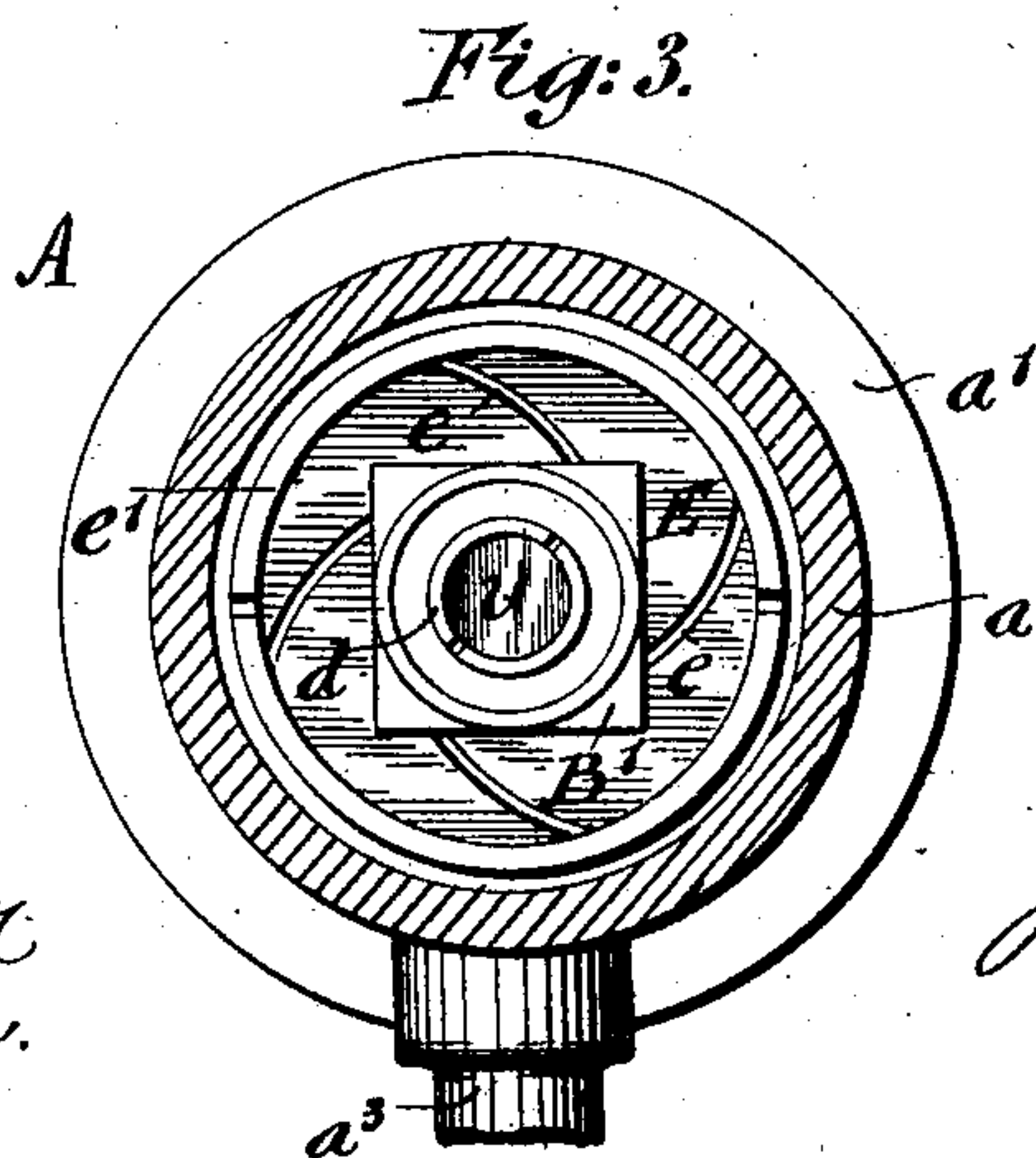
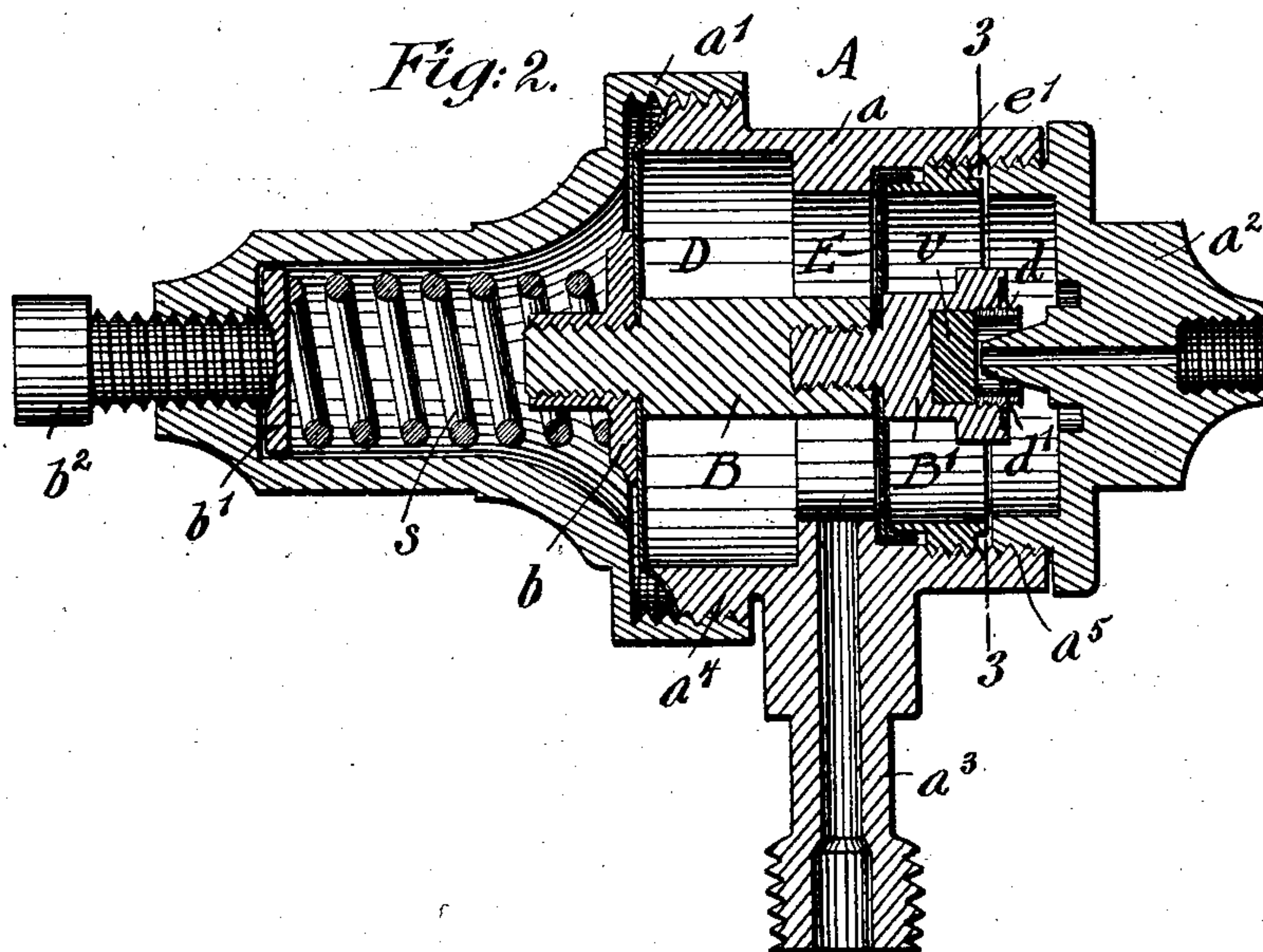
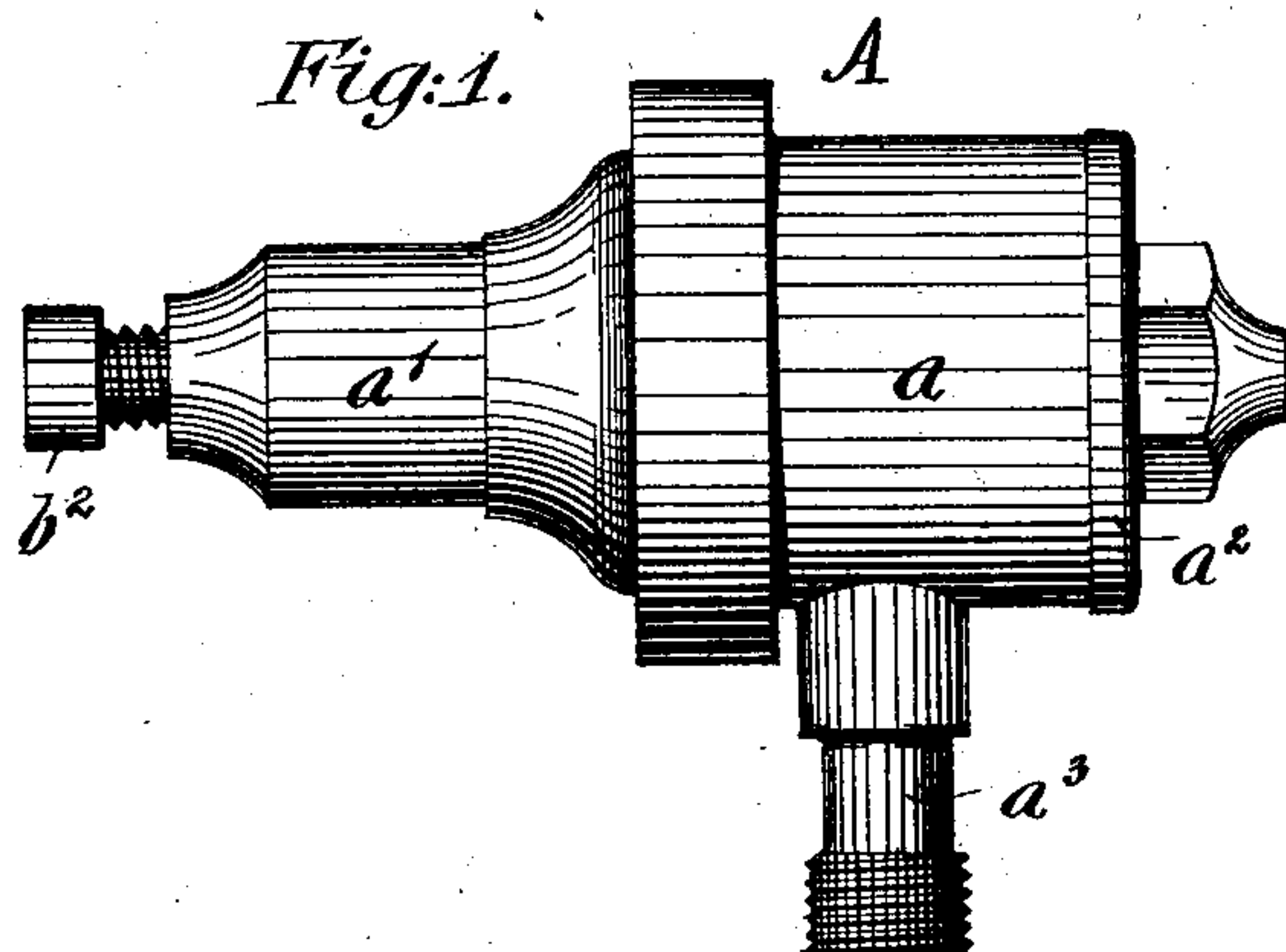


No. 720,375.

PATENTED FEB. 10, 1903.

J. NAGELDINGER.
PRESSURE RELIEF VALVE.
APPLICATION FILED MAY 16, 1902.

NO MODEL.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN NAGELDINGER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
WILLIAM CH. F. BOYER, OF NEW YORK, N. Y.

PRESSURE-RELIEF VALVE.

SPECIFICATION forming part of Letters Patent No. 720,375, dated February 10, 1903.

Application filed May 16, 1902. Serial No. 107,614. (No model.)

To all whom it may concern:

Be it known that I, JOHN NAGELDINGER, a citizen of the United States, residing in New York, borough of Manhattan, and State of New York, have invented certain new and useful Improvements in Pressure-Relief Valves, of which the following is a specification.

This invention has reference to certain improvements in pressure-relief valves of that class that are intended for use with fountains containing carbonic acid or other fluids under pressure, and by which the objections to the present pressure-relief valves—namely, the too large surface area of the same and the liability to getting fast to their seats when not tested for a long time—are obviated by means of a very reliable construction of the relief-valve that responds accurately to any overpressure of gas beyond the pressure for which the valve is set; and for this purpose the invention consists of a pressure-relief valve which comprises a valve-casing, a diaphragm in said casing, a spindle attached to said diaphragm, a pressure-regulating spring acting on said spindle, a valve attached to the end of the spindle, an outlet-orifice provided with an interior seat for the valve, and a supply-pipe for the gas or other fluid connected with said valve-casing.

The invention consists, further, of a pressure-relief valve in which the spring-actuated spindle is provided with a detachable portion having a socket for the valve and a diaphragm applied between said spindle and said detachable portion, so as to steady the valve in its motion toward the valve-seat and produce the effective closing or opening of the same.

In the accompanying drawings, Figure 1 is a side elevation of my improved pressure-relief valve. Fig. 2 is a vertical longitudinal section of the same drawn on a larger scale; and Fig. 3 is a vertical transverse section on line 3-3, Fig. 2.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the casing of my improved pressure-relief valve, which casing is preferably made in three sections, a cylindrical middle section a , a rear section a' , and a smaller cap or discharge section a^2 . The cylindrical middle section a is

provided with a supply-pipe a^3 , which is adapted to be connected with a receiver or other reservoir containing carbonic acid or other fluid under pressure. The middle section a is further provided at one end with an exterior threaded shoulder a^4 , on which the rear section a' is screwed, and with an interior screw-thread a^5 at the opposite end, into which the discharge-section a^2 is screwed.

Between the rear section a' and the rear end of the middle section a is interposed a sheet-metal diaphragm D, that is soldered or otherwise attached to the beveled edge of the middle section a , said diaphragm being acted upon by a strong helical spring s , which is interposed between a sleeve-shaped bushing b on the spindle B, to which the diaphragm D is attached, and a washer b' , that is acted upon by a set-screw b^2 . The helical spring s is placed in a cylindrical extension or housing of the rear section a' , while the set-screw acts in the end of said extension, as shown clearly in Fig. 2. The set-screw b^2 permits the adjustment of the spring s to the required degree of pressure to which the pressure-relief valve is to be set.

The spindle B is provided with a detachable portion B' at its front end, the threaded shank of which is screwed into a bore of the spindle B, said end portion B' being provided with a suitable socket in which the valve v is seated, the valve being retained by a cylindrical bushing d , that is screwed into the socket.

The cap-section a^2 is provided with a longitudinal bore and with an interior nozzle or seat d' , against which the valve v is pressed by the pressure-regulating spring s . The valve v may be made of hard rubber or other suitable material that produces the reliable closing of the nozzle and discharge-opening in the cap-section a^2 .

Between the main portion of the spindle B and the detachable portion B' is held a sheet-metal diaphragm E, which is preferably provided with a plurality of slits e , that extend from the outer circumference of the diaphragm toward the center of the same, as shown in Fig. 3, said diaphragm serving for guiding and steadying the spindle in its vibratory movements and for supporting it at

the center of the valve-casing A. By providing the diaphragm with slits a certain degree of resiliency is imparted to the same, so that it may yield to the spindle as the same vibrates backward and forward. This slitted diaphragm always holds the spindle centrally in line with the nozzle at the end of the spindle and produces thereby the uniform contact of the face of the valve with the seat of the nozzle, and thereby the effective closing or opening of the valve during its operation. The diaphragm E is provided with a circumferential flange, which is engaged by an interior screw-ring e' , that screws into the middle section a , as shown clearly in Fig. 2.

When the gas is supplied through the supply-pipe a^3 , it expands in the valve and acts on the diaphragm D. The counter-pressure on the diaphragm D is thereby overcome and the spindle B compelled to move under pressure of the gas, and the valve v is moved away from the seat of the nozzle d' , so as to permit the escape of gas until the pressure in the receptacle is reduced. As soon as the pressure falls below that for which the spring is set the valve is instantly closed on the seat of the nozzle, so as to close the same effectively and prevent the further escape of gas. As soon as the gas-pressure rises again beyond the tension of the spring the gas is again permitted to escape through the nozzle and bore in the cap-section, the valve being again closed as soon as the pressure lowers below that to which the spring is set. The movement imparted to the spindle by the pressure of the gas and tension of the spring acting on the diaphragm produces the reestablishment of the desired pressure in the gas-reservoir without any danger of sticking of the valve or inaccuracy of the same due to too large surface area of the valve. The valve-spindle is guided by its diaphragm so as to be held always in proper alinement with the axis of the casing and discharge-nozzle,

so that the proper reliable and effective working is obtained.

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

1. The combination, with a valve-casing provided with a supply-pipe, of a spring-actuated main diaphragm in said casing, a spindle attached to said diaphragm and provided with a socket at its end, a valve seated in the socket of the spindle, a discharge-nozzle and opening at the end of the valve-casing, and means for guiding said spindle in line with said discharge-nozzle, substantially as set forth.

2. The combination, with a valve-casing provided with a supply-pipe, of a spring-actuated main diaphragm in said casing, a spindle attached to said diaphragm and provided with a socket at its end, a valve seated in the socket of the spindle, a discharge-nozzle and opening at the end of the valve-casing, and an auxiliary diaphragm attached to the valve-spindle for guiding and seating the same, substantially as set forth.

3. The combination, with a valve-casing provided with a supply-pipe, of a spring-actuated main diaphragm in said casing, a spindle attached to said diaphragm, a detachable portion on said spindle provided with a socket at its end, a valve in said socket, and an auxiliary diaphragm attached between the main and the detachable portions of the spindle and provided with slits extending from the circumference toward the center of the auxiliary diaphragm so as to guide and steady the spindle, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHN NAGELDINGER.

Witnesses:

PAUL GOEPEL,
HENRY SUHRBIER.