

(No Model.)

3 Sheets—Sheet 1.

C. H. BOOTH.

ANTI-FRICTION DREDGING PUMP.

No. 313,649.

Patented Mar. 10, 1885.

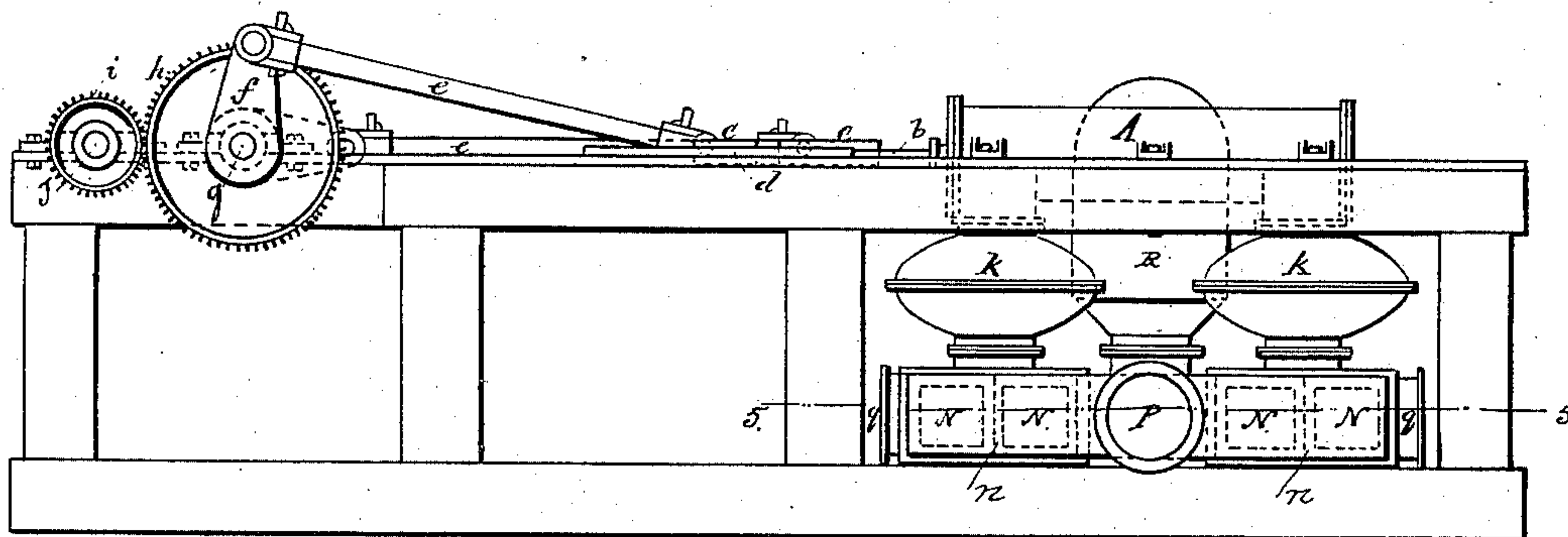


Fig. 1.

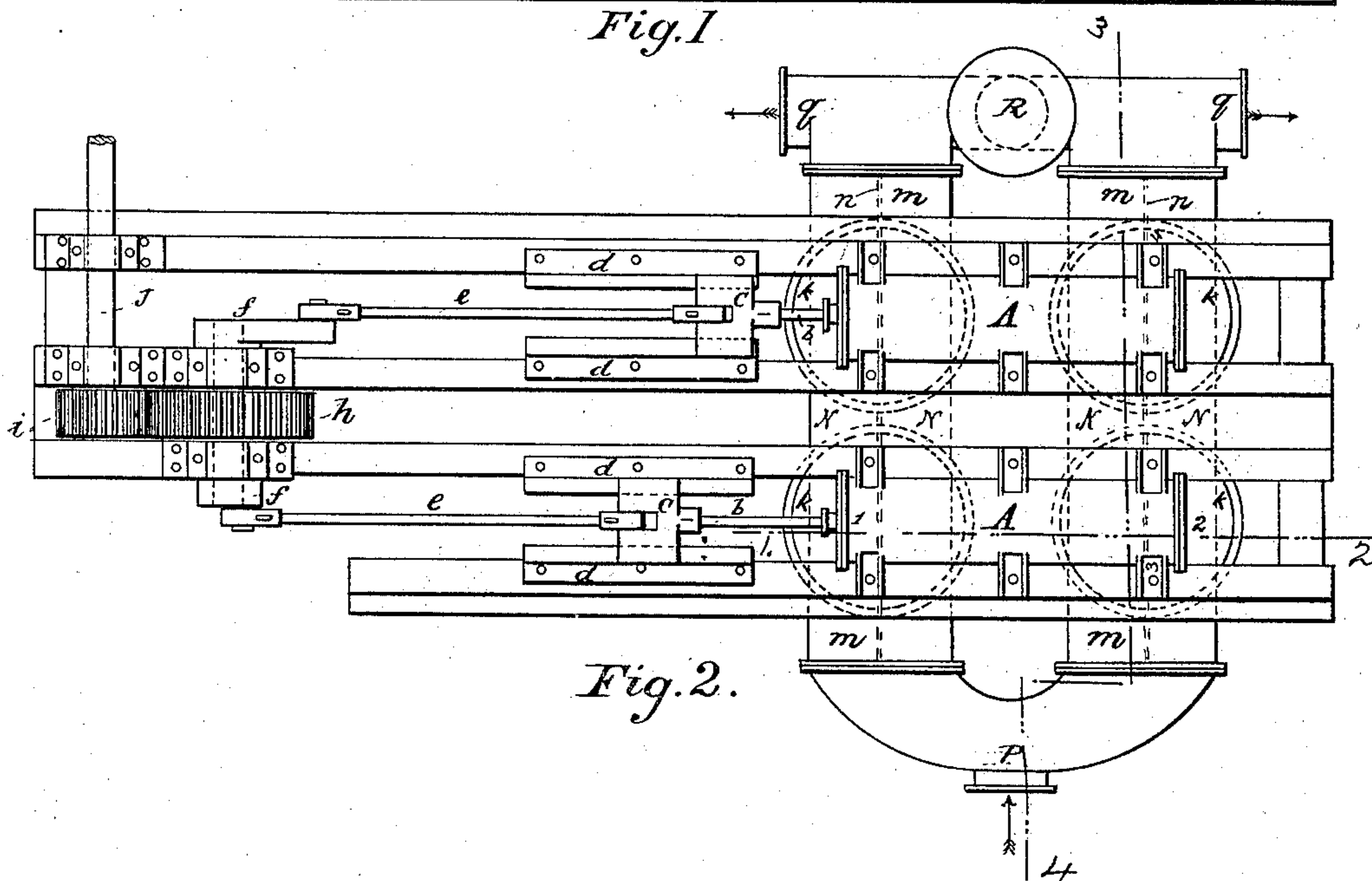


Fig. 2.

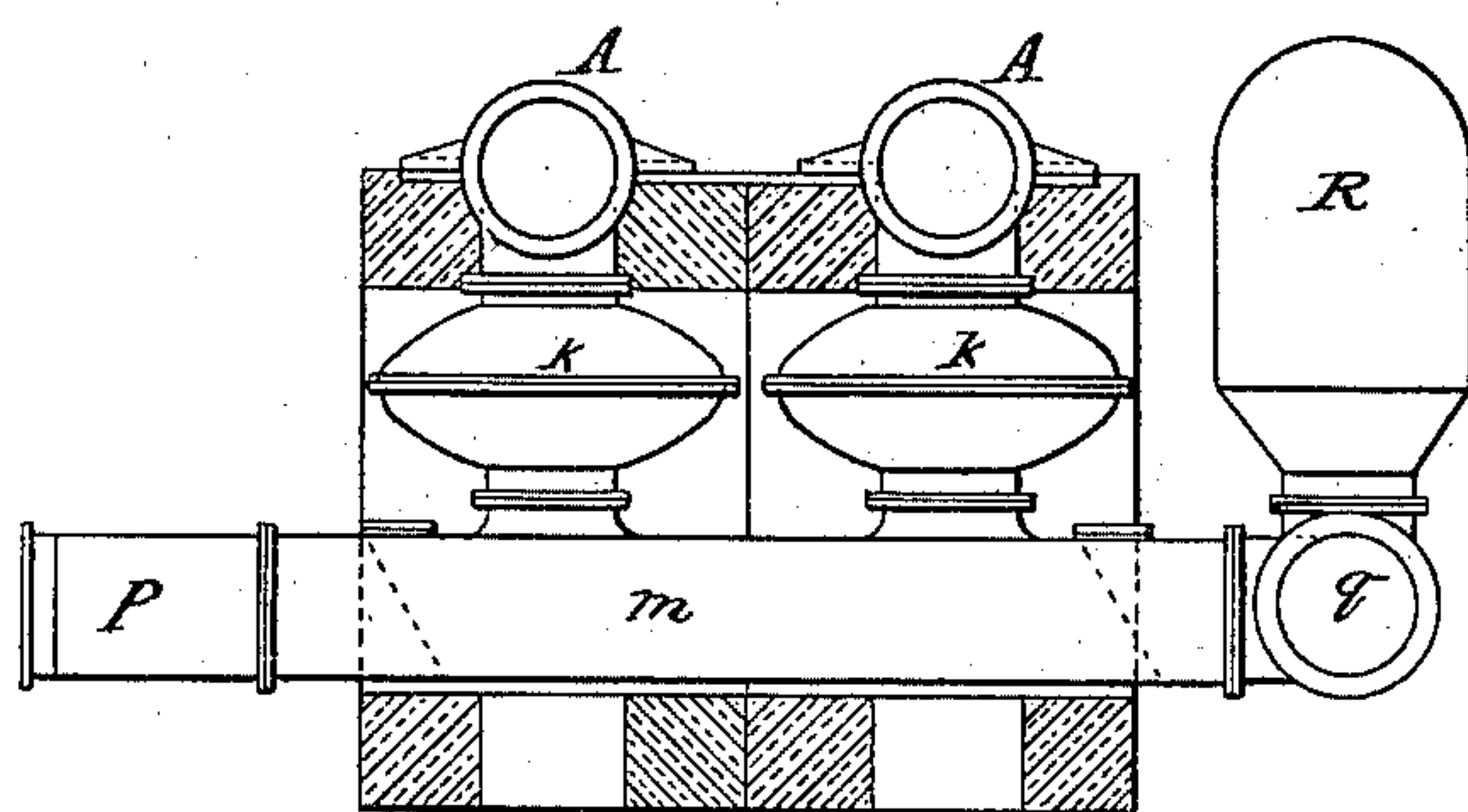


Fig. 3.

Witnesses:

Frederic Thornely.

Joshua D. Carter

Inventor.

Caleb H. Booth.

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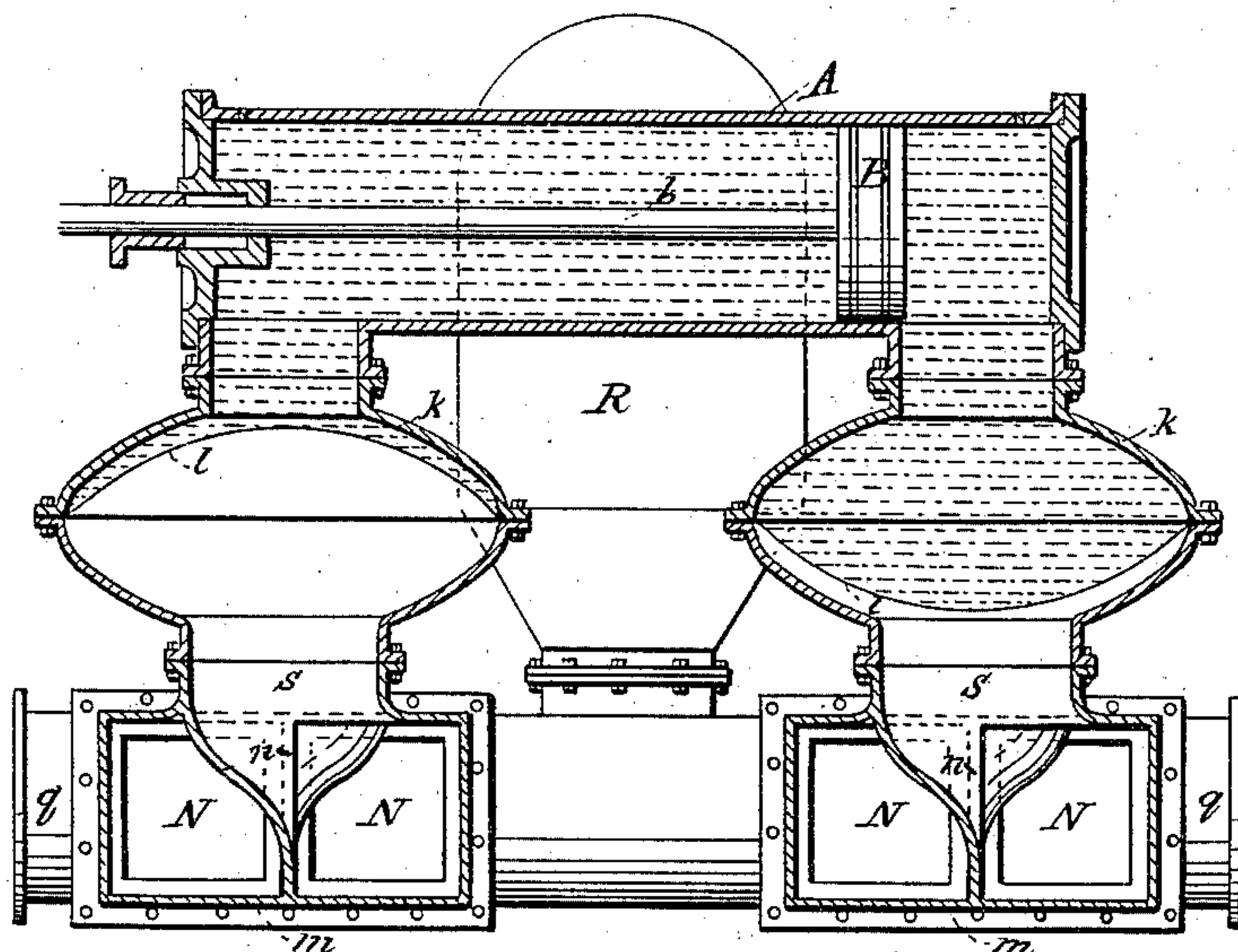


Fig. 4

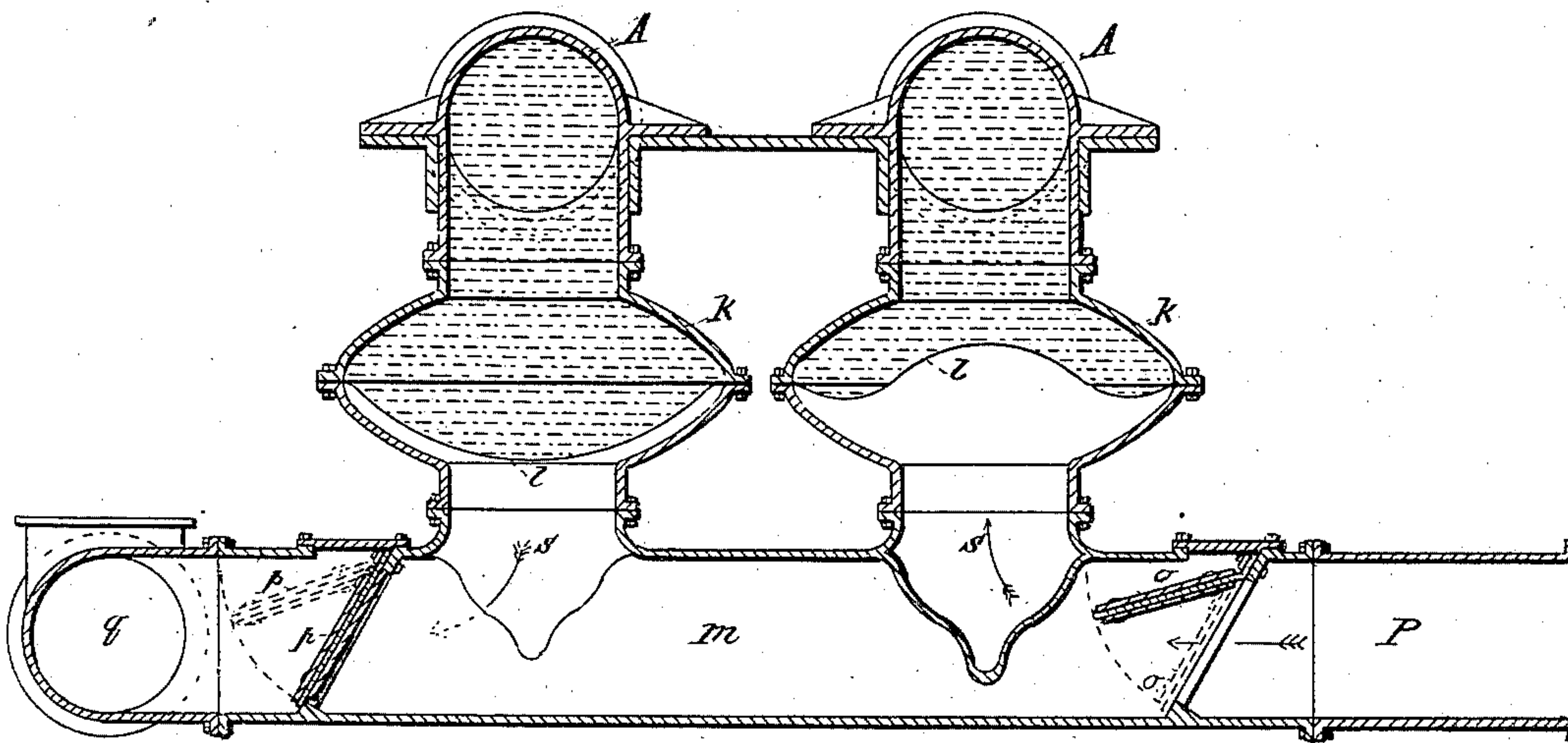


Fig. 5

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Fig. 6.

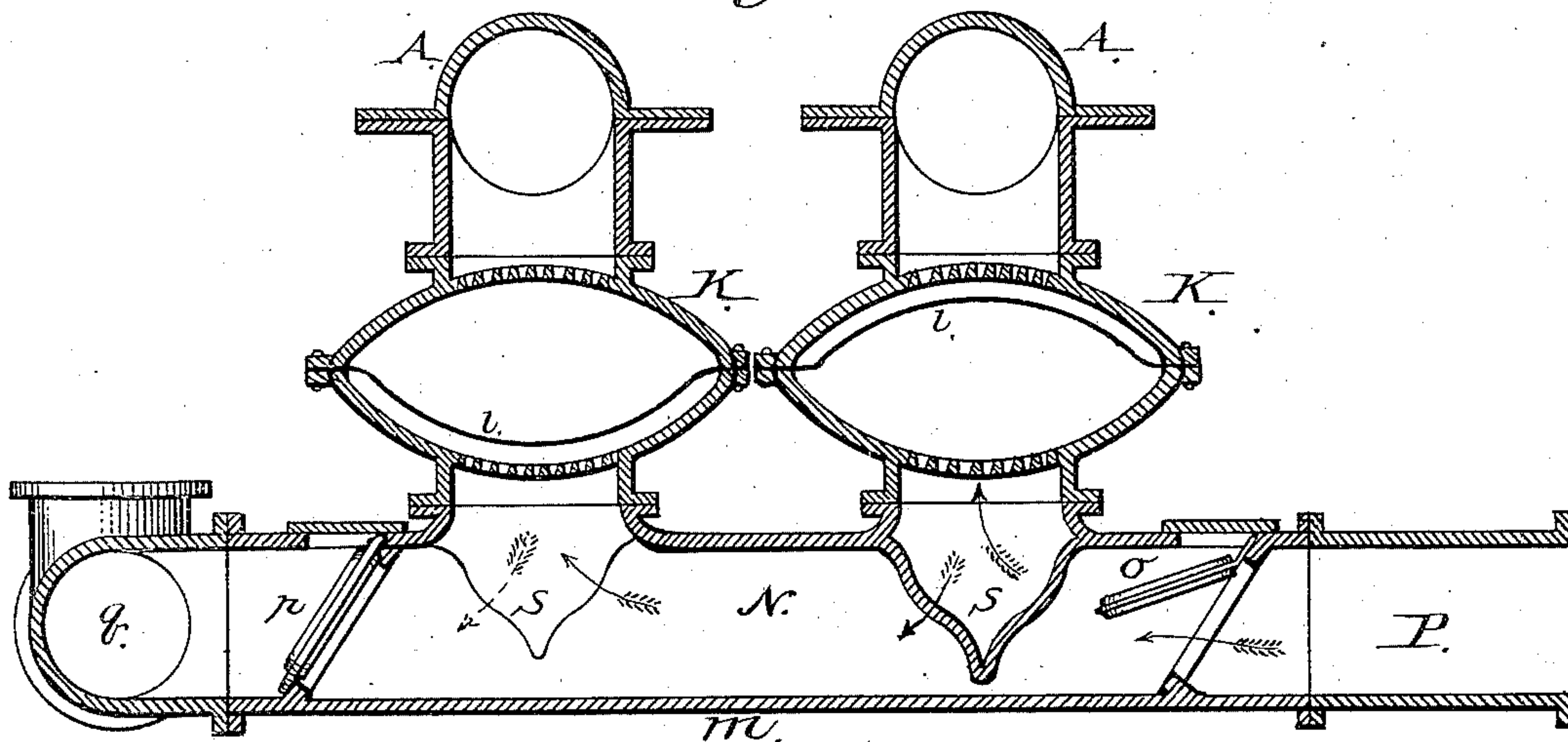
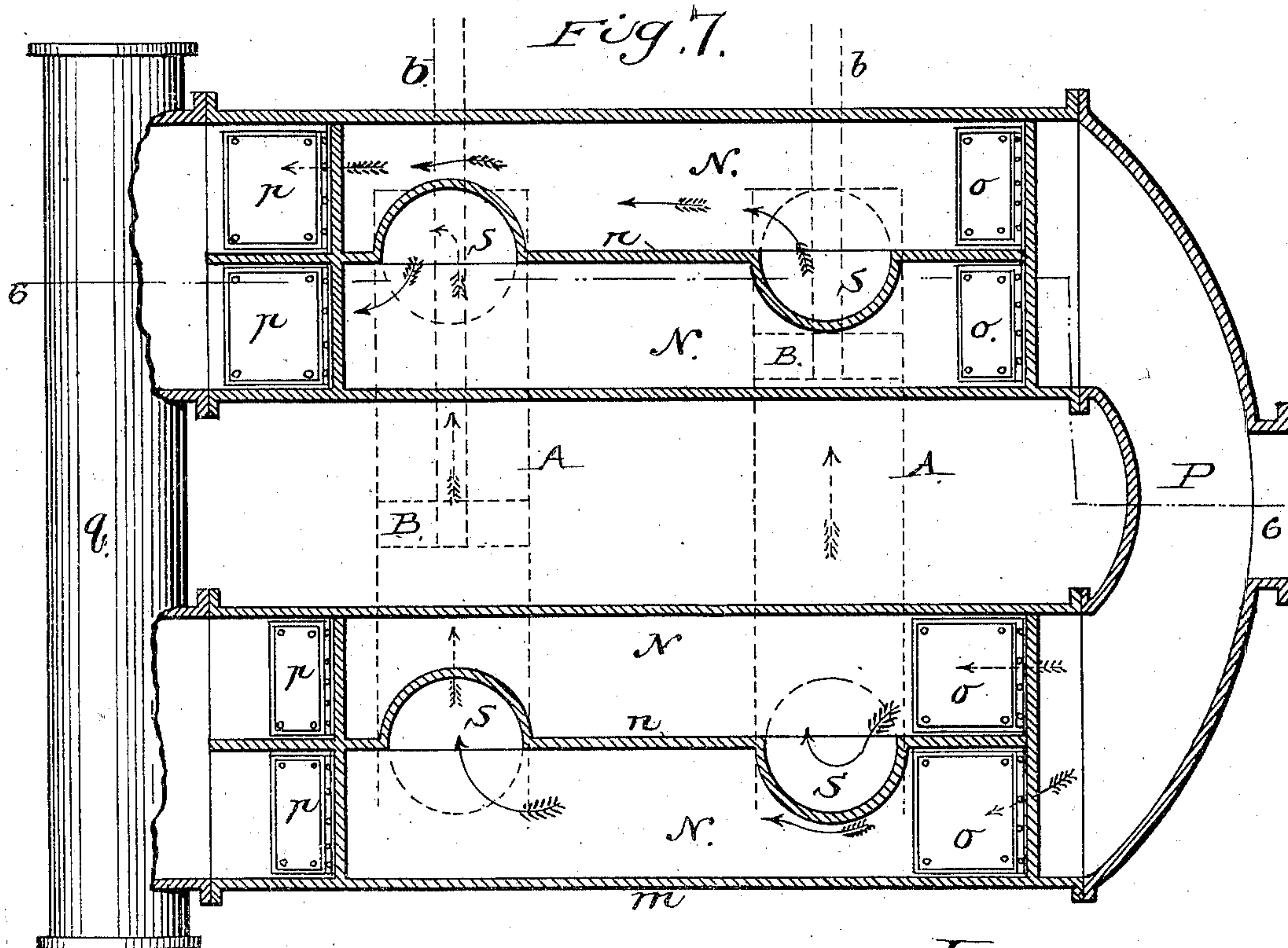


Fig. 7.



Witnesses;
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UNITED STATES PATENT OFFICE.

CALEB H. BOOTH, OF DUBUQUE, IOWA.

ANTI-FRICTION DREDGING-PUMP.

SPECIFICATION forming part of Letters Patent No. 313,649, dated March 10, 1885.

Application filed May 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, CALEB H. BOOTH, a citizen of the United States, residing at Dubuque, in the county of Dubuque and State of Iowa, have invented a new and useful Anti-Friction Dredging-Pump, of which the following is a specification.

The object of my invention is to remove, by pumping, from ocean and river bars, bottoms of lakes, rivers, harbors, &c., sand and other material mixed with water and force it through discharge-pipes to the dumping-ground. This dumping-ground may be located at any reasonable elevation and distance from the pump if the requisite power be employed.

My invention consists in the combination of devices hereinafter explained and claimed, and illustrated in the accompanying drawings, which make a part of this specification, in which—

Figure 1 represents a side elevation of the entire pump. Fig. 2 is a plan of same. Fig. 3 is an end elevation of same. Fig. 4 is a longitudinal section, on an enlarged scale, of one of the pump-cylinders, diaphragm-chambers, and valve-chests on the line 1 2, Fig. 2. Fig. 5 is a cross-section, on same scale as Fig. 4, of the two pump-cylinders, diaphragm-chambers, and valve-chests on the line 3 4, Fig. 2. Fig. 6 is a sectional view on line 6 6 of Fig. 7, and Fig. 7 is a horizontal sectional view on line 5 5 of Fig. 1.

Similar letters refer to similar parts throughout the several views.

A A represent two pump-cylinders provided with pistons B B, attached to one end of the piston-rods b b, the other ends being attached to the cross-heads C C, working on the slides d d, by means of the connecting-rods e e and the cranks f f, the cranks f f being placed at right angles to each other on the shaft g and driven by the gears h and i, the gear i being attached to a shaft, j, which is operated by a steam-engine or other suitable power. Each pump-cylinder A A has two hollow chambers, k k, of a spherical or spheroidal form, attached one at each end. Each of these chambers k is provided with a

flexible diaphragm, l, of leather, rubber, or other suitable material. The diaphragms l l l l are formed or molded into a semi-spherical shape, so as to have a capacity in their full movement or pulsation equal to or slightly exceeding that of one stroke of their corresponding pump-cylinders A A, thus giving the cylinder its full amount of liquid to supply its capacity without any strain on the diaphragm.

To the diaphragm-chambers k k k k are attached two double valve-chests, m m, placed at right angles to the pump-cylinders A A, as shown in Fig. 2. Each valve-chest m is divided into two compartments, N N, by the partition n, extending the entire length of the chest, and so arranged that the separate compartments communicate by one opening each with their respective diaphragm-chambers, each diaphragm-chamber receiving and discharging through its respective opening S. Each valve-chest m is provided with suction-valves o o, discharge-valves p p, and connected with the suction-pipe P on one end and with the discharge-pipe q on the other end, as shown in Fig. 5.

R is an air-vessel attached to the discharge-pipe q, to equalize the flow of the discharge.

The operation of the pump is as follows: The piston B in each cylinder A is first moved to one end of the stroke, as shown on Fig. 4, and the entire space between the piston B and the nearest flexible diaphragm l is then filled with pure water, oil, or other suitable liquid. The piston is then moved to the other end of the stroke, and the corresponding space between the piston B and flexible diaphragm l is filled in like manner. The dredge-pump is now ready for operation. The motion of the pistons B B acting on the contained liquid communicates a corresponding action or inversion to the diaphragms l l l l. The movement of the diaphragms causes a suction and discharge of material in the compartments N N N N of the valve-chests m m, the whole of the material moved being entirely separate from the pump-cylinders A A by means of diaphragms l l l l.

I am aware that elastic and flexible dia-

phragms in pumps are not new, the same being shown in patent issued to H. A. Jamieson, June 10, 1877, No. 192,072, and in the patent issued to W. Shearer, November 29, 1870, No. 109,678.
5 I therefore do not claim such diaphragms, broadly.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination, with the independent dia-

phragm-chambers K, of a single flexible dia- 10
phragm semi-spherical in cross-section and introduced between the valve-chests of a pump, and moving pistons or plungers, substantially as and for the purpose set forth.

CALEB H. BOOTH.

Witnesses:

FREDERIC THORNELY,
JOSHUA D. CARTER.