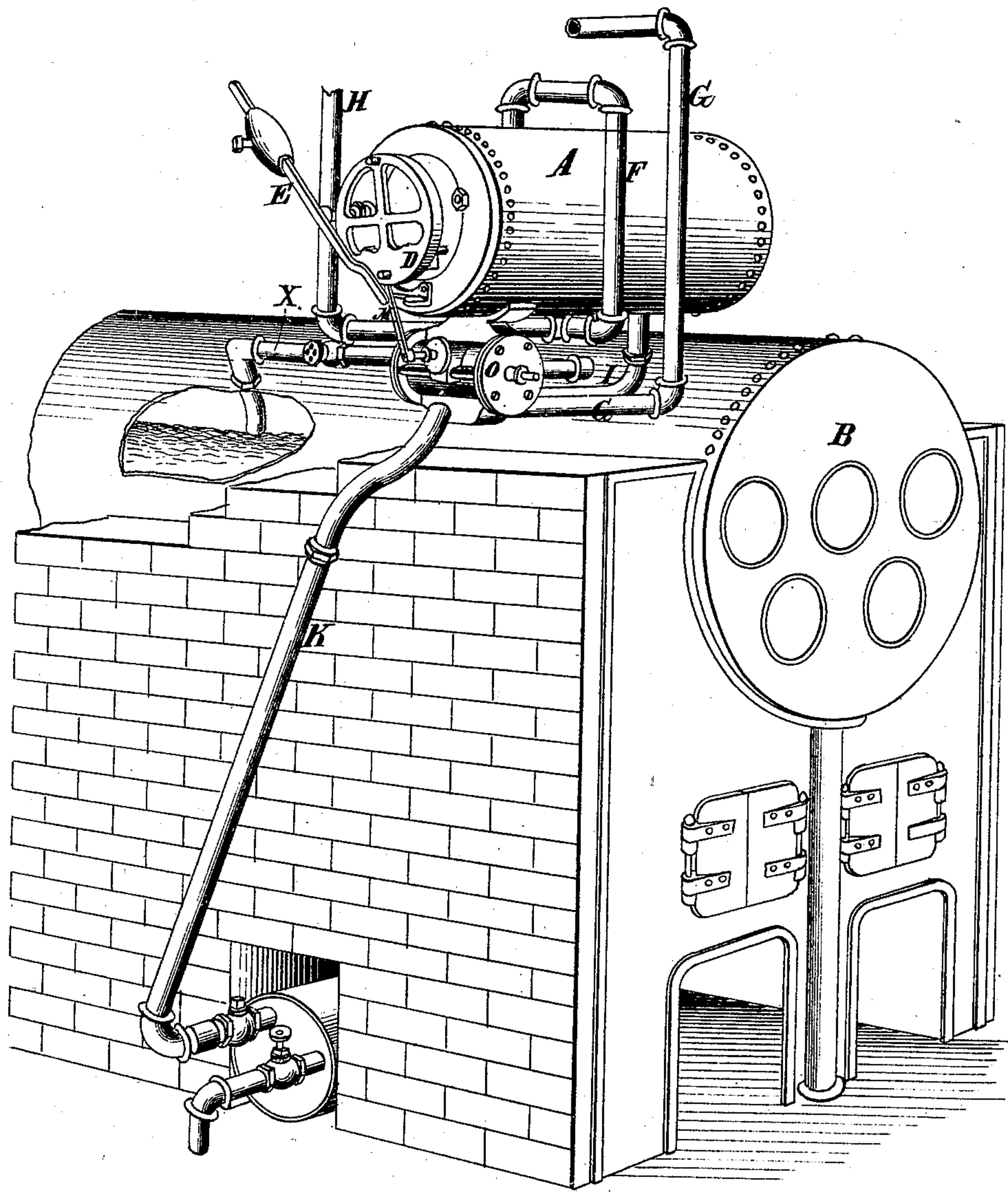


S. COOK.
AUTOMATIC BOILER FEEDER.

No. 171,100.

Patented Dec. 14, 1875.

Fig. 1.



Witnesses:
A. Rupprecht.
John Eils

Silas Cook
Inventor.
D. P. Holloway & Co
Atty

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Fig. 2.

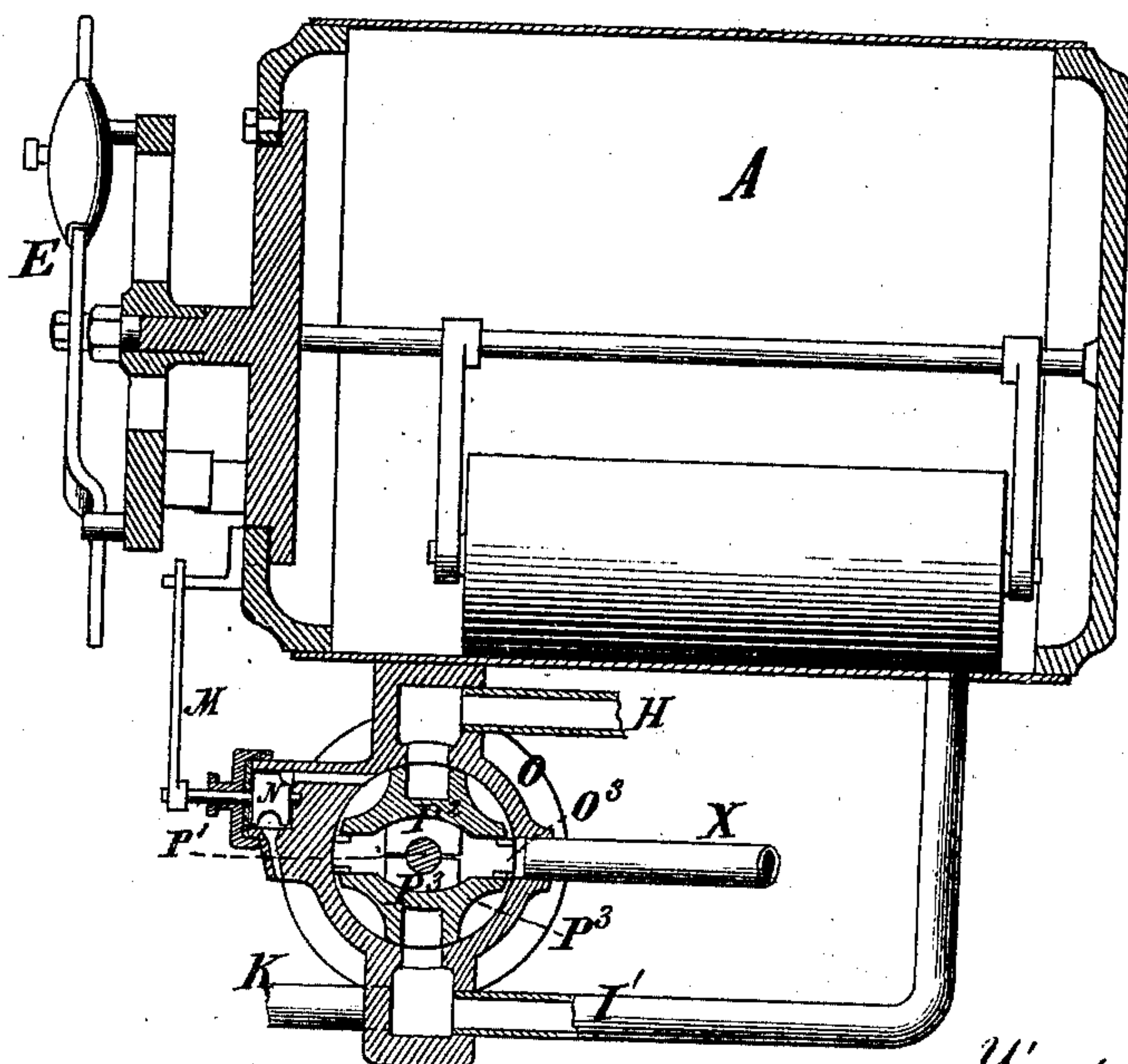


Fig. 5.

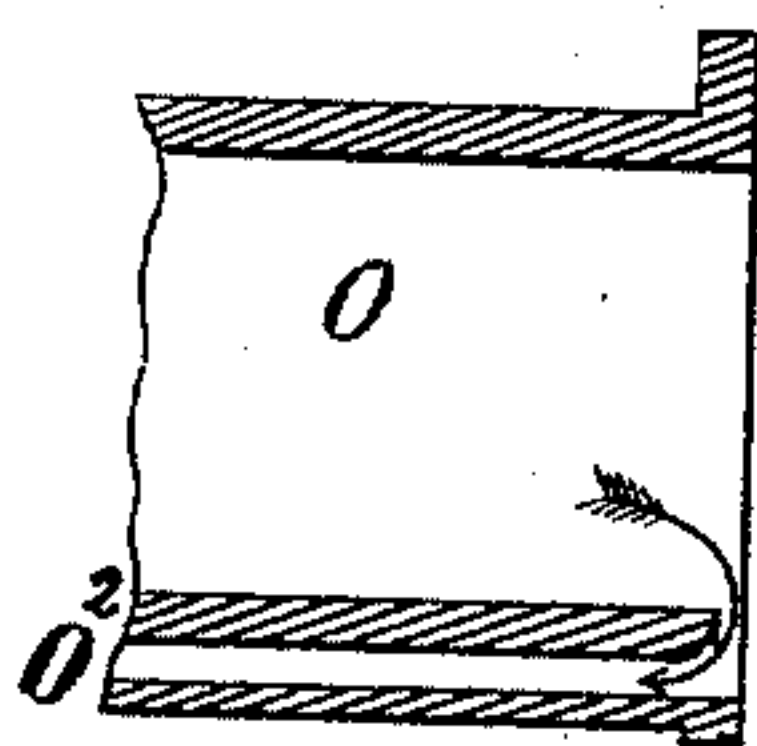


Fig. 4.

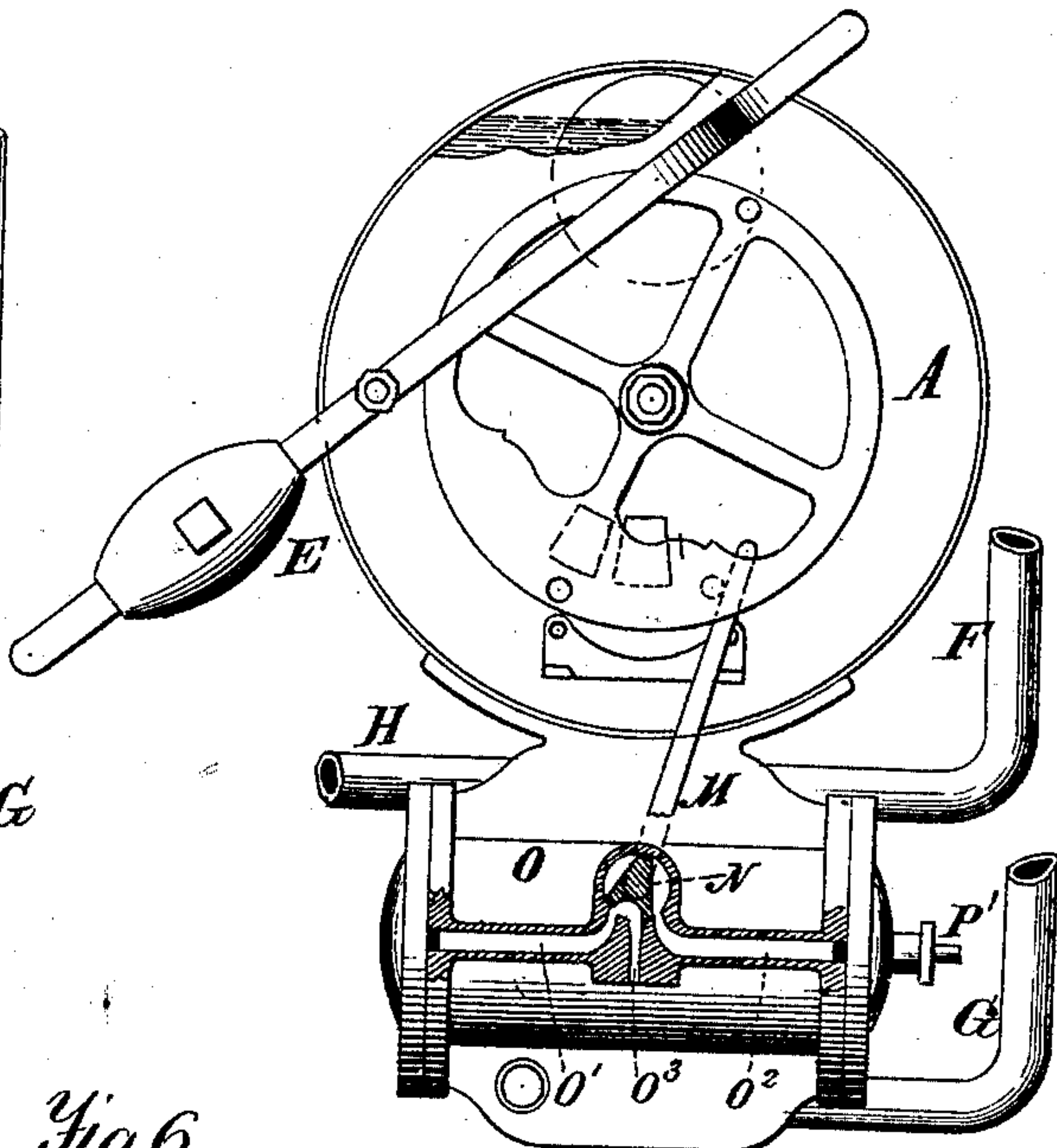


Fig. 3.

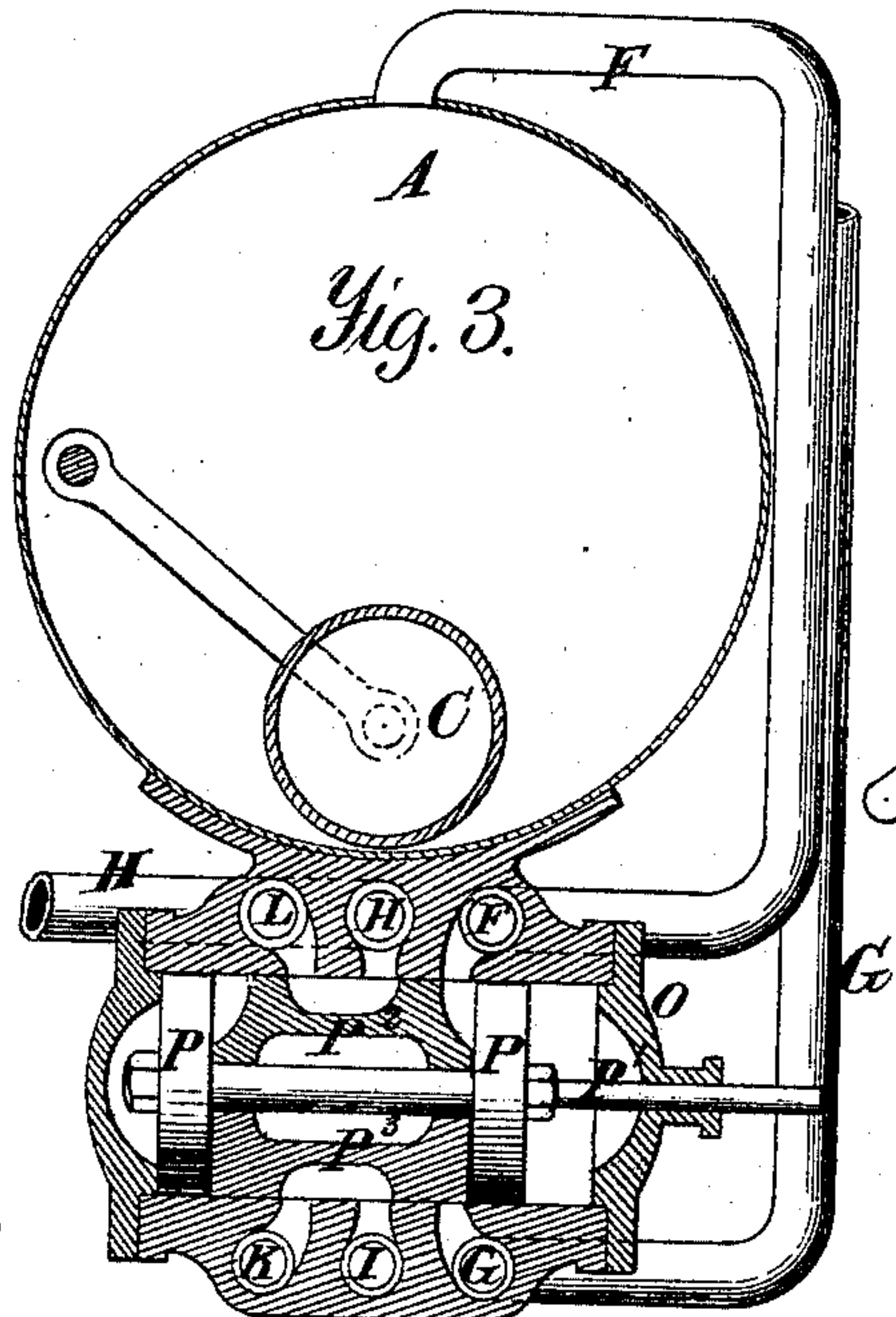
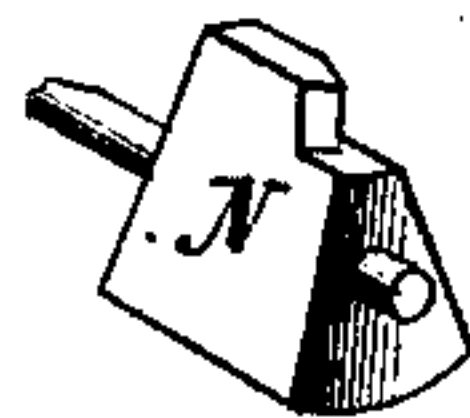


Fig. 6.



Witnesses:
A. Rupprecht.
John C. Eils

Silas Cook
Inventor.
D. R. Holloway & Co
Atty

UNITED STATES PATENT OFFICE.

SILAS COOK, OF MAGNOLIA, IOWA, ASSIGNOR TO AUTOMATIC BOILER-FEEDER MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN AUTOMATIC BOILER-FEEDERS.

Specification forming part of Letters Patent No. **171,100**, dated December 14, 1875; application filed November 16, 1875.

To all whom it may concern:

Be it known that I, SILAS COOK, of Magnolia, in the county of Harrison and State of Iowa, have invented a new and useful Improvement in Automatic Boiler-Feeders, of which the following is a specification:

I took out on the 30th day of November, A. D. 1869, United States Letters Patent No. 97,361, to which and the reissues thereof I refer for a full description of the principle of operation of my invention. I also refer to another application for Letters Patent filed herewith for another improvement made by me on the same machine. It will, therefore, be unnecessary to repeat herein fully the explanations therein more completely set forth.

The improvement to which this invention particularly relates is the connection with the feeder and float and mechanism for shifting a valve when the chamber is alternately emptied and filled, a piston-valve shifted by letting steam into chambers formed at one end and the other of the cylinder. Said last-named valve is formed to regulate the admission of steam and water on the general principles of said original patent.

In the annexed drawings, making part of this specification, Figure 1 is a perspective view of a boiler with feeder attached. Fig. 2 is a vertical longitudinal elevation of the same. Fig. 3 is a vertical transverse section of the same. Fig. 4 is an end elevation thereof, partly in section. Fig. 5 is a partial section of the cylinder. Fig. 6 is a perspective view of the small valve which regulates admission of steam to the cylinder.

The same letters in all the figures indicate the same parts.

I have illustrated in this case a feeder only; but if a heater should be added after the principles set forth in the said former Letters Patent, it may be done after the plan therein set forth without modification of anything belonging to this application.

In the annexed drawings, A is the feeder; B, the boiler; C, the float; D, the weighted wheel; E, the adjustable counter-balance to the float; F, pipe, carrying steam to feeder;

G, supply-pipe, from overhead tank, or from hydrant, &c.; H, pipe for exhausting steam from the feeder, to permit water to flow in; I, pipe conducting water from the feeder to the valve-cylinder; K, pipe conducting water from the latter to the boiler; L, port to which pipe may be attached to conduct steam to cistern, in case water is to be forced up from well to tank or heater; M, the stem, which connects from weighted wheel to valve-stem; X, the pipe leading from the water-line to the cylinder.

All the foregoing parts are constructed and intended to operate as set forth in the application filed herewith, and need not now be described in detail.

In the present case, the valve N, actuated by the movement of the weighted wheel, is intended to perform no other function than to direct the admission of steam to one or other end of the cylinder O through the ports O¹ and O², which are alternately induction and eduction ports, as the valve is shifted to open communication with the steam-pipe X and the cylinder at one end, and from the other end with the eduction-port O³. The cylinder is bored and fitted with heads in the usual manner, the rod P¹ projecting through a stuffing-box in one head, as shown. On this rod are two heads, P P, placed so as to leave a chamber on each side when they are equidistant from their respective cylinder-heads. In the space between the piston-heads I place two valves, P² and P³, the edge of the upper one being cut away like valve N, so as to permit the steam entering from the pipe X into the space between the valve-plates P² P³ to ascend into the space between the upper one and the cylinder, and enter the port leading into the chamber of valve N, and thence through the ports O² O¹ into the chambers in the ends of the cylinder, and also to admit steam to pipe F and feeder B. To give access to the latter pipe, the valve is cut away at the end, as shown in Fig. 3; and if a pipe to cistern is also used, it must be, in like manner, cut away at the other end.

The operation of this feeder is as follows:

The feeder being empty and the float at the bottom, water being introduced into the feeder, the float will rise, turning arm E and lifting the weighted wheel until it falls, and shifts the valve N. When the feeder is full, the valve is in the position shown in Fig. 3, which represents the position of the parts just before the float has reached the bottom and shifted the valve. The pipe F is open, so that steam may flow from X through the valve between plates P² P³, and up through notch and recess into the pipe F and into the feeder, so that the pressure of steam in the boiler and feeder being equalized, the water will flow through pipes I and K, under the lower valve-plate P, from the feeder to the boiler, until the water in the latter is raised until the pipe X is sealed, when the flow stops until the evaporation reduces the water again below the end of pipe X.

In case the pipe L is used to raise water in this position of the valves, the steam can escape from the pipe L to the exhaust-pipe H, as explained in the other cases referred to.

When the water is exhausted from the feeder, the fall of the weighted wheel shifts the valve N, and permits the steam to enter the other port and drive the valves to the other end of the cylinder O. This cuts off connection with the steam to the feeder, and opens ports F and H, so that the excess of pressure is taken off of the feeder and the water may enter. This is done by the lower valve opening communication between the feed-water pipe G and the pipe I leading to the feeder from the cylinder, so that the water will flow by gravity from the overhead supply to the feeder until it is filled, and the valves again

shifted, and so the work goes on automatically and indefinitely.

What I claim as my invention herein, and desire to secure by Letters Patent is not broadly for the parts shown, nor on the other hand is it limited to the precise construction set forth, for it is obvious that instead of a piston-valve such as shown, having two plates, P² and P³, above one another, they could be placed on the same plane and converted into slide-valves without at all varying the principle of operation.

What I do claim is—

1. In combination with the piston-valve P cylinder O, and weighted wheel, actuated by the rise and fall of the float, an intermediate oscillating valve, N, actuated by the movement of the wheel, and controlling the admission of steam to the piston-valve, substantially as set forth.

2. The cylinder O, and piston-valve, consisting of the parts P P² P³, constructed and arranged substantially as set forth.

3. The combination of the valve-plates P² P³, with the induction-pipe X opening between them, and the ports H and F, substantially as set forth.

4. The cylinder constructed with ports O¹ O², and ports leading to pipes F and H, G, I, and K, and X, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SILAS COOK.

Witnesses:

ISAAC P. HILL,
J. D. HORNBY.