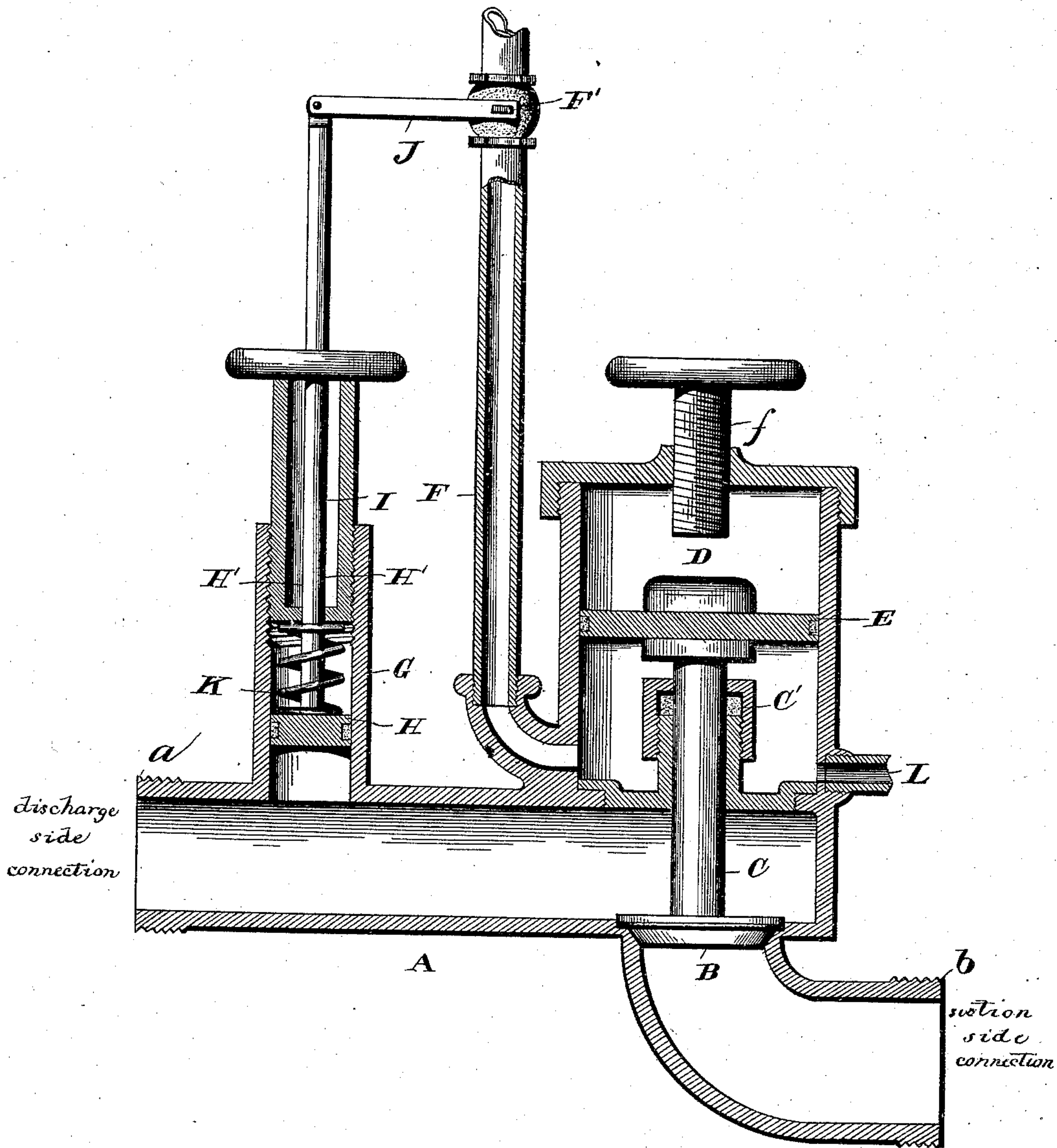


(No Model.)

J. W. ALLAN.  
RELIEF VALVE.

No. 474,711.

Patented May 10, 1892.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOHN W. ALLAN, OF MINNEAPOLIS, MINNESOTA.

## RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 474,711, dated May 10, 1892.

Application filed November 30, 1891. Serial No. 413,584. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. ALLAN, a citizen of the United States, and a resident of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Relief-Valves; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to letters of reference marked thereon, which form a part of this specification.

The figure of the drawing is a representation of the invention in vertical section.

This invention has relation to certain new and useful improvements in relief-valves; and it consists in the novel construction and combination of parts, as hereinafter specified.

The invention relates more especially to valves of the above-named character, wherein steam and water pressure are alternately employed in opening and closing the valve for controlling the pressure in fire-engine pumps when the shut-offs or controlling nozzles are open or closed, or in any other class of pumps wherein relief or controlling valves are employed.

In the accompanying drawing, the letter A designates the casing or shell, having at one end the coupling *a*, designed to be connected with the discharge side of a pump, and at the opposite portion a coupling *b*, designed to be connected to the suction side of the pump.

B designates a valve which when closed shuts off the passage through the coupling *b* and stops the flow of water from the discharge to the suction side of the pump through the valve, said valve being held closed by water-pressure from the discharge side. Said valve has a stem C, which passes through a stuffing-box C' into a steam-cylinder D and is connected to a piston-head E thereon.

F is a steam-supply pipe communicating with the lower portion of said cylinder and provided with a valve F'. When steam is admitted to the cylinder, the piston is forced upwardly, thereby unseating the valve B and allowing a free flow or circulation of water from the discharge to the suction side of the

pump. The upward throw of the piston and the corresponding lift of the valve may be governed by an adjustable plug or screw *f*, which projects into the upper portion of the cylinder.

G designates a second cylinder, communicating at its lower end with the chamber of the shell or casing on the discharge side. Reciprocating in this cylinder is a piston H, carried by a rod or stem H', which projects outwardly through a stuffing-box I and is connected at its upper portion to an arm or lever J, the opposite end portion of said lever being connected to and designed to operate the valve F' in the steam-pipe F to admit or cut off the supply of steam from the cylinder D. The piston H is held against the discharge-pressure by a spring K in the cylinder G. The stuffing-box I has a threaded adjustable engagement with the cylinder G, and as the spring is seated between the piston and the stuffing box or plug by the adjustment of the latter said spring may be regulated to balance any desired pressure.

The operation of the valve is as follows: The spring is screwed down on the piston H until it balances the desired water-pressure on the discharge side of the pump. When the flow of water is stopped or arrested by closing the shut-off or controlling nozzle, the pressure will increase on the discharge side of the pump, overbalancing the spring-pressure on the piston H, forcing the latter upwardly, its rod or stem operating the arm or lever J to open the valve F', and thereby admitting steam to the cylinder D. This will instantly force the piston E upwardly in said cylinder, lifting the valve B from its seat and allowing a free flow of water from the discharge to the suction side, and thereby taking all overpressure from the hose. When the shut-off or controlling nozzle of the hose is again opened, the pressure is relieved on the discharge side until overcome by the spring K forcing the piston H downwardly, and thereby cutting off steam from the cylinder D. The steam remaining in said cylinder will condense and allow the piston E to fall, the valve B being closed thereby and by the pressure of the water.

L is a drip-cock, by means of which the wa-



ter of condensation may be drawn from the cylinder D. The manner in which the valve is connected to the pump will vary somewhat, according to the character of the pump, but is usually effected by drilling a small hole in the suction side of the pump at any convenient point (if there are already no connections which can be utilized) and making a pipe connection therewith and the coupling b. Similar connection is made between the discharge side of the pump and the coupling a.

Having described this invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described valve mechanism, comprising the relief-valve, the steam-operated piston connected thereto, and means whereby an excess of pressure on the discharge side of the pump admits steam to said piston to open the valve and a reduction of pressure will cut off steam and close the valve, substantially as specified.

2. The herein-described valve mechanism for pumps, comprising the valve closing the connection with the suction side of the pump, the stem connected thereto, and a steam-actuated piston, the piston-cylinder, and the valved steam-supply therefor, in combination with the piston actuated by the pressure on the discharge side of the pump and a connection between said piston and the valve of the steam-supply pipe, substantially as specified.

3. The combination, with the chamber or casing having a connection with the discharge and with the suction side of a pump, the valve normally held closed by the pressure of water from the discharge side and shutting off the connection with the suction side, and the steam-actuated piston connected to said valve, the piston actuated by the pressure from the discharge side and normally balanced thereagainst by a spring, of a connection between said piston and the valve of the steam-sup-

ply for actuating the first-named piston, substantially as specified.

4. The combination, with the chamber or casing having a connection with the discharge side of a pump, a valve closing the connection with the suction side and normally held closed by the pressure of the water from the discharge side, the stem of said valve, the piston-head connected thereto and designed to lift said valve, the piston-cylinder, and means for regulating the throw of said piston therein, of the piston actuated by an excess of pressure on the discharge side and normally balanced thereagainst by a spring, the cylinder for said piston and means for controlling the action of said spring to the desired pressure, the piston rod or stem, and the connection between said stem and the valve of the steam-supply for the first-named cylinder, substantially as specified.

5. The relief-valve mechanism herein described, comprising a casing having a chamber therein and provided with couplings for connection with the suction and with the discharge side of a pump, a valve in one of said couplings closing the connection with the suction side and normally held closed by the pressure of the water in said chamber from the discharge side, the stem of said valve, the cylinder, and the piston-head on said stem working in said cylinder, a second cylinder having a piston therein actuated by an excess of pressure from the discharge side and balanced against a normal pressure therein, the rod or stem of said piston, a lever connected thereto, and a steam-inlet leading into the first cylinder and having a valve operated by said lever, substantially as specified.

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

JOHN W. ALLAN.

Witnesses:

ADOLPH G. SCHLINER,  
EDWARD I. KINGSLEY.