P. H. DONOVAN.

TRIPLE VALVE DEVICE.

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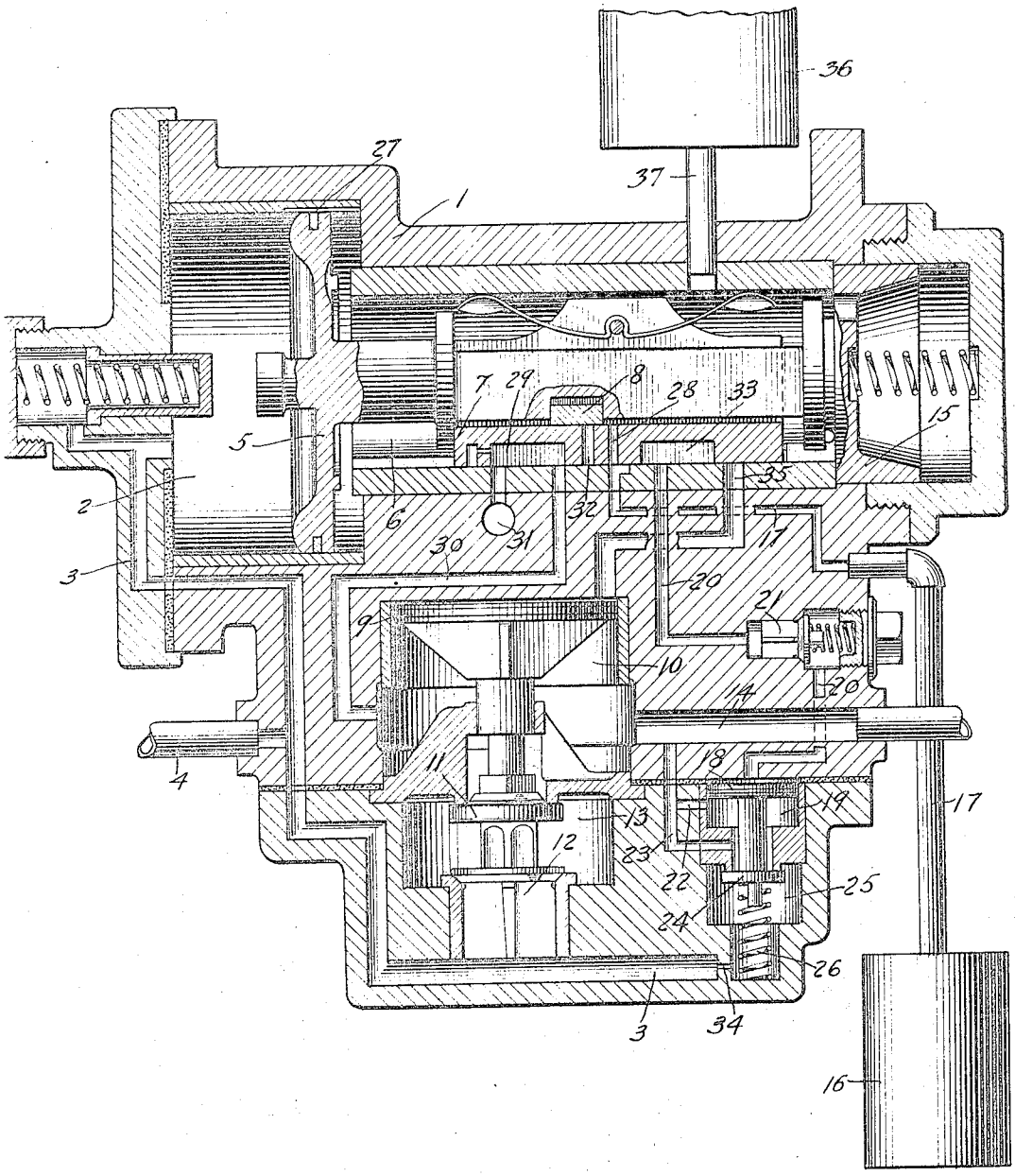

WITNESSES

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UNITED STATES PATENT OFFICE.

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TRIPLE-VALVE DEVICE.

1,134,442. Specification of Letters Patent. Patented Apr. 6, 1915.

Application filed January 18, 1912. Serial No. 671,864.

To all whom it may concern:

Be it known that I, PATRICK H. DONOVAN, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Triple-Valve Devices, of which the following is a specification.

This invention relates to fluid pressure brakes, and more particularly to a triple valve device.

In making a service application of the brakes, fluid is supplied from the auxiliary reservoir to the brake cylinder at substantially the same rate as the train pipe pressure is being reduced, and on long trains the rate of train pipe reduction being quite slow, it sometimes happens that fluid escapes through the usual brake cylinder leakage groove as fast as the same can be supplied from the auxiliary reservoir to the brake cylinder, thus preventing a sufficient building up of brake cylinder pressure to effect the outward movement of the brake cylinder piston.

The principal object of the present invention is to obviate the above difficulty by providing means for initially securing a sufficient pressure in the brake cylinder in making a service application of the brakes to insure the movement of the brake cylinder piston out beyond the brake cylinder leakage groove.

In the accompanying drawing, the single figure illustrates a triple valve device embodying my improvement.

While the application of my improvement is not confined to any particular type of triple valve device, I have shown the same embodied in a triple valve of the retarded release type comprising a casing 1 having a piston chamber 2, connected by passage 3 to train pipe 4 and containing triple valve piston 5, and having valve chamber 6 open to the auxiliary reservoir 36 through pipe 37 and containing main slide valve 7 and auxiliary slide valve 8, mounted on and having a movement relative to said main slide valve, said valves being operated by the piston 5. The triple valve casing 1 may also contain a quick action emergency valve mechanism, comprising a piston 9 operating in piston chamber 10, a train pipe vent valve 11 adapted to be actuated by piston 9, and a check valve 12 for preventing back flow from chamber 13 to train pipe passage 3. Chamber 10 below the emergency piston 9 is connected by pipe and passage 14 to the brake cylinder.

A yielding resistance device 15 acts on the triple valve piston 5 and tends to resist the movement of the same from full release position to the retarded release position.

According to my improvement, a small reservoir 16 is connected to a pipe and passage 17, leading to the seat of main slide valve 7 and a quick application valve device is provided, comprising a piston 18 contained in piston chamber 19 and having a passage 20 leading from the upper face thereof to the seat of the main slide valve 7. Passage 20 contains a check valve 21 adapted to prevent flow from piston 18 to the slide valve 7. The downward movement of piston 18 is adapted to connect the upper side of the piston and consequently passage 20 with a port 22 opening into passage 23 which in turn is connected with brake cylinder passage 14. Piston 18 is also adapted to operate a valve 24 contained in chamber 25 for venting fluid from the train pipe to the brake cylinder in a service application of the brakes.

In operation, fluid supplied to the train pipe flows to the triple valve piston chamber 2 and through the usual feed groove 27 to charge the valve chamber 6 and the auxiliary reservoir. From valve chamber 6, fluid flows through port 28 in the main slide valve 7 to passage 17 thereby charging the reservoir 16 with fluid under pressure. In full release position, as shown in the drawing, cavity 29 in the slide valve 7 connects port 30, leading from the chamber 10 and brake cylinder passage 14, with exhaust port 31.

In order to effect a service application of the brakes, the train pipe pressure is reduced and the triple valve piston thereupon moves outwardly, the graduating valve 8 first opening the service port 32 and the main slide valve then moving so as to disconnect the brake cylinder passage 30 from the exhaust port 31 and also cause a cavity 33 in the main slide valve to connect passage 20 with passage 17. Fluid under pres-

sure thereupon flows from the quick application reservoir 16 past the check valve 21 to the top of the quick application piston 18 and forcing the same downwardly uncovers the port 22, so that fluid from the reservoir can equalize into the brake cylinder through passages 23 and 14. Sufficient fluid is thus admitted to the brake cylinder to cause the brake cylinder piston to move out beyond the brake cylinder leakage groove. The movement of piston 18 also pushes the quick service valve 24 from its seat, so that fluid from the train pipe is vented through passage 3 and chamber 25, past the valve 24, to passages 23 and 14, to effect a local reduction in train pipe pressure and consequently quick serial action throughout the train, the passage 3 being preferably provided with restricted portion 34, so as to limit the rate of reduction in train pipe pressure in service applications of the brakes. Upon equalization of the pressure in the reservoir 16 into the brake cylinder, the valve 24 and piston 18 are returned to normal position by the spring 26 and further reduction in train pipe pressure is prevented. The continued movement of the triple valve piston 5 to service application position causes the service port 32 to register with brake cylinder port 30, so that fluid from the auxiliary reservoir is supplied to the brake cylinder in the usual manner.

It will now be noted that after the initial venting of fluid from the train pipe to the brake cylinder by the action of the piston 18 and valve 24, the valve 24 is closed upon equalization of the reservoir 16 into the brake cylinder and no further venting of fluid takes place upon subsequent reductions in train pipe pressure.

Upon a sudden reduction in train pipe pressure the triple valve piston moves out in the usual manner to emergency position, in which the emergency port 35 is opened and fluid from the auxiliary reservoir admitted to the top of the emergency piston 9, said piston being thereby operated in the usual manner to open the emergency vent valve 11. In emergency position, the cavity 33 connects passage 17 with passage 30, so that the reservoir 16 equalizes into the brake cylinder in emergency applications of the brakes, as well as in service.

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

1. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir, and a triple valve device operating upon a reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder to effect a service application of the brakes, of an additional source of fluid under pressure, a movable abutment operated by flow of fluid from said source during the initial movement of the triple valve device from release position for opening a communication for supplying fluid from said source to the brake cylinder, and a check valve for preventing back flow.

2. In a fluid pressure brake, the combination with a train pipe and auxiliary reservoir, of a triple valve device comprising a piston subject to the opposing pressures of the train pipe and auxiliary reservoir, a valve operated by said piston upon a reduction in train pipe pressure for supplying fluid from the auxiliary reservoir to the brake cylinder, an additional source of fluid under pressure, a movable abutment operated by the flow of fluid from the additional source of fluid under pressure for supplying fluid from said source to the brake cylinder, and means controlled by said valve for connecting said source to said abutment in the initial movement of the valve from release position to effect an application of the brakes, and a check valve for preventing back flow.

3. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir and triple valve device, of an additional reservoir normally charged with fluid under pressure and means operated by fluid from said additional reservoir in making a service application of the brakes for venting fluid from the train pipe to the brake cylinder to effect a local reduction in train pipe pressure.

4. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir and triple valve device, of an additional reservoir normally charged with fluid under pressure, a movable abutment subject on one side to brake cylinder pressure and operated by fluid from said additional reservoir in making an application of the brakes for connecting said reservoir to the brake cylinder, and a valve operated by said abutment for venting fluid from the train pipe to the brake cylinder.

5. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir and triple valve device, of an additional reservoir normally charged with fluid under pressure, a movable abutment subject on one side to brake cylinder pressure and operated by fluid from said additional reservoir in making an application of the brakes for connecting said reservoir to the brake cylinder, and a valve operated by said abutment for venting fluid from the train pipe to the brake cylinder, said abutment being operated upon equalization of the additional reservoir into the brake cylinder to close said valve.

6. In a fluid pressure brake, the combination with a train pipe, auxiliary reservoir and triple valve device, of an additional reservoir normally charged with fluid under

pressure, a movable abutment subject on one side to brake cylinder pressure and operated by fluid from said additional reservoir in making an application of the brakes for connecting said reservoir to the brake cylinder, a valve operated by said abutment for venting fluid from the train pipe to the brake cylinder, and a spring for closing said valve upon equalization of the additional reservoir into the brake cylinder.

In testimony whereof I have hereunto set my hand.

PATRICK H. DONOVAN.

Witnesses:
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CLYDE V. MCCURDY.