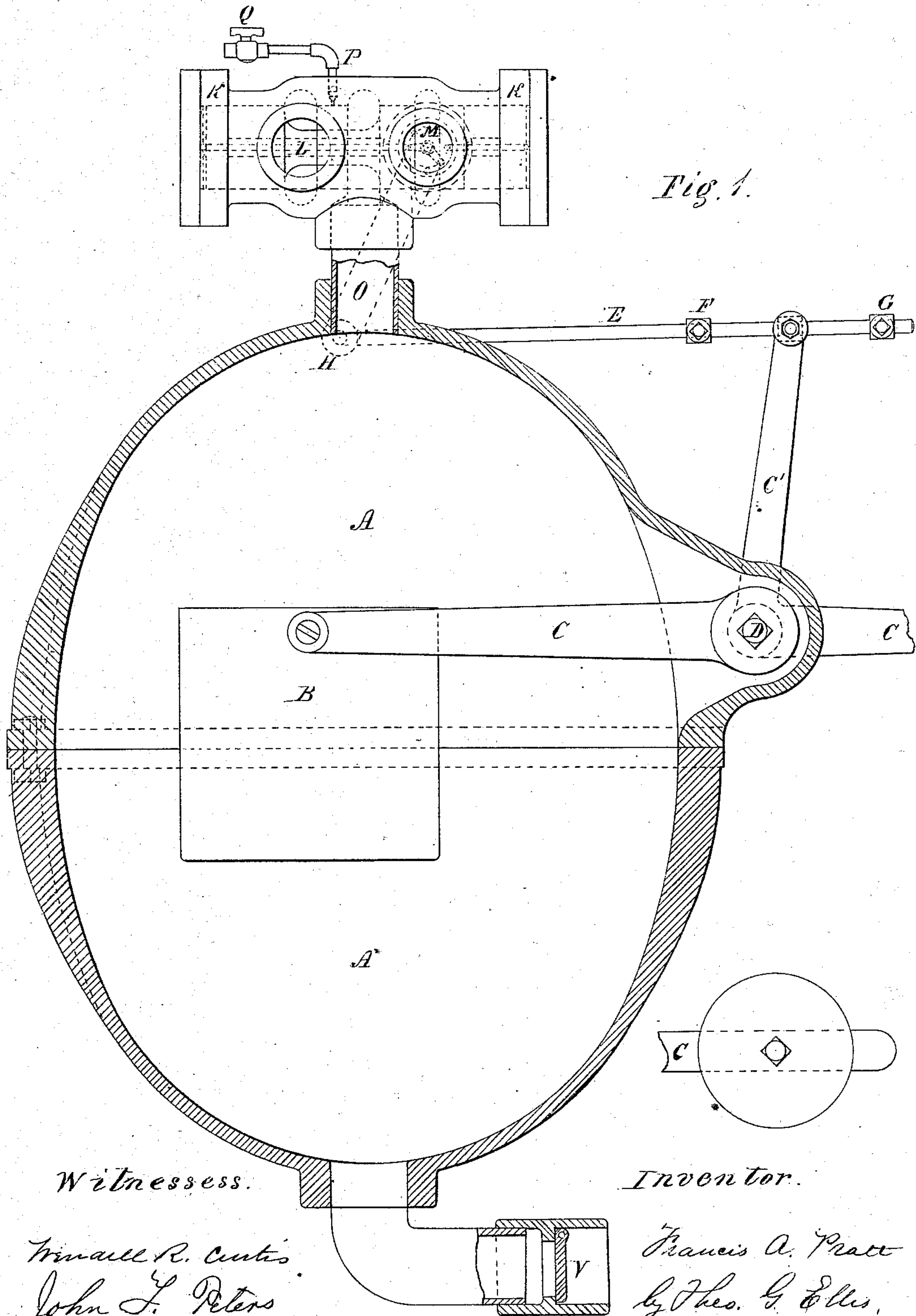


F. A. PRATT.
Steam-Trap.

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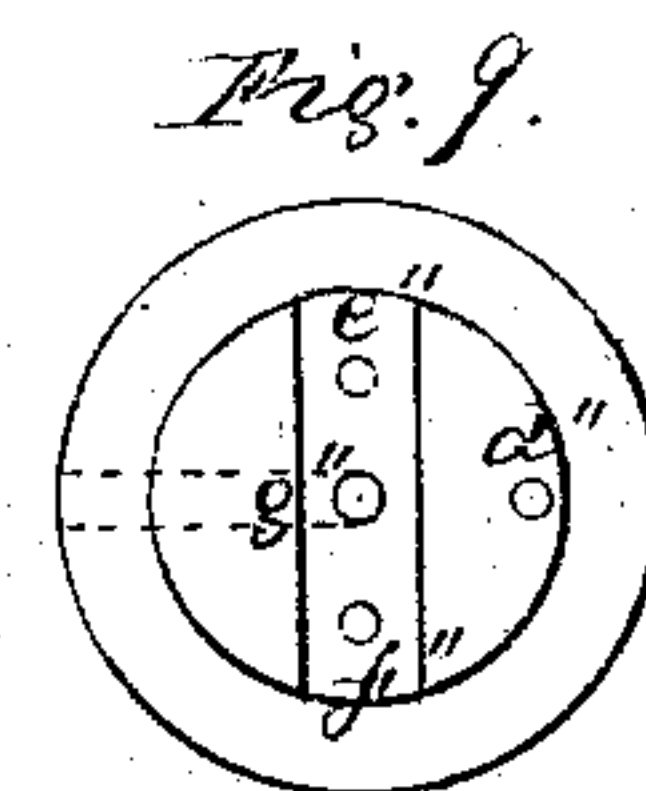
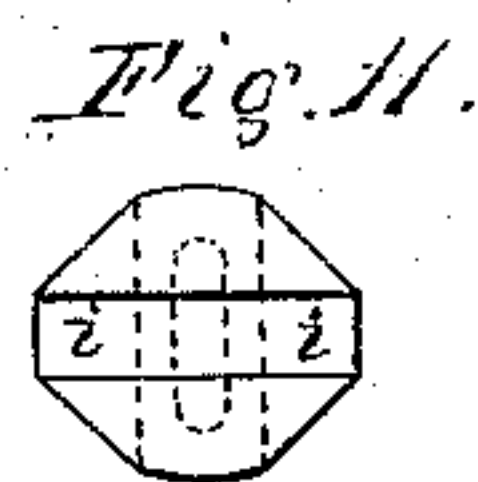
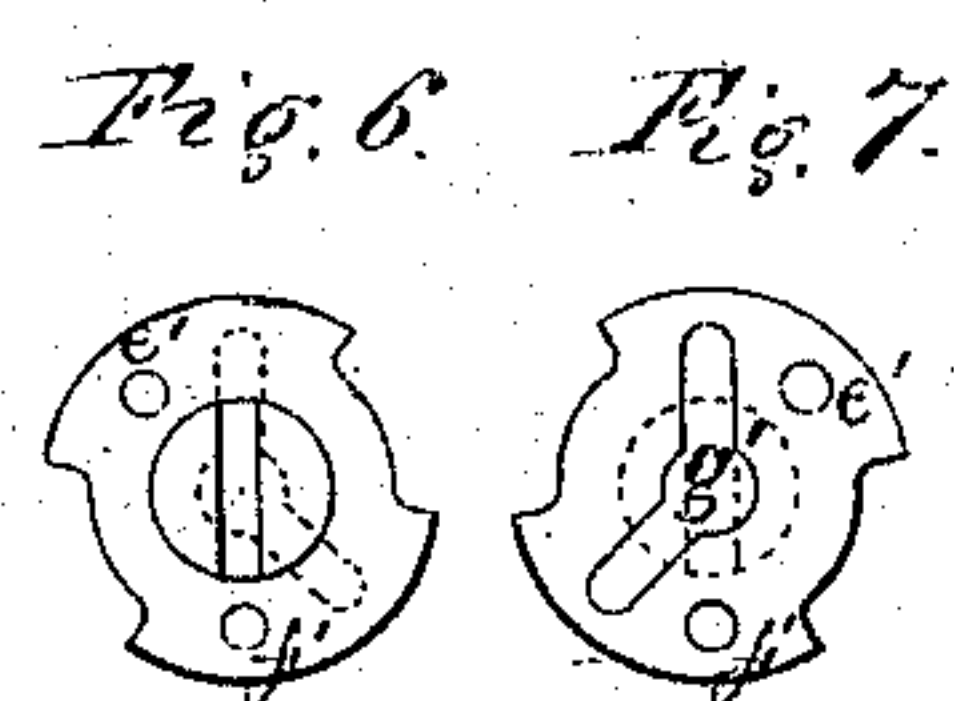
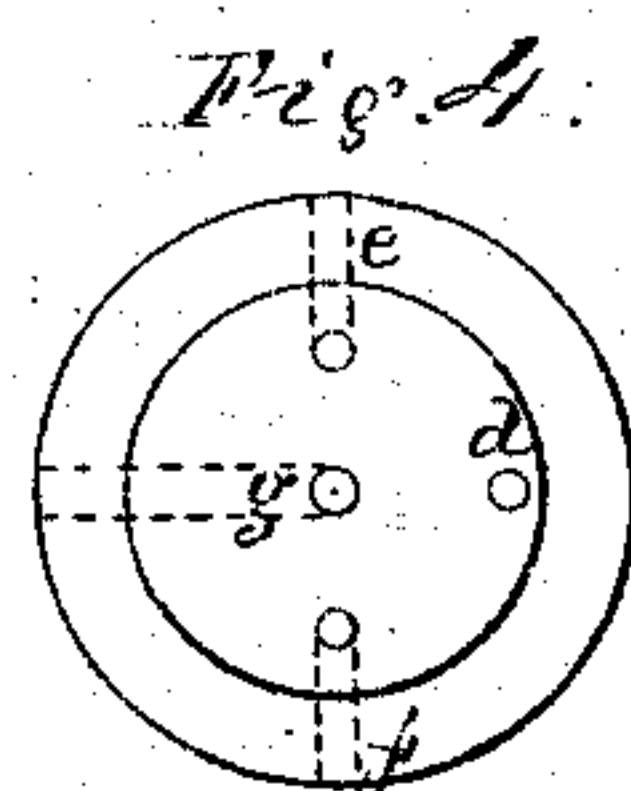
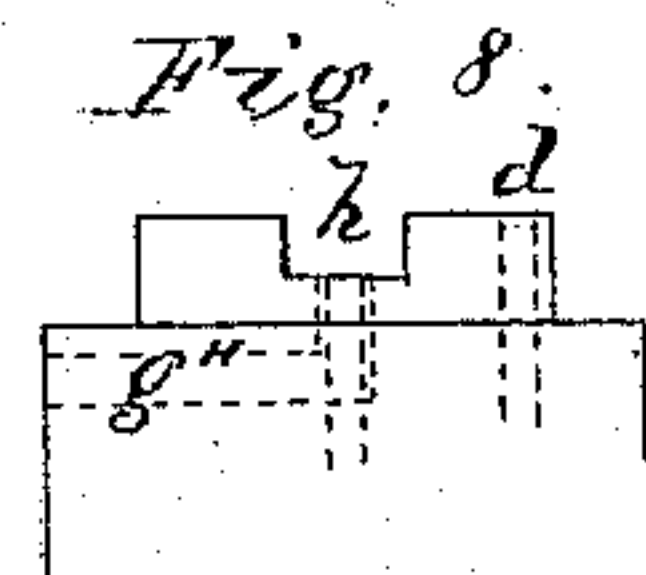
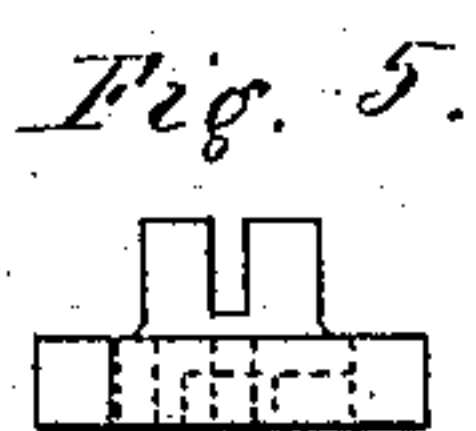
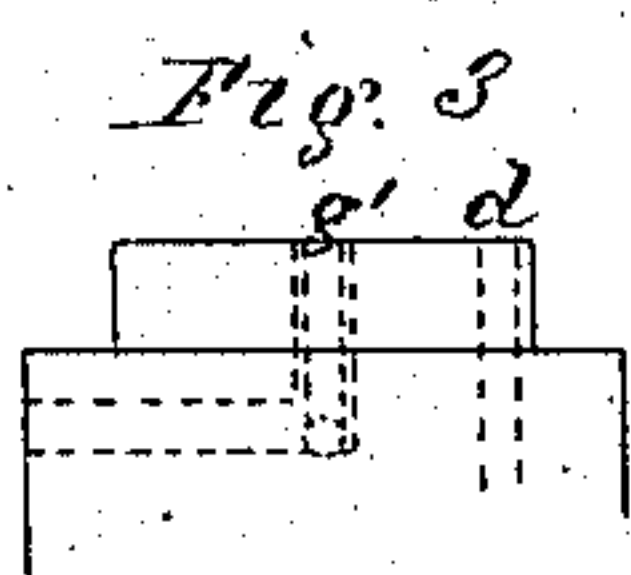
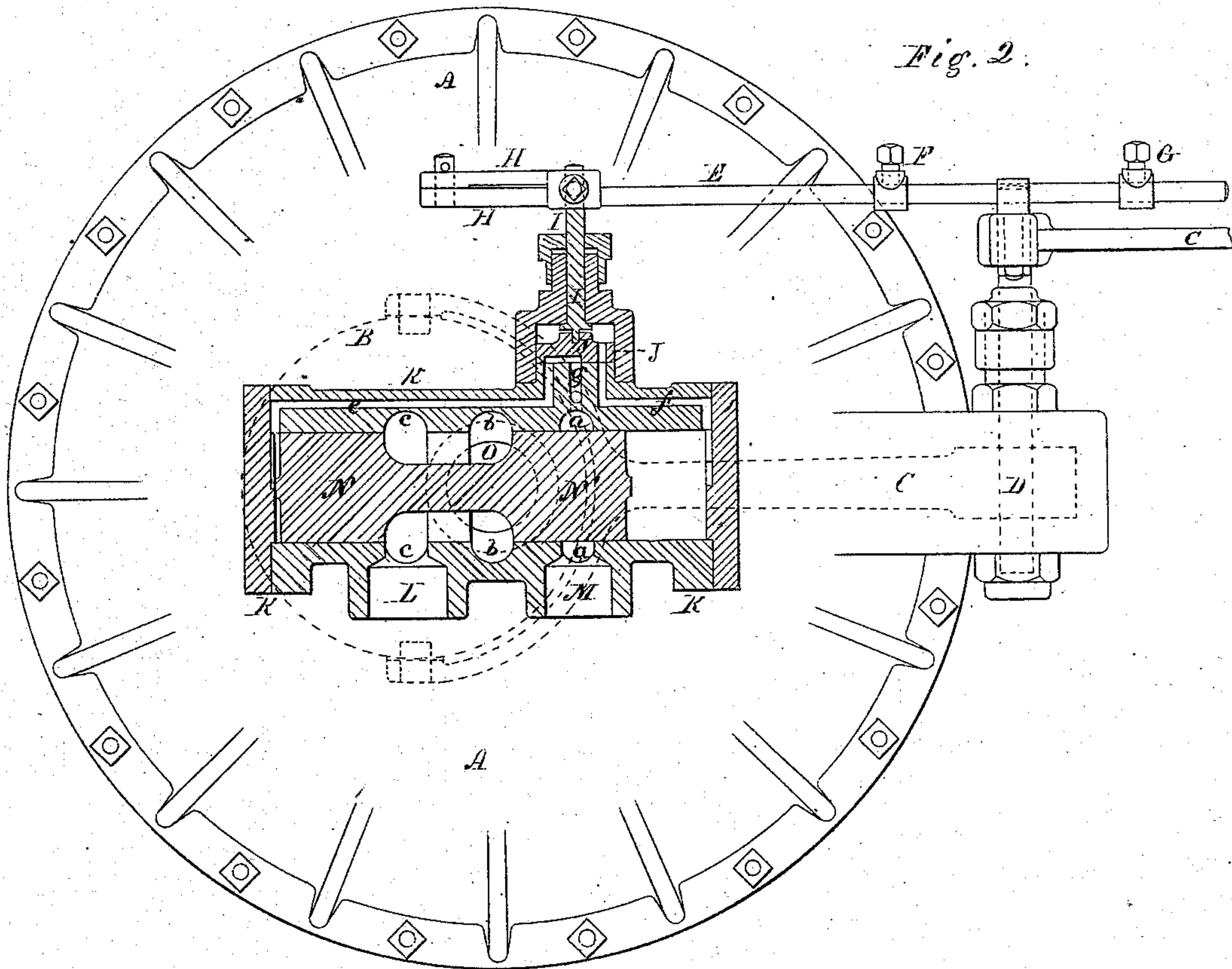
Patented May 4, 1875.



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Steam-Trap.

No. 162,765.

Patented May 4, 1875.



Witnesses.

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Inventor.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN STEAM-TRAPS.

Specification forming part of Letters Patent No. **162,765**, dated May 4, 1875; application filed March 11, 1875.

To all whom it may concern:

Be it known that I, FRANCIS A. PRATT, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Steam-Traps; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

The object of my invention is to provide a mechanism which shall allow water to flow through it to a steam-generator, but which shall prevent the flowing back of steam through the pipe when the water enters. My invention can also be adapted to regulate the flow into a boiler, so as to maintain the water within it at a given height.

My invention consists in an arrangement of levers, valves, and pistons, by which the steam-pressure in the boiler, acting upon a small subsidiary valve, throws a piston back and forth in a cylinder, so as to open and close, alternately, the communications between a reservoir-chamber and the water and steam pipes, the whole forming an automatic mechanism for admitting the water into the boiler.

In the accompanying drawings on two sheets, Figure 1 shows an upright view of my improved steam-trap, with the reservoir-chamber in section. Fig. 2 is a top view, with the valve mechanism shown in section. Figs. 3 and 4 are a side and top views of the seat of the small rotating valve, showing the steam-passages. Fig. 5 is a side view, and Figs. 6 and 7 are a top and bottom view, of the small rotating valve. Figs. 8 and 9 are a side and top view of the valve-seat arranged for a slide instead of a rotating valve, and Figs. 10 and 11 are a side and top view of the slide-valve adjusted to it.

A is a reservoir, which is alternately filled with water and emptied. It has a check-valve, V, at the bottom, to prevent any flowing back from the boiler. B is a float, which rises and falls with the water in the reservoir. C is a lever, attached to the float at one end,

and carrying a counterbalance-weight at the other. It is attached to the shaft D, which extends through a stuffing-box to the outside of the reservoir. C' is an arm, extending upward, outside of the reservoir, from the shaft D, and is operated by the arm C. At its upper end it has a swivel-socket, through which slides the bar E. F and G are two adjustable stops upon the bar E, which can be clamped in any position, so that any desired amount of motion can be given to the bar E by the movement of the arm C'. H is an arm, attached to the axis I of the small rotating valve J. K is a cylinder, into which enters the water-pipe L, which may be the drip-pipe coming from a system of steam heating-pipes, or any other water supply, and also the steam-pipe M, leading from the boiler. Within this cylinder moves the double piston N N'. This cylinder K has upon its interior the circular grooves *a b c*, and from its under side leads the pipe O. From the groove *a* a small aperture, *d*, leads through the thickness of the cylinder to the space above the small valve J, to supply steam from the pipe M through the groove *a*. From the valve-seat two small channels, *e* and *f*, lead to each end of the cylinder, and also an exhaust-pipe, *g*, leads from its center out to the open air. The valve J (shown more particularly in Figs. 5, 6, and 7) has two openings through it, (shown at *e'* and *f'*), which are brought alternately over the channels *e* or *f*, in opposite positions of the valve as it rotates back and forth by means of the lever H. It also has upon its under side the groove *g'*, which always covers the exhaust-pipe *g*, and opens a connection with the opposite end of the cylinder to that which is in connection with the steam through one of the openings *e' f'*.

In the position shown in the drawings, the steam has entered through M *a d f' f* and driven the piston N N' to the opposite end of the cylinder, from which the steam has escaped, through *e g' g*, to the open air. This position of the piston opens communication from the water-pipe L to the reservoir A, through the space between the heads N and N' of the piston and the pipe O. This allows the reservoir to fill, and raises the float B.

When it has risen so as to bring the lever C' against the stop G it reverses the valve J , brings the opening e' over e , and connects f with g . This throws the piston $N N'$ to the other end of the cylinder, and closes the water-pipe L , while it opens communication between the steam-pipe M and the reservoir A . The entering steam from the boiler creates an equilibrium of pressure above and below the water in the reservoir, and the water flows out by its gravity into the boiler, the reservoir A being placed sufficiently high for the purpose. When the water has flowed out the descent of the float throws the end of the lever C' against the stop F , and again reverses the small valve J , which again throws the piston, and the reservoir fills. This alternate action continues automatically. If it is desired to feed water into the boiler only to a certain level, the steam-pipe M is inserted at that level, in which case steam cannot enter to operate the apparatus until the water falls below the orifice. In place of the rotating valve J a slide-valve can be used. The valve shown in Figs. 10 and 11 slides back and forth in the groove h , Fig. 8. It opens and covers the ports $e f g$ in the ordinary manner of a slide-valve, and is operated by a crank-pin upon the end of shaft I , working in the groove i . The ports $d'' e'' f'' g''$ correspond

to $d e f g$ before described. P is an opening in the top of the cylinder K , usually fitted with a small pipe and stop-cock Q . This opening or vent is opened and closed by the movement of the piston-head N . It is open when the piston is in the position shown in the drawing, and allows all uncondensed steam or air which may be within the reservoir A to escape, and allow free entrance to the water from the pipe L . When the piston moves to the other end of the cylinder, to allow steam to enter from the pipe M , it closes the opening P , so as to prevent the escape of the steam. The cock Q is merely for the purpose of adjusting the size of the escape-aperture P .

What I claim as my invention is—

1. The combination of the subsidiary disk-valve J and its steam-channels with the cylinder and reciprocating piston $K N N'$, and the steam and water pipes $M L O$, substantially as and for the purpose herein described.

2. The aperture P in the cylinder K , in combination with the reciprocating piston N and pipe O , leading to the reservoir, to form an escape-valve, substantially as herein described.

FRANCIS A. PRATT.

Witnesses:

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THEO. G. ELLIS.