam-surface h, the chambered wheel A, provided with ports d', and the sliding cut-offs D, having heads D', openings d<sup>2</sup>, and spring e<sup>2</sup>, substantially as shown and described.

4. In a rotary force-pump, the radial piston-chambers A', having inlet-ports d', in combination with the spring-actuated sliding cut-off D, having a similar port, d<sup>2</sup>, substantially as herein shown and described.

5. A rotary force-pump consisting, essentially, of a radially-chambered wheel having inlets for water, gravitating pistons connected in pairs, an air-chamber having an outlet-pipe, intermediate pipes connecting the radial piston-chambers and air-chamber, and a frame or box in which the pump-wheel is supported and revolved, all constructed and arranged to operate substantially as herein shown and described.

6. In a rotary force-pump, the combination of the box H, having camway h, the wheel A, having radial chambers A', provided with suitable ports, the valved pistons E E, connected in pairs, the flexible bags G G, chamber b, radial pipes A<sup>3</sup>, sliding cut-offs D D, air-chamber C, and pipes b' c, substantially as shown and described.

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

ALLEVI ANNIBALE.

Witnesses:

STEPHEN J. GUSCOTT,  
FRANK RIEDER.