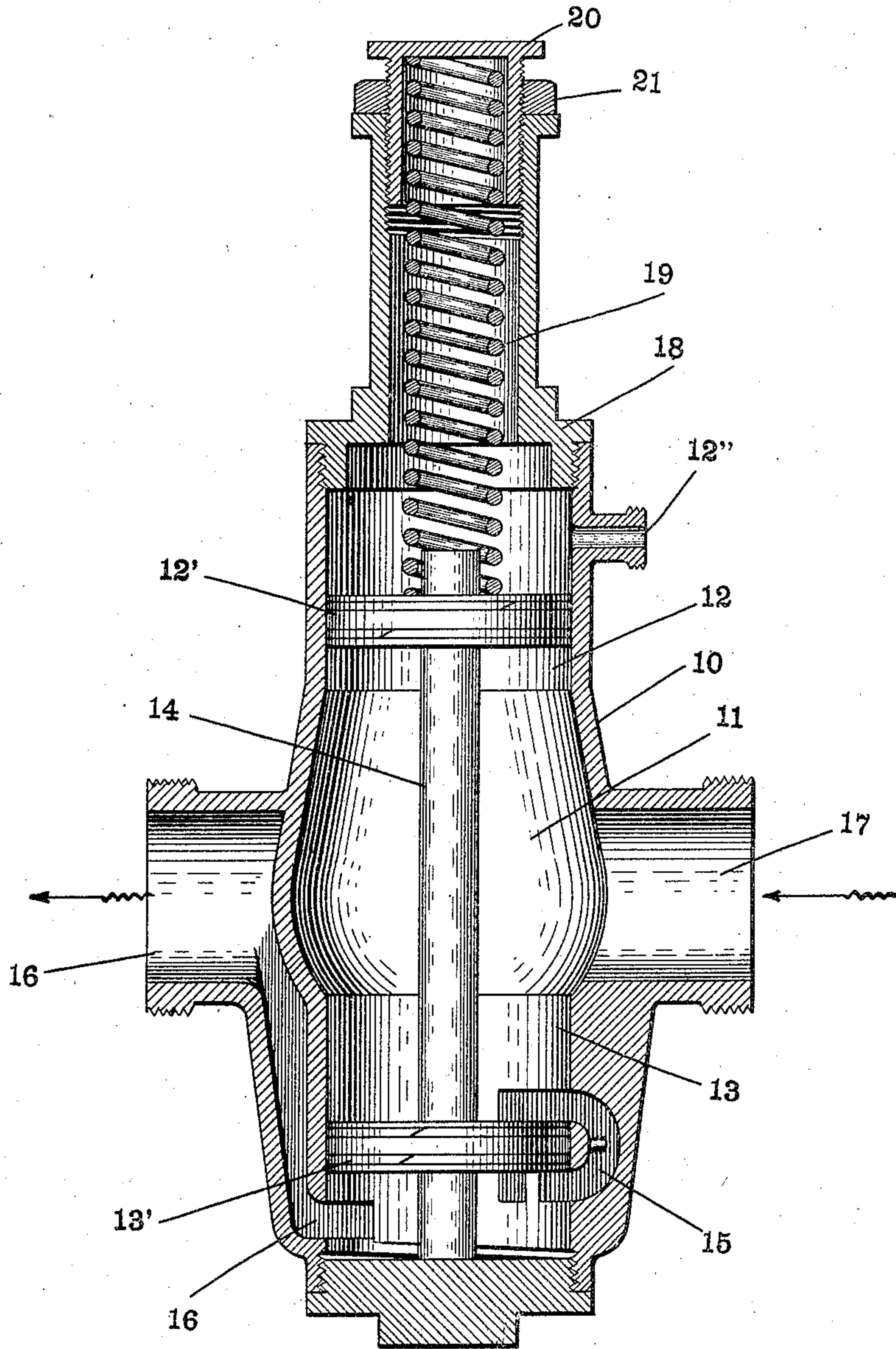


No. 789,819.

PATENTED MAY 16, 1905.

H. C. ROOT.  
VALVE.

APPLICATION FILED MAR. 8, 1905.



Witnesses  
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# UNITED STATES PATENT OFFICE.

HARRY C. ROOT, OF CHARLESTON, ILLINOIS.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 789,819, dated May 16, 1905.

Application filed March 8, 1905. Serial No. 249,096.

*To all whom it may concern:*

Be it known that I, HARRY C. ROOT, a citizen of the United States, residing at Charleston, in the county of Coles and State of Illinois, have invented certain new and useful Improvements in Valves, of which the following is a specification.

The object of my invention is to produce a pressure reducing and controlling valve of the type shown in my Patent No. 706,488, issued May 24, 1904, the particular object being the production of a form of this valve which shall be more compact.

The accompanying drawing, which is a central vertical section, shows the position occupied when the parts are in normal operating position.

In the drawing, 10 indicates a suitable casing, within which is formed a chamber 11. At one end of chamber 11 is a cylinder 12 and at the other end a cylinder 13. Mounted within cylinder 12 is a piston 12', and mounted within the cylinder 13 is a piston 13', these two pistons being connected by a rod 14. Leading from the inner end of cylinder 13 around the piston 13' to the outer end of the cylinder is a by-pass 15, and leading from the outer end of cylinder 13 is the discharge-passage 16. An inlet-passage 17 leads into chamber 11. Leading into the upper end of cylinder 12 beyond any point to which the piston 12' can be forced is a vent-passage 12''. The outer end of cylinder 12 is closed by a tubular cap 18, within which is arranged a pressure - controlling spring 19, the force of which upon piston 12' may be varied by means of an adjustable cap 20, which is threaded into the upper end of the tubular cap 18 and is held in any desired position of adjustment by a suitable check-nut 21.

In operation the parts are normally in position shown in the drawing. The fluid-pressure entering the inlet-passage 17 passes into chamber 11 and from thence through by-pass 15 into the lower end of cylinder 13 and from thence out through the discharge-passage 16. The pressure within chamber 11 acts upon the inner faces of the two pistons 12' and 13', thus serving to substantially balance the piston

structure, (the cylinder 12 being made a trifle larger than the cylinder 13 for that purpose, if desired.) The pressure also acts upon the lower face of piston 13', and hence if the pressure within the outlet-passage and the lower end of the cylinder 13 becomes greater than the force of the spring 19 upon the piston structure the piston structure will be moved up so that piston 13' will move over the inlet end of the by-pass 15, and thus cut down the flow of fluid until the pressure within the lower end of cylinder 13 and outlet 16 becomes equal to the pressure exerted by the spring on the piston structure.

The operation of this device is like the operation of a device in the patent referred to, the difference being that the initial pressure is introduced between the pistons and there is no fluid-pressure in the spring-chamber. By this means the structure becomes considerably more compact than that shown in my prior patent, and there is no need of any packing-gland at any point. The by-pass 15 may be provided with suitable bridges to prevent the possibility of piston 13 catching in port while moving over same.

I claim as my invention—

1. A pressure-controlling valve structure consisting of; a casing, having an intermediate chamber with a passage communicating therewith, a pair of cylinders one at each end of said chamber, a by-pass forming a communication between the opposite ends of one of said cylinders, and a passage forming a communication between the outer end of said last-mentioned cylinder and the exterior; and a pair of connected pistons mounted one in each of said cylinders, one of said pistons controlling the by-pass.

2. A pressure-controlling valve structure consisting of; a casing, having an intermediate chamber with a passage communicating therewith, a pair of cylinders one at each end of said chamber, a by-pass forming a communication between the opposite ends of one of said cylinders, and a passage forming a communication between the outer end of said last-mentioned cylinder and the exterior; a pair of connected pistons mounted one in each



of said cylinders, one of said pistons controlling the by-pass; and a pressure-controlling spring engaging said piston structure.

3. A pressure-controlling valve structure  
5 consisting of; a casing, having an intermediate chamber with a passage communicating therewith, a pair of cylinders one at each end of said chamber, a by-pass forming a communication between the opposite ends of one  
10 of said cylinders, and a passage forming a communication between the outer end of said last-mentioned cylinder and the exterior; a pair of connected pistons mounted one in each of said cylinders, one of said pistons controlling the by-pass; and means for loading the  
15 valve structure.

4. A pressure-controlling valve structure consisting of; a casing, having an intermediate initial-pressure chamber, an inlet-passage  
20 leading thereinto, a pair of cylinders arranged at opposite ends of said initial-pressure chamber, a by-pass forming a communication between the opposite ends of one of said cylinders, and an outlet-passage leading from the  
25 outer end of said last-mentioned cylinder; a piston structure mounted in said casing and consisting of a pair of connected pistons one mounted in each of said cylinders and one of

said pistons controlling the effective area of the by-pass; and a pressure-controlling spring  
30 arranged in the outer end of the other cylinder.

5. A pressure-controlling valve structure consisting of; a casing, having an intermediate initial-pressure chamber, an inlet-passage  
35 leading thereinto, a pair of cylinders arranged at opposite ends of said initial-pressure chamber, a by-pass forming a communication between the opposite ends of one of said cylinders, and an outlet-passage leading from the  
40 outer end of said last-mentioned cylinder; a piston structure mounted in said casing and consisting of a pair of connected pistons one mounted in each of said cylinders and one of  
45 said pistons controlling the effective area of the by-pass; a pressure-controlling spring arranged in the outer end of the other cylinder; and means for adjusting the effective pressure of said spring.

In witness whereof I have hereunto set my  
50 hand and seal, at Charleston, Illinois, this 4th day of March, A. D. 1905.

HARRY C. ROOT. [L. s.]

Witnesses:

GEO. E. BURKETT,  
WALTER S. EASTIN.