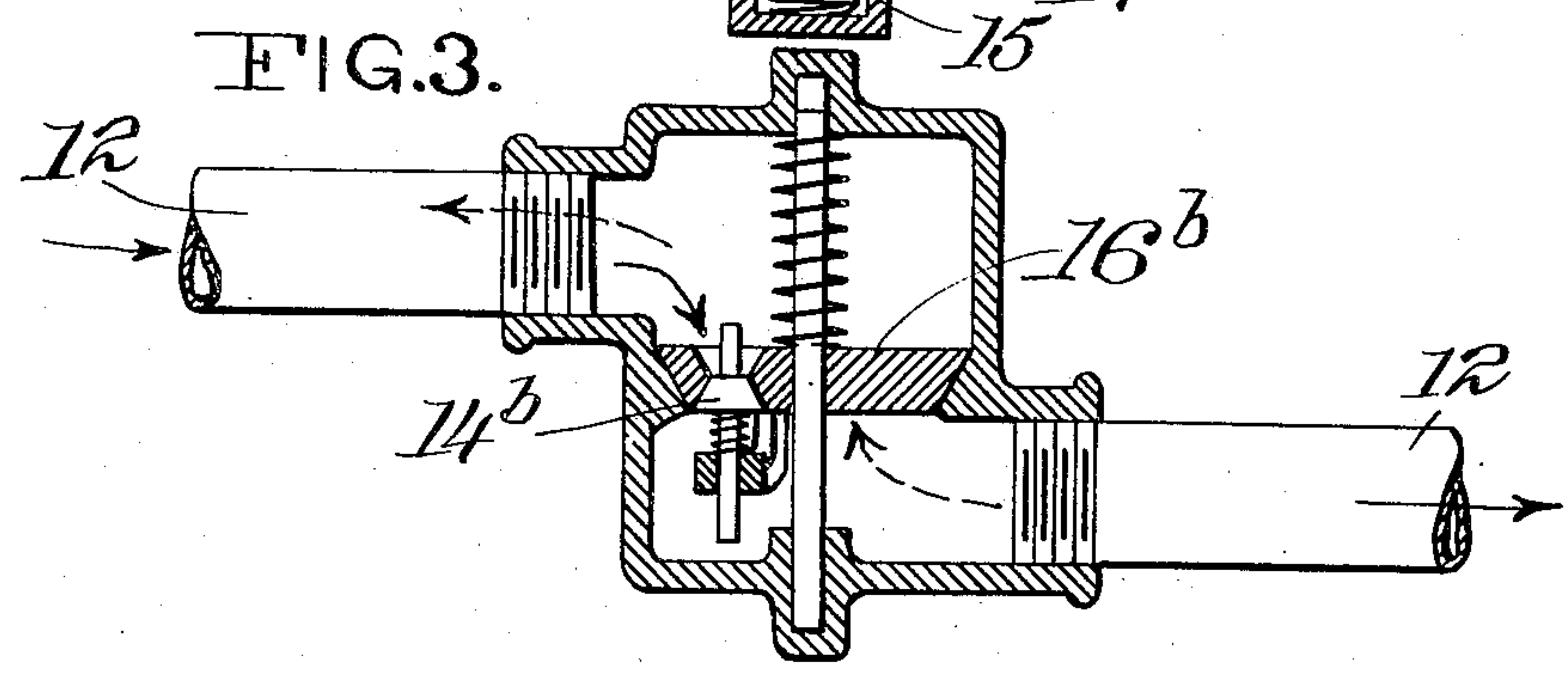
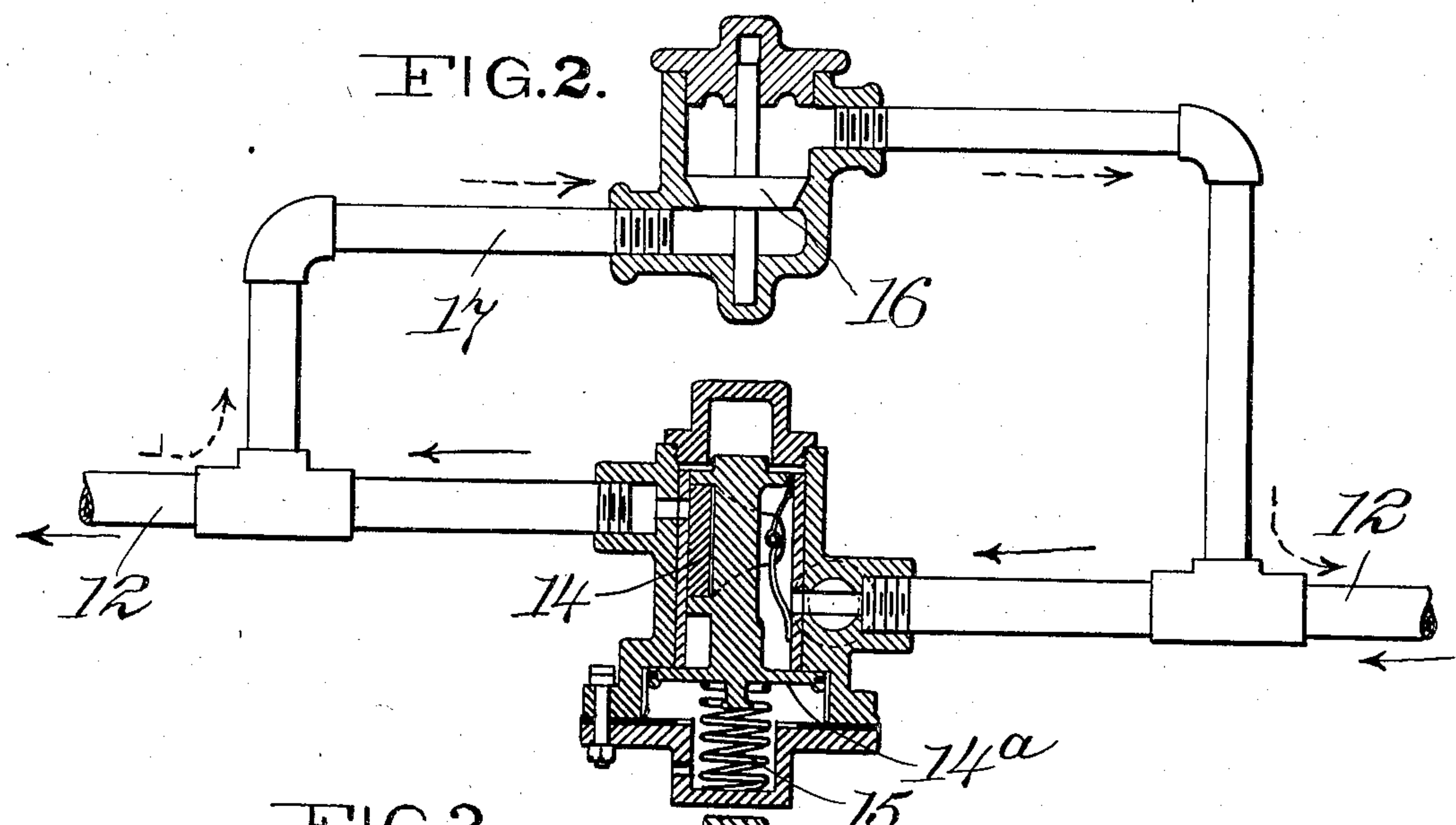
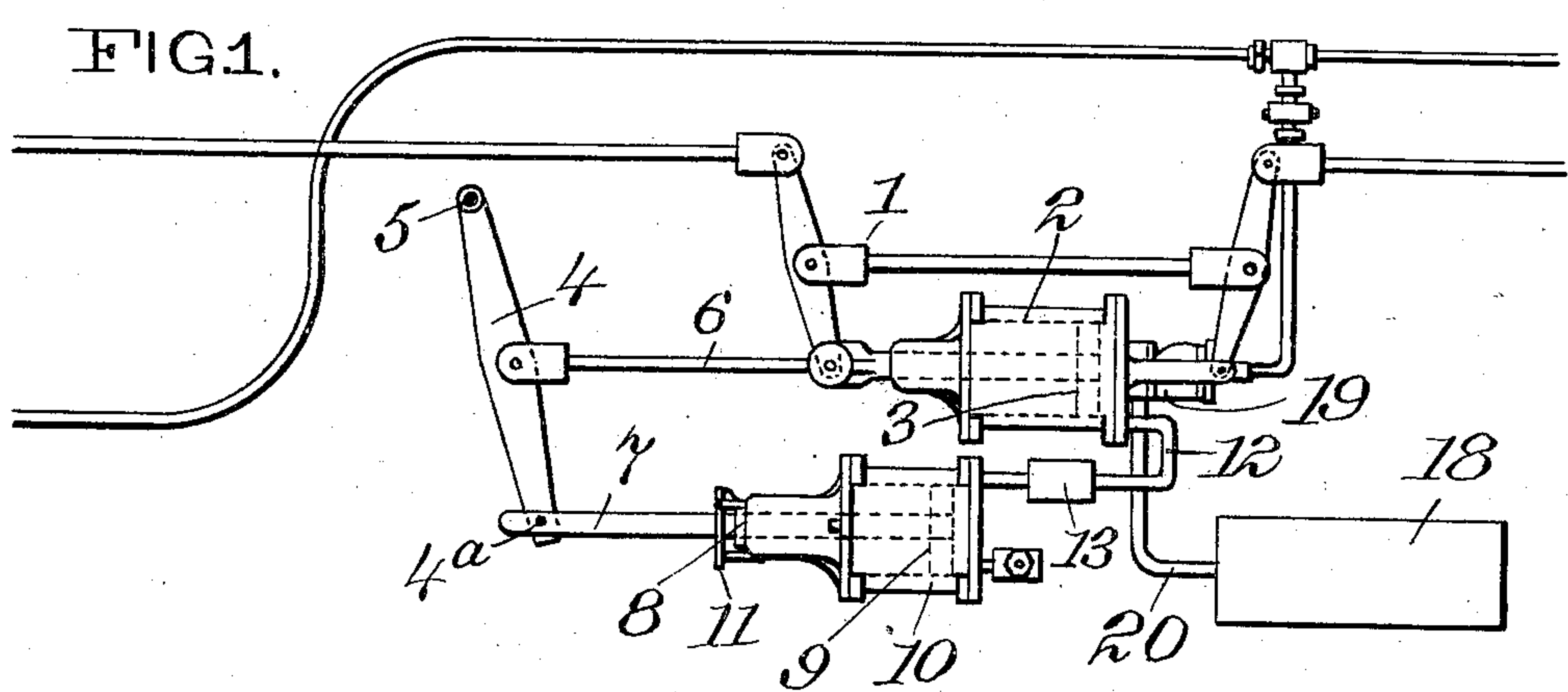


No. 827,880.

PATENTED AUG. 7, 1906.

A. PARKER-SMITH.
FLUID PRESSURE BRAKE.
APPLICATION FILED DEC. 1, 1905.



Witnesses
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FLUID-PRESSURE BRAKE.

No. 827,880.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed December 1, 1905. Serial No. 289,909.

To all whom it may concern:

Be it known that I, AUGUSTUS PARKER-SMITH, a citizen of the United States of America, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Fluid-Pressure Brakes, of which the following is a specification.

My invention relates to fluid-pressure brake systems, and is designed to economize the consumption of compressed air in the well-known air-brake systems in use on railroad and trolley cars. It has been heretofore proposed to employ two cylinders in such systems, the main cylinder serving to take up the slack and the brake-shoe clearance, after which the second cylinder comes into action and produces a greatly-increased brake-pressure without much additional consumption of air.

My invention is designed to perfect the action of one form of such two-cylinder systems in which the operation of the piston in the second cylinder is dependent upon the attainment of a predetermined pressure in the main cylinder.

The best form of apparatus at present known to me embodying my invention is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a plan view of the two cylinders and their connections. Fig. 2 is a detail in section of my improved arrangement of valves connecting the two cylinders. Fig. 3 is a similar view of a modified form of valve.

Throughout the drawings like reference-figures indicate like parts.

1 represents a portion of the usual system of levers and rods composing the brake-rigging.

2 is the main cylinder, whose piston 3 is connected to the brake-levers in the usual way.

4 is a supplemental lever pivoted at 5 to the car-body, connected by rod 6 to piston 3 and by pivot 4^a to push-rod 7, which latter telescopes into the hollow piston-rod 8 of piston 9 in the second cylinder 10.

11 represents any suitable means, such as a friction-clutch, for connecting the piston of the second cylinder to the push-rod 7, and thereby to the brake-levers, when said piston begins to move on its outward stroke.

12 is a pipe connecting the main cylinder with the second cylinder, and 13 represents diagrammatically in Fig. 1 the mechanism

for controlling the flow of fluid from one cylinder to the other through pipe 12. This controlling means consists of a valve 14, opening from the main cylinder to the second cylinder, controlled by piston 14^a, which is set by means of spring 15 to move and open valve 14 at a predetermined pressure of such fluid—say twenty pounds to the square inch. (See Fig. 2.) The unobstructed return-flow when brakes are released is permitted by check-valve 16, located in a by-pass connection 17 around said valve 14. The usual auxiliary reservoir is shown at 18, connected to triple valve 19 by pipe 20.

In Fig. 3 the admission-valve 14^b is shown located in the return check-valve 16^b, the assumption being in each case that the full-line arrows show the direction of flow of the air when the brakes are being applied, while the dotted-line arrows show the direction of flow when the air is escaping from the second cylinder.

The operation of my invention is as follows: When the triple valve 19 is actuated to admit air to main cylinder 2, piston 3 is forced out and the brakes applied in the usual way. The push-rod 7 moves idly out of hollow piston-rod 8. The first air so admitted moves piston 3 to take up slack and brake-shoe clearance. When the brakes are set and the pressure in cylinder 2 mounts up to the predetermined amount—say twenty pounds to the square inch—valve 14 opens and air passes over to cylinder 10. Piston 9 then moves out, clutch 11 grasps push-rod 7, and the pressure applied to piston 9 is conveyed to the lever 4 and by it transmitted with double force to the brake-rigging. When the brakes are released and pressure goes down in cylinder 2, the air flows freely back through check-valve 16 from cylinder 10 to cylinder 2 and thence to the triple-valve exhaust-port in the usual way. In the modification shown in Fig. 3 the same action takes place, except that valve 14^b performs the function of valve 14 and 16^b the function of valve 16.

The advantages of my invention comprise the perfect and simple control of the exhaust which it provides. Heretofore it has been proposed to employ a spring-governed valve in this combination; but such valve has also operated an exhaust-opening from the second cylinder to the atmosphere. Hence when the spring-valve closed accidentally during the application of the brakes, as from

a reduction of pressure in the main cylinder, due to the flow of air into the second cylinder, or from leakage in any form, the exhaust from the second cylinder would be opened 5 and the braking power of the same lost. This also produced a variable and jerky action of the brakes. My invention avoids this difficulty. When the valve 14 closes, it merely holds the air in cylinder 10 until the 10 main cylinder is exhausted to a lower pressure in the process of releasing the brakes. Then the check-valve 16 opens and the air flows out freely.

It is evident, of course, that various 15 changes could be made in the details of construction illustrated without departing from the spirit and scope of my invention. Different forms of valves might be used, and the form of pressure-operating device might be 20 changed, as by substituting a diaphragm for the piston 14^a. The exhaust from the second cylinder might be controlled directly by the exhaust of the triple valve 19; but these and similar modifications I should still con- 25 sider within the scope of my invention.

Having therefore described my invention, I claim—

1. In a fluid-pressure brake system, the combination with the brake-levers of a main 30 pressure-cylinder and piston connected to said levers, of a second cylinder and piston supplied with fluid under pressure from the first cylinder, means for connecting the piston of the second cylinder to the brake-levers 35 when said piston moves on its outstroke, a valve controlling the flow of air from the main cylinder to the second cylinder which valve is set to open at a predetermined pres-

sure, and a check-valve controlling the re- 40 turn flow of fluid from the second cylinder to the main cylinder.

2. In a fluid-pressure brake system, the combination with the brake-levers of a main pressure-cylinder and piston connected to 45 said levers, of a second cylinder and piston supplied with fluid under pressure from the first cylinder, means for connecting the piston of the second cylinder to the brake-levers when said piston moves on its outstroke, a 50 valve controlling the flow of air from the main cylinder to the second cylinder which valve is set to open at a predetermined pressure, and a check-valve controlling the re- turn flow of fluid from the second cylinder to 55 the main cylinder, said check-valve being located in a by-pass around said first-men- tioned valve.

3. In a fluid-pressure brake system, the combination with the brake-levers of a main 60 pressure-cylinder and piston connected to said levers, of a second cylinder and piston supplied with fluid under pressure from the first cylinder, means for connecting the piston of the second cylinder to the brake-levers when said piston moves on its outstroke, a 65 valve controlling the flow of air from the main cylinder to the second cylinder which valve is set to open at a predetermined pressure, and means other than said valve for ex- hausting the fluid from said second cylinder. 70

Signed at New York, N. Y., this 28th day of November, 1905.

AUGUSTUS PARKER-SMITH.

Witnesses:

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