April 19, 1932. W. F. MEIER 1,855,135

TEST RACK

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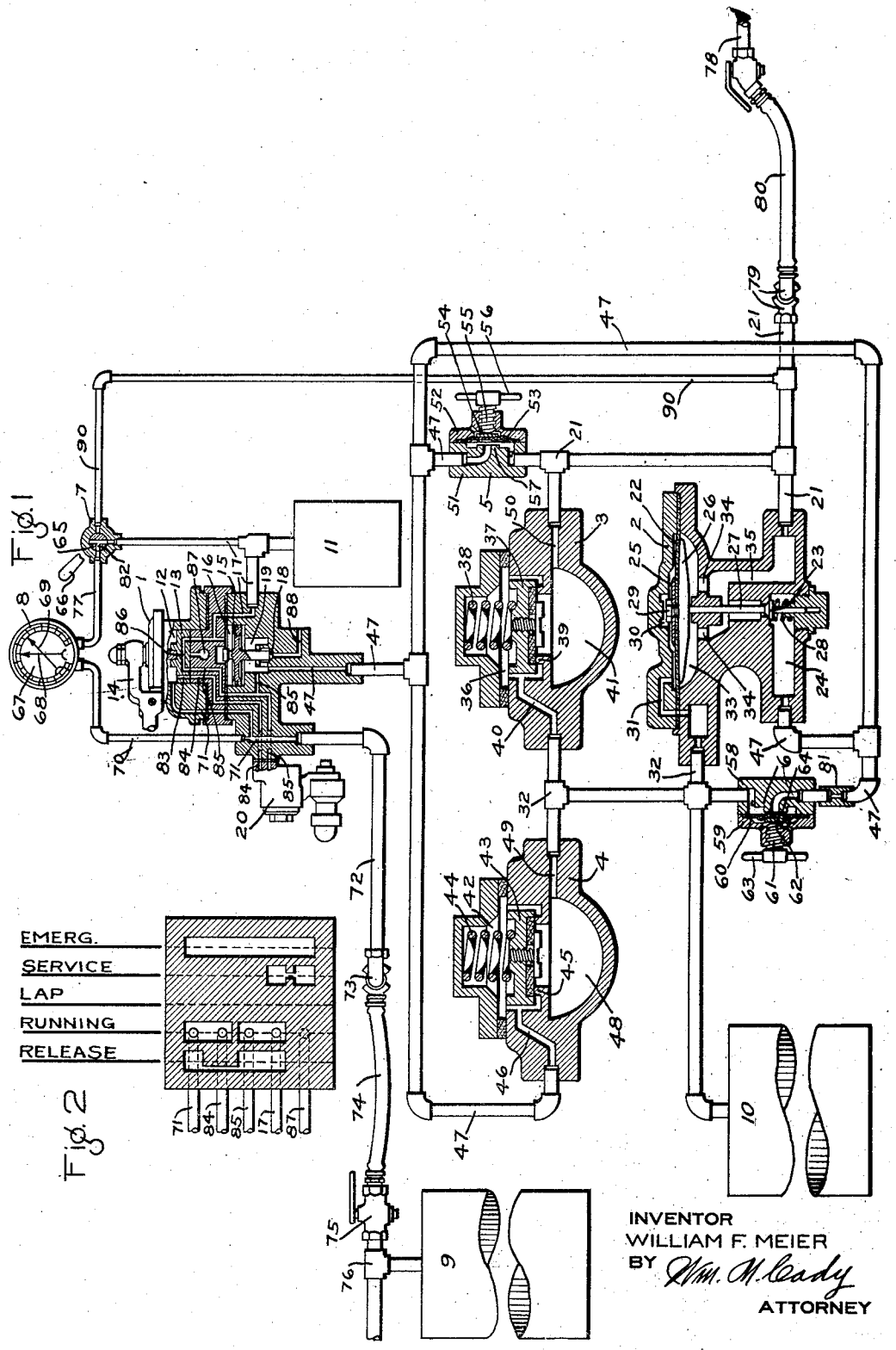


Fig. 1

Fig. 2

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TEST RACK

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This invention relates to testing devices of the type employed to check the operation of fluid pressure brakes.

When railroad cars are in the shop for repairs, or prior to coupling a locomotive to a train of coupled cars for moving the train in service, it is customary to test the operation of the brake controlling devices on said cars. For this purpose, a portable testing apparatus is provided which is adapted to be connected to the brake pipe at one end of a train of coupled cars and is operative to vary the pressure in said brake pipe for causing the operation of the valve devices on the cars in the train. If any of the valve devices are thereby found to be unsatisfactory for service operation, they may be removed or replaced.

The principal object of my invention is to provide an improved testing apparatus of the above character.

In the accompanying drawings: Fig. 1 is a diagrammatic view, partly in section, of an improved fluid pressure brake testing apparatus embodying my invention; and Fig. 2 is a diagrammatic development view of the brake valve device shown in Fig. 1.

As shown in the drawings, the testing apparatus comprises a brake valve device 1, a control valve device 2, a release check valve device 3, an application check valve device 4, a diaphragm cock 5, a diaphragm cock 6, a three-way plug valve device 7, a duplex pressure gauge 8, a main or supply reservoir 9, a control valve reservoir 10, and an equalizing reservoir 11.

The brake valve device 1 is of the usual well known construction comprising a casing having a chamber 12 containing a rotary valve 13 adapted to be operated by a handle 14. In said casing is disposed the usual brake pipe discharge valve mechanism comprising an equalizing piston 15 having at one side a chamber 16 connected to the equalizing reservoir 11 through a passage and pipe 17, and a brake pipe discharge valve 18 contained in a chamber 19 at the opposite side of the equalizing piston 15 and adapted to be operated thereby. Preferably associated with the brake valve device 1 is a feed valve device 20 which is of the usual well known construction and is adapted to reduce the pressure of fluid supplied thereto from any suitable source, such as the supply reservoir 9, to a pressure such as is employed in a brake pipe 21 for operating the brakes on a train, as will be evident from the following more detailed description of the operation of my invention.

The control valve device 2 comprises a casing containing a diaphragm 22, and a valve 23 contained in a chamber 24. Follower plates 25 and 26 are clamped to the opposite sides of said diaphragm by a cap screw 29, extending through the follower plate 25 and diaphragm 22, and having screw-threaded engagement in the follower plate 26. The valve 23 has a stem 27 engaging the follower plate 26 so that deflection of the diaphragm 22 in a downwardly direction will unseat said valve against the pressure of a spring 28. A chamber 30 formed at one side of diaphragm 22 is connected through a passage 31 to a pipe 32, which is connected to the control valve reservoir 10, and a chamber 33 at the opposite side of said diaphragm is connected to brake pipe 21 through ports 34 and a passage 35.

The release check valve device 3 comprises a casing having a chamber 36 containing a poppet valve 37 and a spring 38 engaging said poppet valve for urging same into engagement with a seat rib 39 formed in the casing. The chamber 36 is connected by a passage 40 to the control valve reservoir pipe 32 and a chamber 41 formed in the casing at the lower side of said poppet valve is connected by a passage 50 to brake pipe 21.

The application check valve device 4 comprises a casing having a chamber 42 containing a poppet valve 43 and a spring 44 engaging said poppet valve for urging same into engagement with a seat rib 45 formed in the casing. The chamber 42 is connected by a passage 46 to a pipe 47 and a chamber 48 formed in the casing at the lower side of the poppet valve 43 is connected by a passage 49 to the control valve reservoir pipe 32.

The diaphragm cock 5 comprises a casing formed of a body section 51 and a cover sec-

tion 52. A flexible diaphragm 53 is clamped adjacent its periphery between the body section and cover section of said casing. A follower plate 54 is disposed on one side of said diaphragm. One end of a screw 55, having screw-threaded engagement in the cover portion 52 of the casing, engages said follower and the other end is provided with an operating handle 56. Turning of the screw 55 by handle 56 provides relative movement between the screw and casing to move the diaphragm 53 into engagement with a seat 57 provided in the body section of the casing.

The diaphragm cock 6 is of the same construction as diaphragm cock 5 and comprises a casing formed of a body section 58 and a cover section 59. A flexible diaphragm 60 is clamped adjacent its periphery between said two casing sections and is adapted to be moved by turning a handle 63 on a screw 61, having screw-threaded engagement in the cover portion of the casing, said screw acting upon a follower plate 62 engaging the diaphragm. In closed position of the cock, the diaphragm is adapted to engage a seat 64.

The three way plug valve device 7 comprises a casing containing a rotatable plug valve 65 adapted to be operated by a handle 66.

The duplex pressure gauge 8 is of the usual well known construction, having a graduated dial 67, and pointers 68 and 69 which are adapted to be rotated around said dial. The gauge is connected to the supply reservoir 9 through pipe 70, passage 71 in the brake valve device, pipe 72, couplings 73, a flexible hose 74, a plug valve 75 and a pipe 76, and one of the gauge pointers, for instance pointer 69, is adapted to register the pressure of fluid supplied from said supply reservoir to the brake valve device. The gauge is also connected through pipe 77 to the three-way plug valve device 7 and the other gauge pointer 68 is therefore adapted to register either the pressure of fluid in brake pipe 21 or in equalizing reservoir 11, according to the position of said three-way plug valve device 7, as will be evident from the following more detailed description of the operation of my invention.

As shown in the drawings, the brake pipe connection 21 of the testing apparatus is adapted to be connected to the brake pipe 78 on a car at one end of a train of coupled cars by means of a pair of couplings 79 and a flexible hose 80, and is well understood that by varying the pressure in the brake pipe 78, the brake controlling devices on the cars in the train, which are adapted to operate in response to variations in brake pipe pressure, will be operated and while being operated may be inspected.

In operation, the brake valve device 1 is initially placed in running position, the screw 55 of diaphragm cock 5 is turned so as to permit diaphragm 53 to deflect away from the seat 57 and thereby establish communication from pipe 47 to pipe 21, the screw 61 of diaphragm cock 6 is turned so as to deflect diaphragm 60 into engagement with the seat 64 and thereby close communication from the control valve reservoir pipe 32 to pipe 47, through the choke fitting 81, and the plug valve 65 of the three-way plug valve device 7 is turned to the position shown in the drawings, in which the equalizing reservoir 11 is connected to the pressure gauge 8 by way of pipe 17, port 82 in plug valve 65 and pipe 77.

The brake pipe connection 21 of the testing apparatus is connected to the brake pipe 78 of the train by means of the couplings 79 and flexible hose 80, and the fluid pressure supply pipe 72 of the testing apparatus is connected to the fluid pressure supply reservoir 9 by means of the couplings 73, flexible hose 74, plug valve 75 and pipe 76, the plug valve 75 being normally opened.

Fluid under pressure is supplied to reservoir 9 in the usual well known manner and flows from said reservoir through pipe 76, plug valve 75, flexible hose 74, couplings 73 and pipe 72 to the brake valve device 1 and from thence through passage 71 to the pressure gauge 8 and to the rotary valve chamber 12 of the brake valve device. The pointer 69 on the gauge 8 is thereby operated by the fluid under pressure supplied through pipe 70 to register the supply reservoir pressure.

With the brake valve device in the running position, as shown in the drawings, fluid at supply reservoir pressure flows from the rotary valve chamber 12 through port 83 in the rotary valve 13 and passage 84 to the feed valve device 20. The feed valve device then operates in the usual manner to reduce the supply reservoir pressure to the pressure which is normally carried in the brake pipe and supply fluid at the reduced pressure to passage 85 through which it flows to equalizing piston chamber 19, and through port 86 in the rotary valve 13 to passage 17 leading to the equalizing piston chamber 16 and through pipe 17 to the equalizing reservoir 11.

From the equalizing piston chamber 19, fluid under pressure flows through passage and pipe 47 to the application check valve chamber 42, to valve chamber 24 of the control valve device 2, through choke fitting 81 to the diaphragm cock 6, and to the diaphragm cock 5.

The diaphragm 53 of cock 5 is initially deflected away from the seat 57, so that fluid under pressure flows from pipe 47 to brake pipe connection 21 and from thence through couplings 79 and flexible hose 80 to the brake pipe 78, thereby charging said brake pipe. When thus charging the brake pipe, after a certain pressure is obtained therein, the brake pipe may be inspected for leakage such as at joints and at connections to the brake pipe.

At the same time as the brake pipe 78 is being charged, fluid under pressure flows from pipe 21 through passage 35 in the control valve device and ports 34 to diaphragm chamber 33 and also from pipe 21 to chamber 41 of the release check valve device 3. The pressure of fluid in valve chamber 41 moves the valve 37 upwardly against the pressure of spring 39 and fluid under pressure then flows from chamber 41 to chamber 36 and from thence through passage 40 and pipe 32 to the control valve reservoir 10 and from pipe 32 through passage 31 to diaphragm chamber 30.

The pressure of spring 38 in the release check valve device 3 is such as to cause substantially no reduction in the pressure supplied to control reservoir 10 and diaphragm chamber 30 of the control valve device. Thus the fluid pressures acting on the opposite sides of the control valve diaphragm 22 become substantially equal, so that the diaphragm 22 is in a state of equilibrium which permits spring 28 to hold the valve 23 seated.

As the testing apparatus and brake pipe 78 are thus charged, the pressure in the equalizing piston chamber 16, which is connected to the equalizing reservoir 11, and in the equalizing piston chamber 19 builds up at substantially the same rate and the equalizing piston 15 holds the brake pipe discharge valve 18 seated in the usual well known manner.

The equalizing reservoir 11 being initially connected to the pressure gauge 8 through pipe 17, port 82 in the three-way plug valve 65 and pipe 77, the pressure obtained in said reservoir is registered by pointer 68 on said gauge.

After the brake pipe 78, the control valve reservoir 10 and equalizing reservoir 11 are thus charged with fluid at the pressure normally carried in the brake pipe, as governed by the adjustment of the feed valve device 20, the brake pipe pressure may be reduced any predetermined amount to apply the brakes on the train, and the pressure in the brake pipe then maintained at the reduced pressure in order to offset leakage from the brake pipe, as will now be explained.

To effect a reduction in brake pipe pressure, the rotary valve 13 of the brake valve device 1 is turned to service position by operating the handle 14. In service position of the rotary valve 13, passage 17 is connected to an atmospheric port 87 which permits fluid under pressure to flow from the equalizing reservoir 11 and equalizing piston chamber 16 to the atmosphere and reduce the pressure acting on the upper side of the equalizing piston 15, such a reduction being registered by pointer 68 on the pressure gauge which is connected to the equalizing reservoir.

Reducing the pressure of fluid in equalizing piston chamber 16 permits the higher pressure of fluid in the equalizing piston chamber 19 to move the equalizing piston 15 upwardly and unseat the brake pipe discharge valve 18, which connects pipe 47 to the atmosphere through an exhaust passage 88.

With the diaphragm 53 of cock 5 away from its seat 57, fluid under pressure is permitted to flow from the brake pipe 78 through flexible hose 80, couplings 79, and brake pipe connection 21 to pipe 47 and from thence to the atmosphere past the unseated discharge valve 18 and through the exhaust passage 88, thereby reducing the pressure of fluid in said brake pipe. Since diaphragm chamber 33 of the control valve device is connected to pipe 21 through ports 34 and passage 35, the pressure in said chamber reduces with brake pipe pressure. As the pressure in pipe 47 is reduced, the pressure of fluid in the application check valve chamber 48 moves the check valve 43 upwardly away from seat 45, which permits fluid under pressure to flow from the control valve reservoir 10 and the control valve diaphragm chamber 30 through pipe 32, passage 49, past the application check valve 43 to chamber 42, and from thence through passage 46 to pipe 47 which is connected to the atmosphere past the unseated discharge valve 18 and through atmospheric exhaust passage 88.

The spring 44 in the application check valve device 4 is provided to urge the check valve 43 into engagement with seat 45 but is of such value as to permit substantially the same degree of reduction to occur in chamber 48 as occurs in chamber 42 when the pressure is reduced in pipe 47 in the manner just described.

It will thus be noted that when the pressure of fluid in the brake pipe 78 is reduced, the pressure of fluid is reduced on the opposite sides of the control valve diaphragm 22, thereby maintaining said diaphragm in equilibrium, and also the pressure of fluid in the control valve reservoir 10 is reduced, the degree of reduction in the reservoir 10 being substantially equal to the degree of brake pipe reduction.

When the desired degree of reduction is effected in equalizing reservoir pressure, as indicated by pointer 68 on the pressure gauge 8, the rotary valve 13 of the brake valve device 1 is turned to lap position in which passage 17 is lapped so as to prevent further reduction in pressure in the equalizing piston chamber 16 and equalizing reservoir 11. Then when the brake pipe pressure acting in equalizing piston chamber 19 becomes reduced, by flow to the atmosphere past the unseated discharge valve 18, to a degree slightly less than the reduced pressure in equalizing piston chamber 16, the equalizing piston 15 is operated by the higher pressure in chamber 16 to seat the brake pipe discharge valve

18 so as to prevent further reduction in brake pipe pressure and in the pressure in the control valve reservoir 10.

After a certain reduction in brake pipe pressure is effected, if it is desired to maintain the pressure of fluid in brake pipe 78, at the degree to which it was reduced, against leakage from said brake pipe, so as to permit the operator to inspect the brake devices on the cars in the train when said devices are in the brakes applied position, the diaphragm 53 of the diaphragm cock 5 is moved into engagement with its seat 57 by turning the screw 55. This disconnects the brake pipe 78 from the brake valve device 1. The rotary valve 13 of the brake valve device is then turned to release position in which passage 85 is connected through said rotary valve to the valve chamber 12, which permits fluid at supply reservoir pressure to flow from said chamber through passage 85 to passage and pipe 47 leading to diaphragm cock 5, which is now closed, to the valve chamber 24 of the control valve device and to check valve chamber 42 of the application check valve device 4. In chamber 42, fluid at main reservoir pressure aids spring 44 in effectively seating the check valve 43, so that fluid under pressure in the control reservoir 10 is bottled up and will remain constant at the pressure to which it was reduced, corresponding to the degree of reduction effected in brake pipe pressure, and since diaphragm chamber 30 of the control valve device is connected through passage 31 and pipe 32 to the control valve reservoir 10, the pressure in said chamber, acting on the diaphragm 22, will also remain constant.

With the testing apparatus in the condition just described, if there is leakage from the brake pipe 78, the reduction in brake pipe pressure caused by such leakage is transmitted through the flexible hose 80, couplings 79, pipe 21, passage 35 and ports 34 in the control valve device to chamber 33 below the diaphragm 22. This reduction in pressure in chamber 33 permits the bottled up or constant control valve reservoir pressure in chamber 30, acting on diaphragm 22, to deflect said diaphragm against the reduced pressure in chamber 33 and thereby act through stem 27 to unseat the valve 23 against the spring 28. With the valve 33 unseated, fluid at supply reservoir pressure is permitted to flow from the valve chamber 24 past valve 23 to passage 35 and from thence through pipe 21, couplings 79 and flexible hose 80 to brake pipe 78 to compensate for the leakage of fluid under pressure from said brake pipe.

In the operation of the control valve device as just described, the deflection of diaphragm 22 gradually unseats the valve 23 until said valve is open sufficiently to permit a rate of flow of fluid under pressure to brake pipe 78 just equal to the rate at which the fluid pressure is vented from the brake pipe by leakage, and when such a position of the valve 23 is obtained, the pressure maintained in the brake pipe 78 and in chamber 33 at the lower side of diaphragm 22 by the flow past said valve balances the pressure in chamber 30 at the upper side of said diaphragm. The movement of said diaphragm to further unseat the valve 23 then ceases. With the brake pipe pressure thus maintained against leakage, the degree of brake pipe reduction remains constant, so that the operator may inspect the brake devices on the train in their applied position.

To recharge the brake pipe 78 in order to release the brakes, the rotary valve 13 of the brake valve device is turned to running position, in which position port 83 in said rotary valve registers with passage 84 and permits fluid at supply reservoir pressure to flow from valve chamber 12 to the feed valve device 20. The feed valve device is thereby operated in the usual manner to reduce supply reservoir pressure to the pressure normally carried in the brake pipe and supply fluid at such reduced pressure to passage 85, through which it flows to passage and pipe 47, equalizing piston chamber 19 and to the seat of the rotary valve 13. Port 86 in the rotary valve 13 connects passage 85 to passage 17 thereby permitting fluid at feed valve pressure to flow from passage 85 through port 86 and passage 17 to the equalizing piston chamber 16 and equalizing reservoir 11. The fluid pressures thus build up in equalizing piston chambers 16 and 19 at the same time, and since the pressure of fluid supplied to both of said chambers is the same, the equalizing piston 15 operates in the usual well known manner to hold the brake pipe discharge valve 18 seated.

The screw 55 of diaphragm cock 5 is turned so as to permit diaphragm 53 to deflect away from seat 57, which permits fluid at feed valve pressure to flow from pipe 47 to pipe 21 and from thence through couplings 79 and flexible hose 80 to brake pipe 78, thereby charging the brake pipe.

Fluid at feed valve pressure supplied to pipe 21 also flows through passage 50, in the release check valve device, to chamber 41. The valve 37 is unseated against spring 39 by the pressure of fluid in chamber 41, and fluid under pressure then flows from said chamber past the check valve 37 to chamber 36 and from thence through passage 40 and pipe 32 to the control valve reservoir 10 and from pipe 32 through passage 31 to diaphragm chamber 30 of the control valve device, thereby charging said reservoir and chamber with fluid at feed valve pressure, such as supplied to brake pipe 78. At the same time, fluid at feed valve pressure flows from pipe 21 through passage 35 and ports 34 to diaphragm chamber 33 of the control

valve device. The control valve diaphragm chambers 30 and 33 are thus both charged with fluid at feed valve pressure, and the diaphragm is thereby placed in a state of equilibrium which permits the spring 28 to seat the valve 23.

If it is desired to hasten the rate of recharge of brake pipe 78, the rotary valve 13 of brake valve device 1 is turned to release position in which a direct connection is effected from the supply reservoir passage 71 to passage 85. In this manner, the supply reservoir pressure, which is greater than the pressure supplied by feed valve device 20, is permitted to flow directly to the brake pipe 78 through passage 85, passage and pipe 47, pipe 21, couplings 79 and flexible hose 80, and at the same time to the control valve reservoir 10 and control valve diaphragm chambers 30 and 33. When the brake pipe pressure is thus rapidly increased to a certain degree, then the rotary valve 13 of the brake valve device is turned to running position in which the charging of the brake pipe and testing apparatus continues, but the pressure of the fluid is governed by the adjustment of the feed valve device 20, in the manner hereinbefore described.

If instead of recharging the brake pipe 78 in the manner hereinbefore described, it is desired to increase the brake pipe pressure at a slow gradual rate, the rotary valve 13 of the brake valve device is turned to running position and the screw 55 of diaphragm cock 5 is turned to deflect the diaphragm 53 into engagement with seat 57 so as to prevent flow of fluid at feed valve pressure to the brake pipe 78 in the manner hereinbefore described. The screw 61 of diaphragm cock 6 is turned to permit diaphragm 60 to deflect away from seat 64 so as to establish communication between pipe 47 and control valve reservoir pipe 32.

Fluid at feed valve pressure supplied through the brake valve device to pipe 47 flows to valve chamber 24 of the control valve device and through the choke fitting 81 and diaphragm cock 6 to pipe 32, which is connected through passage 31 to diaphragm chamber 30 of the control valve device and which is also connected to the control reservoir 10. The pressure of fluid in said chamber and reservoir is thus gradually increased at a rate governed by the flow area of choke fitting 81. This gradual increase in pressure in diaphragm chamber 30 over the brake pipe pressure in chamber 33 deflects the diaphragm 22 downwardly, unseating the valve 23 which permits fluid at feed valve pressure to flow from chamber 24 past said valve, through passage 35, pipe 21, couplings 79 and flexible hose 80 to brake pipe 78. From passage 35, fluid under pressure also flows through ports 34 to diaphragm chamber 33 to oppose the pressure in diaphragm chamber 30. The pressures on the opposite sides of the diaphragm 22 thus gradually build up at the same time, and so govern the degree which valve 23 is unseated, that the fluid under pressure supplied to brake pipe 78 past valve 23 effects an increase in brake pipe pressure corresponding to the rate of increase in the control valve reservoir 10 as governed by the flow area of choke fitting 81.

When effecting a gradual recharge of the brake pipe, the plug valve 65 of the three-way plug valve device is turned clockwise 90° so as to connect gauge pipe 77 to a pipe 90 from the brake pipe connection 21. By so doing, the rate and degree of gradual rise in brake pipe pressure is directly indicated to the operator by the movement of the pointer 68. At any time when it is desired to note the pressure in the brake pipe, the three-way plug valve device may be so operated.

It will be noted from the above description of the operation of the improved testing apparatus, that the control reservoir 10 is supplied with fluid under pressure from pipe 21 at the same time as fluid under pressure is supplied through said pipe to brake pipe 78 in normally charging the brake pipe, and when a brake pipe reduction is made, fluid under pressure is permitted to flow from the control reservoir 10 to pipe 47 from which it is vented by operation of the brake valve device 1, in the manner hereinbefore described. However, in order to bottle up the pressure in the control reservoir 10 when the brake pipe pressure is being maintained against leakage in the manner also hereinbefore described, the check valve device 3 is provided to prevent flow from the control reservoir to the brake pipe through pipe 21, and the check valve device 4 is provided to prevent flow of fluid at higher pressure from pipe 47 to said reservoir, the higher pressure being supplied to said pipe and control valve chamber 24 of the control valve device when the brake valve device is in release position.

Some trains are provided with more than one pipe line extending from one end to the other end, such as, for instance, a signal pipe. In the drawings, my improved testing apparatus is preferably shown connected to a brake pipe, but I do not desire to thus limit its application, since it may equally well be employed in testing the condition of any train pipe.

While one illustrative embodiment of the invention has been described in detail, it is not my intention to limit its scope to that embodiment or otherwise than by the terms of the appended claims.

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

1. The combination with a train pipe, of a testing apparatus comprising a brake valve device for varying the pressure of fluid in

said train pipe, a reservoir charged with fluid under pressure, a control valve device governed by the pressure of fluid in said reservoir for supplying fluid under pressure to said train pipe and valve means for preventing flow of fluid from said reservoir to said train pipe and operating automatically to permit flow of fluid from the train pipe to said reservoir.

2. The combination with a train pipe, of a testing apparatus comprising a brake valve device for varying the pressure of fluid in said train pipe, a reservoir charged with fluid under pressure, a control valve device governed by the pressure of fluid in said reservoir for supplying fluid under pressure to said train pipe, a pipe through which fluid under pressure is supplied to said reservoir and through which fluid is vented from said reservoir, and valve means for preventing the flow of fluid from said pipe to said reservoir and operating automatically to permit the venting of fluid from said reservoir to said pipe.

3. The combination with a train pipe, of a testing apparatus comprising a brake valve device for supplying fluid under pressure to said train pipe and for venting fluid under pressure from said train pipe, a cock having an open position for permitting fluid under pressure to flow from said brake valve device to said train pipe, a reservoir charged with fluid under pressure, and a control valve device governed by the pressure of fluid in said reservoir and in said train pipe for controlling the supply of fluid under pressure from said brake valve device to said train pipe when said cock is in closed position, said reservoir having an inlet connection from the train pipe side of said cock and an outlet connection to the brake valve side of said cock for permitting the pressure of fluid in said reservoir to vary with variations in brake pipe pressure when said cock is in open position, a check valve device interposed in the inlet connection for preventing the flow of fluid from said reservoir to said train pipe when the train pipe pressure is reduced and said cock is in closed position, and a check valve device interposed in said outlet connection to prevent flow of fluid from said brake valve device to said reservoir.

4. The combination with a train pipe and a source of fluid under pressure of a reservoir, a testing apparatus comprising a brake valve device for supplying fluid under pressure from said source to said train pipe and to said reservoir, a cock for closing communication from said brake valve device to said train pipe, a check valve device for preventing flow of fluid from said reservoir to said train pipe when said cock is closed and the train pipe pressure is reduced, a control valve device governed by the pressure of fluid in said reservoir and operative when said cock is closed to supply fluid under pressure from said brake valve device to said train pipe, and a check valve device for preventing flow of fluid from said brake valve device to said reservoir when said cock is closed.

5. The combination with a train pipe and a scource of fluid under pressure, of a brake valve device for supplying fluid under pressure from said source to said train pipe and for venting fluid under pressure from said train pipe, a reservoir having a connection to said train pipe through which fluid under pressure is supplied for charging said reservoir, a check valve interposed in said connection, said reservoir having another connection to said brake valve device through which fluid is vented from said reservoir, a check valve interposed in said other reservoir connection, a cock interposed between the first mentioned check valve and said brake valve device for closing communication from said brake valve device to said train pipe, and a control valve device governed by the pressure of fluid in said reservoir for controlling the supply of fluid under pressure from said brake valve device to said train pipe when said cock is in closed position.

In testimony whereof I have hereunto set my hand this 12th day of February, 1930.

WILLIAM F. MEIER.