

(No Model.)

R. E. GAINES.
STEAM PRESSURE REGULATOR.

No. 367,385.

Patented Aug. 2, 1887.

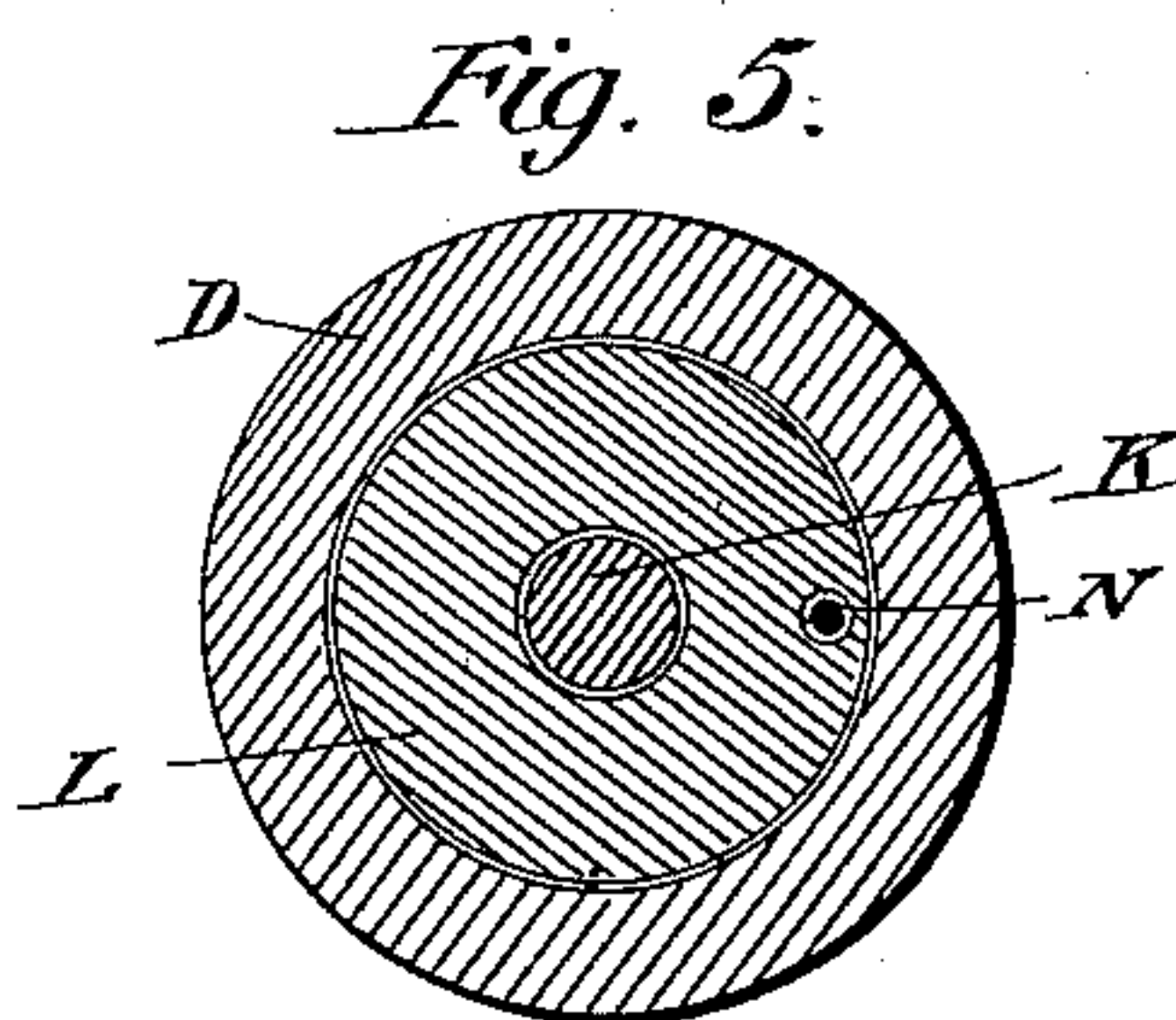
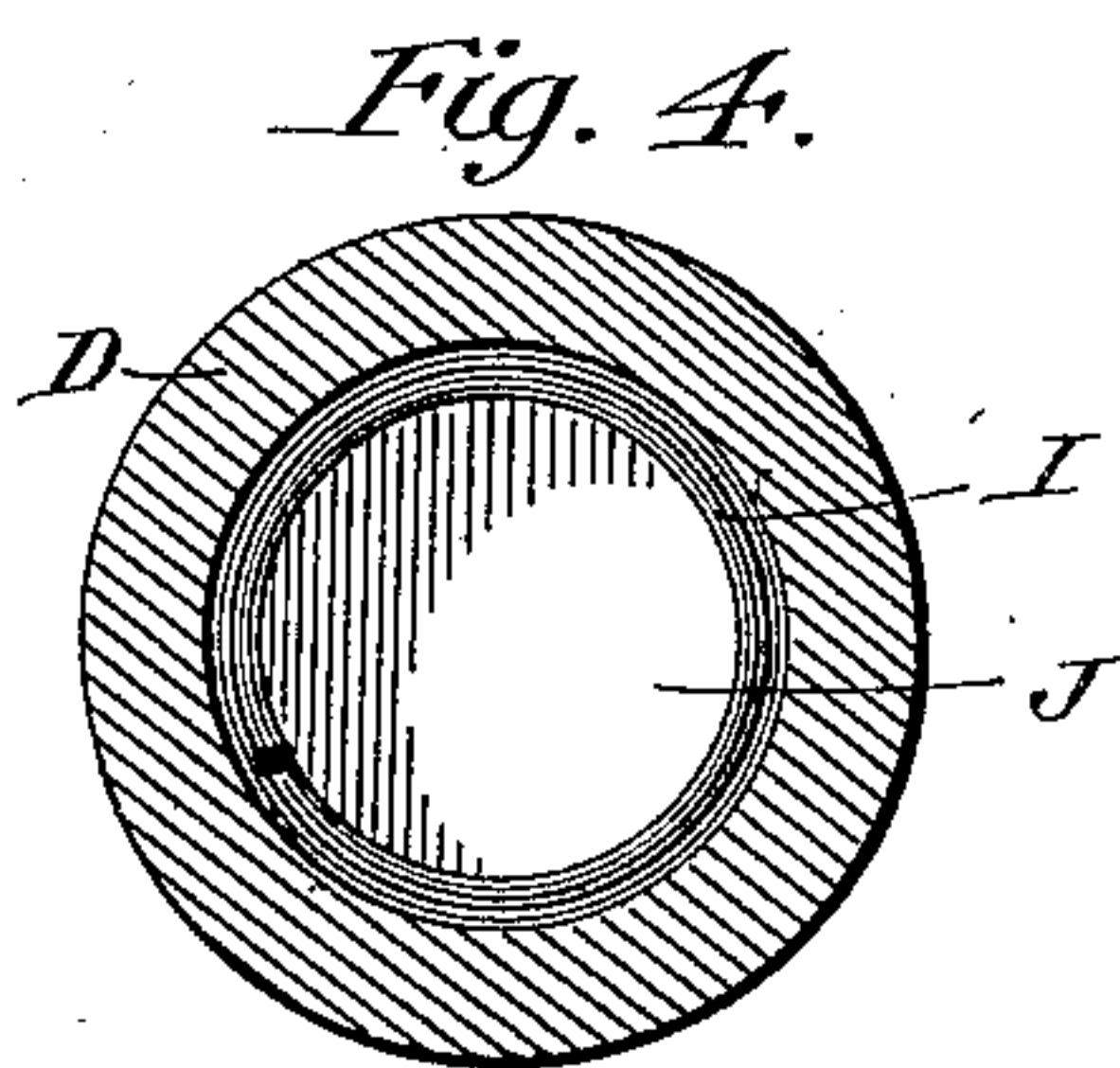
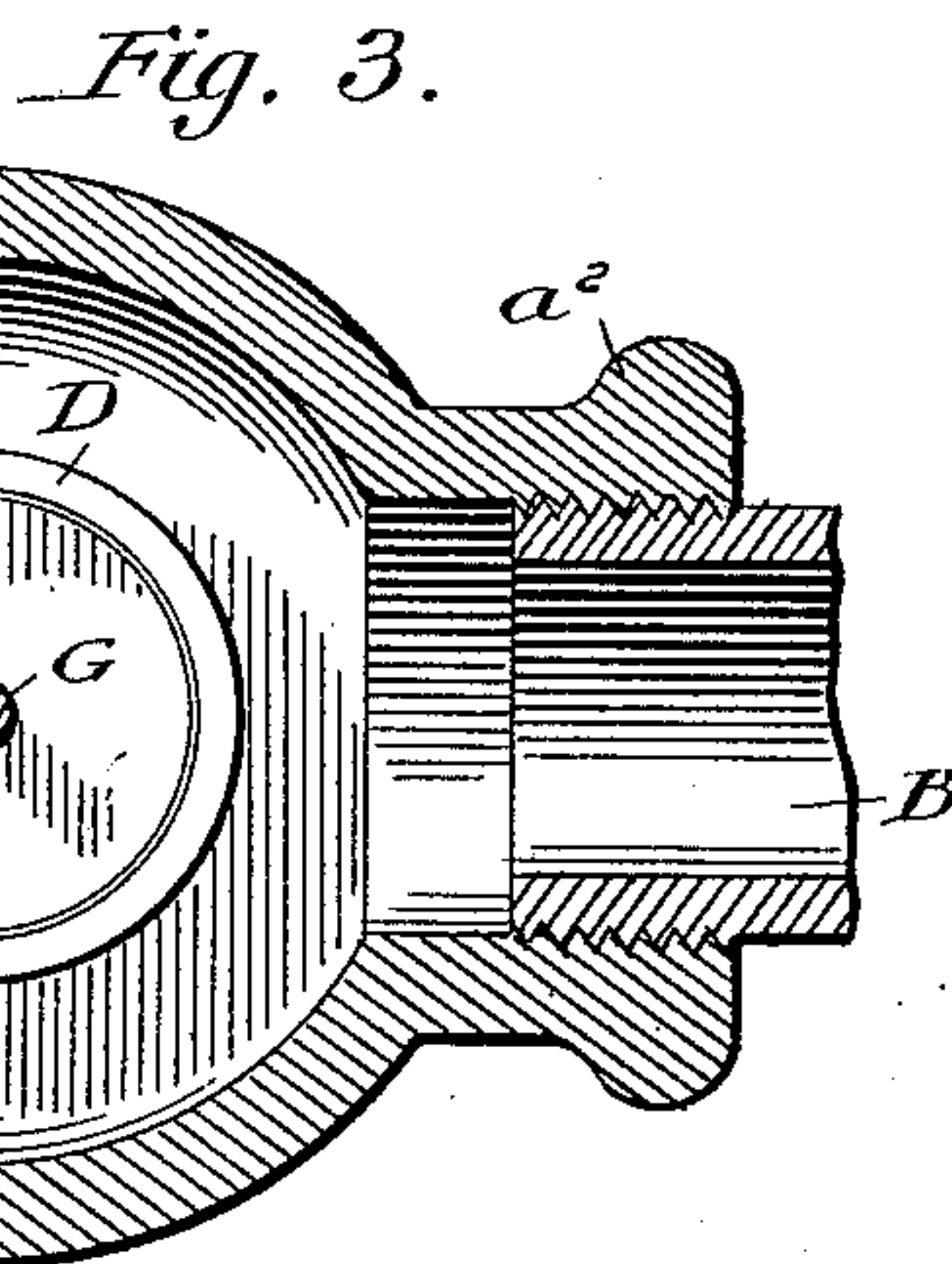
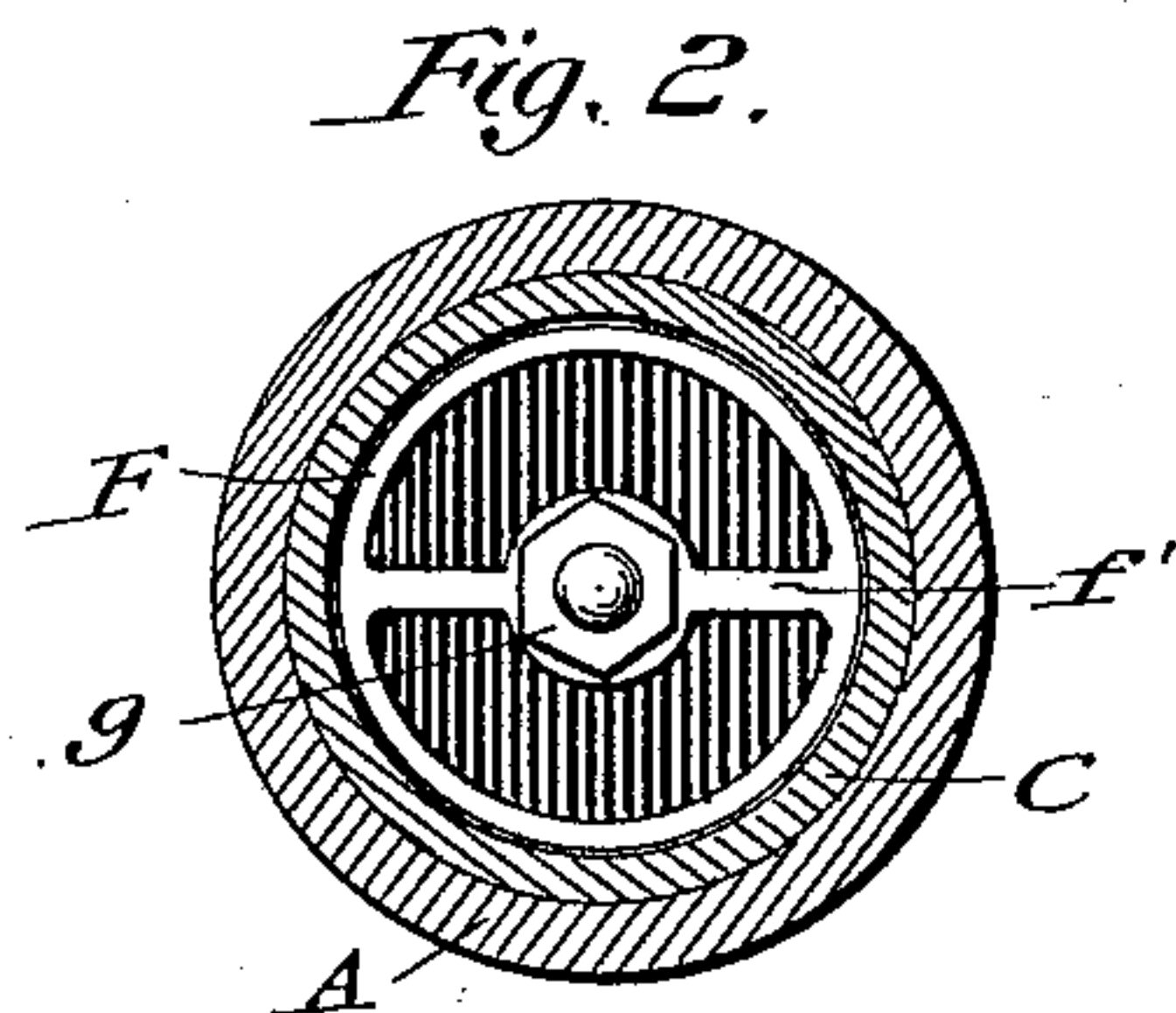
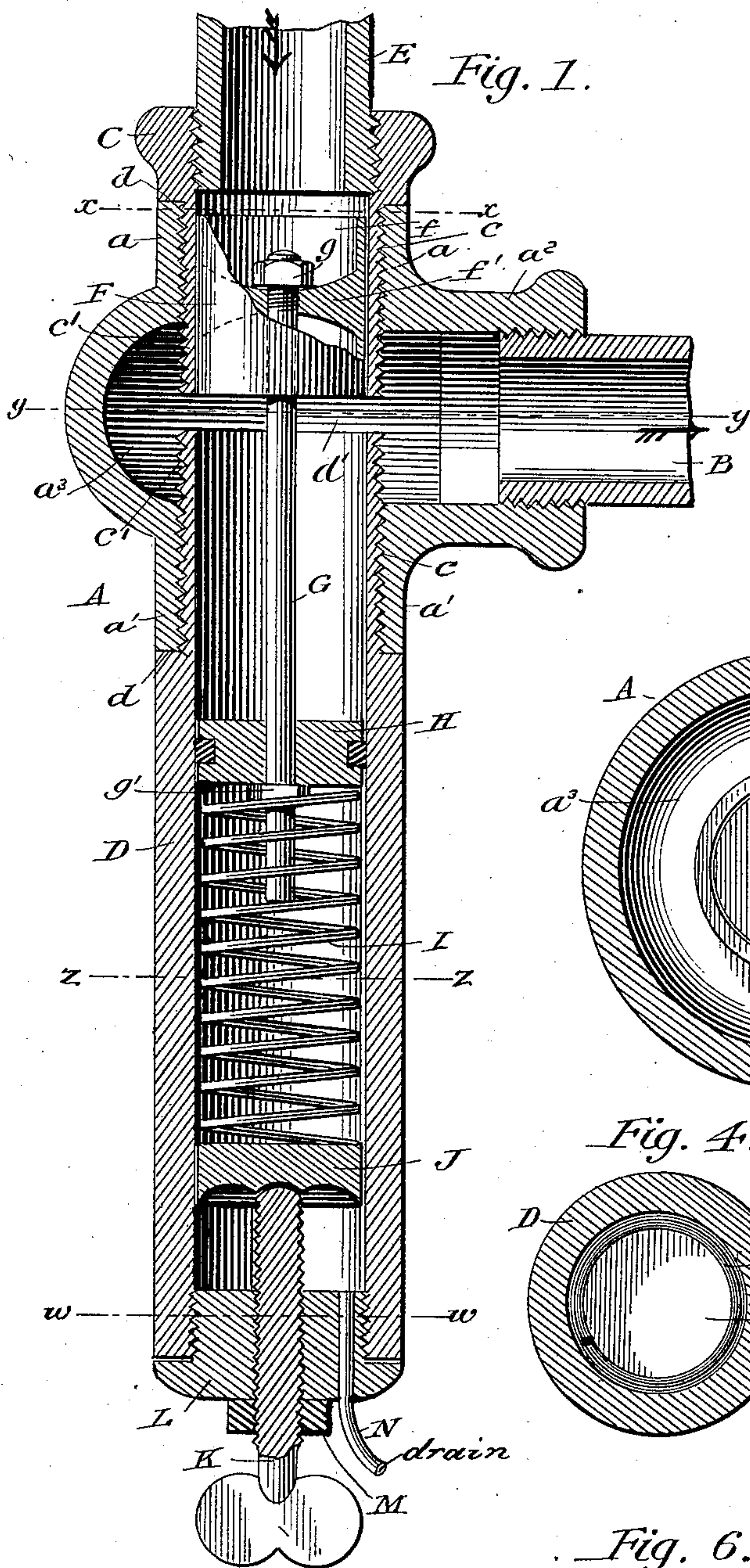
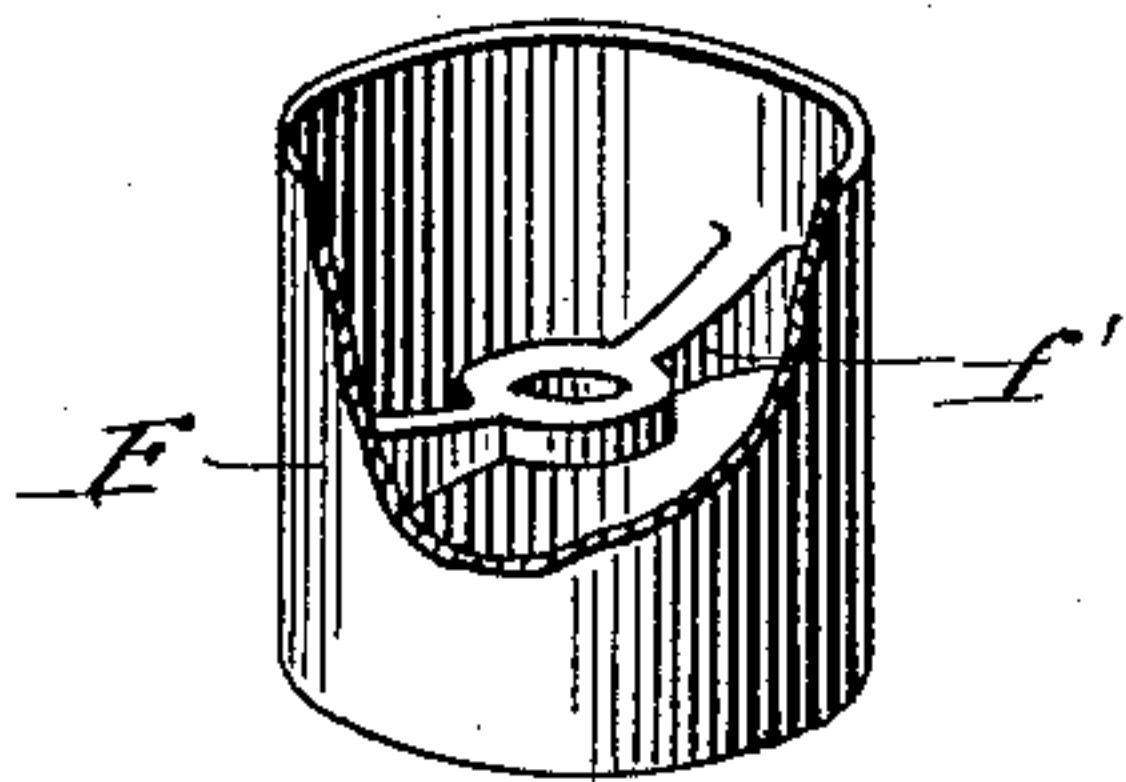


Fig. 6.



Witnesses.

Kovins & Clark

Chas. J. Little,

Inventor

Robert E. Gaines,

By J. R. Little,
Attorney.

UNITED STATES PATENT OFFICE.

ROBERT E. GAINES, OF FRANKFORT, KENTUCKY.

STEAM-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 367,385, dated August 2, 1887.

Application filed April 11, 1887. Serial No. 234,402. (No model.)

To all whom it may concern:

Be it known that I, ROBERT E. GAINES, a citizen of the United States, residing at Frankfort, in the county of Franklin and State of Kentucky, have invented certain new and useful Improvements in Steam-Pressure Regulators; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of steam-pressure regulators in which a cylinder is connected with the steam-pipe and carries a piston acting against the tension of an adjustable spring, a valve being connected with the piston and adapted to be adjusted or operated by any movement of the piston caused by the steam-pressure within the cylinder.

The object of my invention is to provide a simple and improved steam-pressure regulator of this class, which will be equally adapted for application to steam-pumps and steam-engines, which can be applied wherever an elbow is formed in the pipe, and which will efficiently operate to automatically control the speed of the engine entirely by boiler-pressure after the engine is set going.

A further object of my invention is to provide a steam-pressure regulator possessing advantages in point of simplicity and inexpensiveness in construction, durability, and general efficiency.

In the drawings, Figure 1 is a vertical longitudinal sectional view of a steam-pressure regulator embodying my improvements. Fig. 2 is a transverse horizontal section of the same on the line $x x$, Fig. 1. Fig. 3 is a corresponding view on the line $y y$, Fig. 1. Fig. 4 is a corresponding view on the line $z z$, Fig. 1. Fig. 5 is a corresponding view on the line $w w$, Fig. 1. Fig. 6 is a detail perspective view of the valve.

Corresponding parts in the figures are denoted by the same letters of reference.

Referring to the drawings, A designates an ordinary T-pipe joint, which forms an elbow in the steam-pipe, and embodies a top branch, a , a bottom branch, a' , and a side branch, a^2 , the section B of the steam-pipe being connected with the latter.

Into the top and bottom branches, a a' , are

set cylinders C D, respectively, the connection being preferably formed by screw-threads c , extending from a shoulder, d , upon the cylinders. The top cylinder, C, is provided at its upper end with interior screw-threads forming a fitting for the section E of the steam-pipe.

At its central portion the T-joint is formed with an annular enlargement or channel, a^3 , opening into the side branch, a^2 , and the adjoining inner ends, c' , of the cylinders project into this central portion of the T. These adjoining ends are near enough together to form an annular opening, d' , of sufficient capacity to allow the full pipe-area of steam-pressure when the valve, hereinafter described, does not operate to close the opening.

F designates a hollow valve working in the cylinder C, and comprising an annular ring or cylinder, f , and a transverse interior cross-piece, f' . This valve corresponds to the interior diameter of its cylinder, and by reason of its hollow construction is perfectly balanced. The valve is normally just above the opening d' .

To the cross-piece f' of the valve F is connected the end of a vertical piston-rod, G, extending from a piston, H, which works in the lower cylinder, D, the connection of the piston-rod with the valve and piston being preferably effected by means of nuts $g g'$, respectively, as shown.

The valve, piston-rod, and piston normally rest upon and are supported by a coiled spring, I, contained within the lower cylinder, and of required tension. The tension of this spring is regulated by a jam nut, J, working in the cylinder D and against the lower end of the spring, the nut being adjustable by means of a set-screw, K, working through a screw-threaded head, L, in the bottom of the cylinder. The screw is preferably provided with a lock-nut, M, and the head L has a tube, N, forming a vent to allow any products of condensation which may accumulate below the piston to pass off.

The operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains. The steam-pressure from the boiler, passing through the hollow balanced valve, acts upon the piston-head and forces it downward against the ten-

sion of the spring, thereby causing a corresponding movement of the valve, by which the passage of steam through the opening d' is regulated, so that only the amount of pressure
5 required to do the work is allowed to pass into the channel a^3 and to the cylinder of the pump or engine.

By adjustment of the screw and jam-nut the speed is first set or regulated, after which the
10 device automatically retains the same pressure and speed. When the pressure from the boiler increases, the valve operates with relation to the opening d' to correspondingly close it, and when the boiler-pressure decreases the
15 valve is correspondingly raised by the tension of its supporting-spring.

It is manifest that numerous modifications in the construction and arrangement of parts may be made without departing from the spirit
20 and scope of my invention, and I therefore do not limit my claims to the exact construction and arrangement herein shown and specified.

I claim as my invention—

1. In a steam-pressure regulator, the combination of the T-pipe joint having an annular enlargement or channel, an upper and lower
25 cylinder entering the same and forming an opening at their adjoining inner edges opening into said channel, a hollow valve comprising a ring or cylinder and sliding in the upper
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cylinder with relation to the opening, a piston operating in the lower cylinder and connected with the valve, a coiled spring acting against the piston, a jam-nut, and a set-screw, substantially as set forth. 35

2. A steam-pressure regulator comprising a T-pipe joint having an annular central enlargement or channel, an upper and lower cylinder entering said joint in opposite directions and forming an annular opening at their
40 adjoining inner edges, and valve mechanism sliding within the cylinders and adapted to regulate or close said opening, substantially as set forth.

3. In a steam-pressure regulator, the combination, with the T-pipe joint and cylinders entering the same from opposite directions and forming an annular opening at their adjoining inner edges, of a hollow valve comprising a ring or cylinder sliding within one
50 of the cylinders with relation to said opening and mechanism for operating said valve, substantially as set forth.

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

ROBERT E. GAINES.

Witnesses:

JNO. B. MEEK,

WM. L. TANNER.