Oct. 28, 1924.

1,513,028

D. J. BISSELL, JR

DIRECTION VALVE FOR AUTOMATIC TRAIN CONTROL APPARATUS

Filed May 1, 1923

2 Sheets-Sheet 1

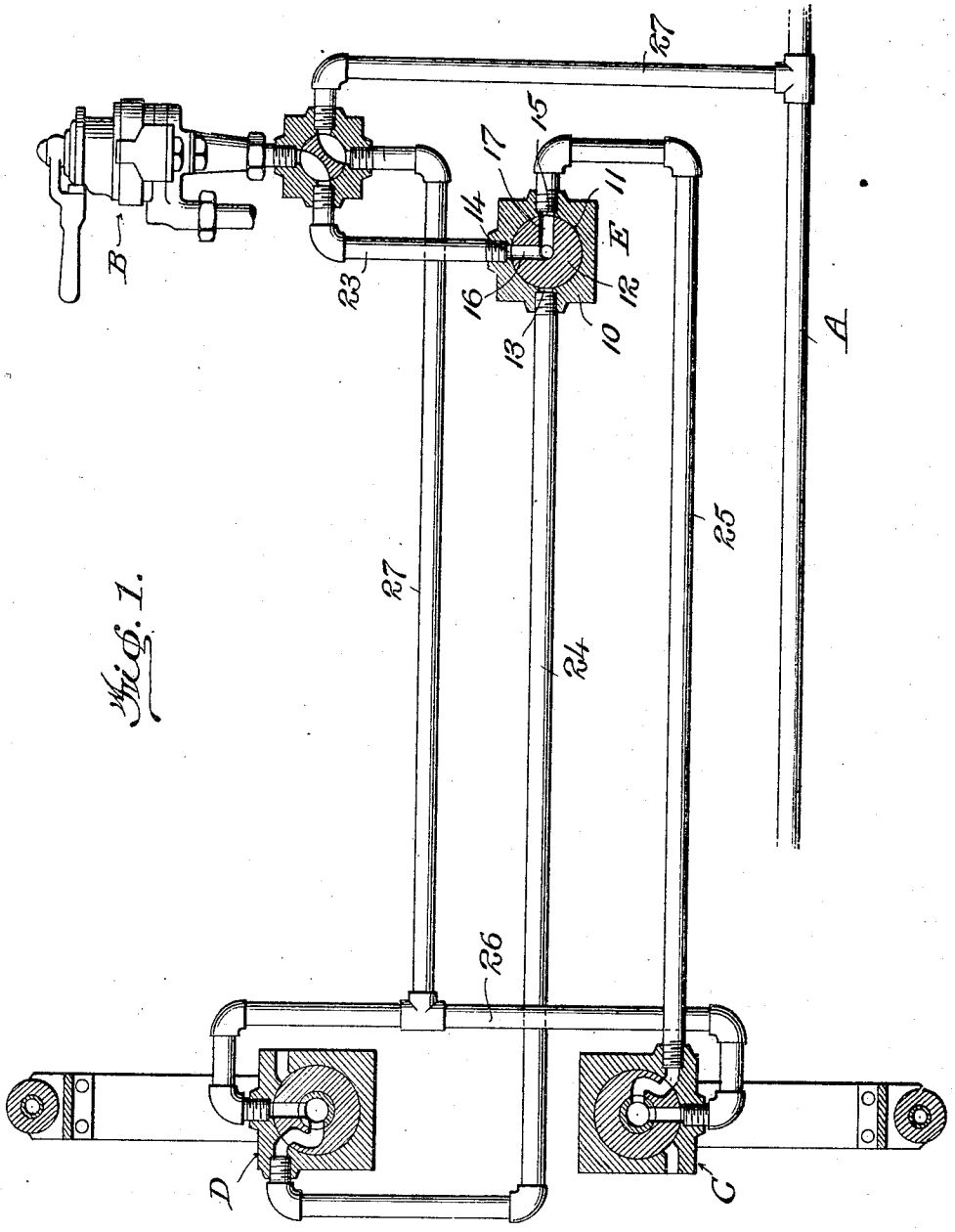


Fig. 1.

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Fig. 4.

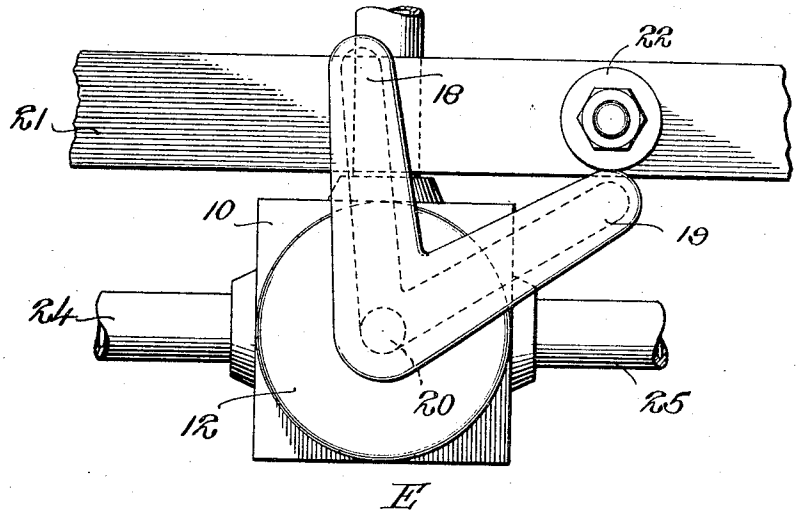


Fig. 2.

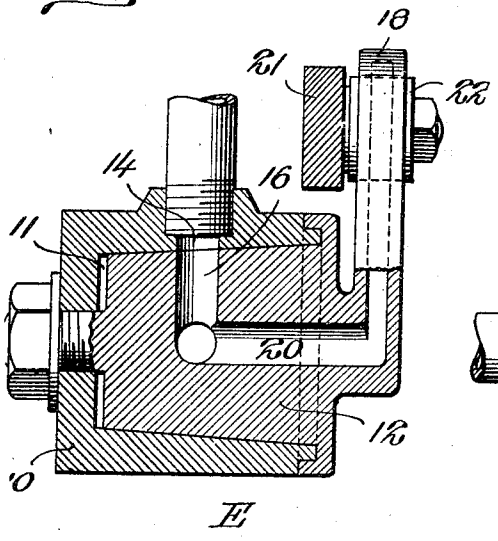
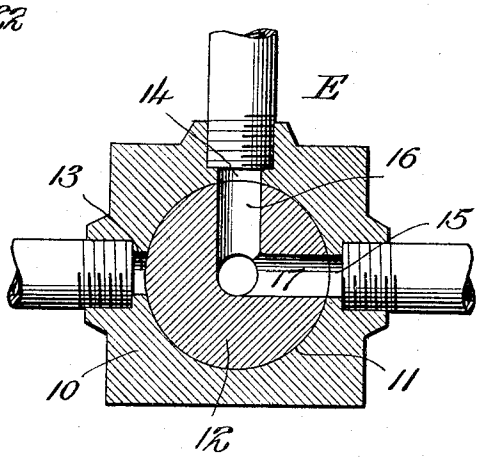


Fig. 3.



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UNITED STATES PATENT OFFICE.

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DIRECTION VALVE FOR AUTOMATIC TRAIN-CONTROL APPARATUS.

Application filed May 1, 1923. Serial No. 635,896.

To all whom it may concern:

Be it known that I, DAVID J. BISSELL, Jr., a citizen of the United States, and resident of Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Direction Valves for Automatic Train-Control Apparatus, of which the following is a specification.

My invention relates to improvements in automatic train control apparatus of the type including a pair of ramp valves, one for forward and the other for backward running, operable upon actuation thereof by a ramp device to cause an exhaust of train line pressure with consequent setting of the brakes and stopping of the train.

More particularly my invention relates to a direction valve for controlling the supply of air from the ordinary engineer's valve to the aforesaid ramp valves, my general purpose being to provide a direction valve to assure that the proper ramp valve is in normal or running position according to the direction in which the train is to be moved, while my specific purpose is to so construct a direction valve of this character that in the event of breakage or fracture of its essential operating parts, air will be exhausted from the train line to apply the brakes and stop the train.

With the foregoing and other purposes in view, my invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claim.

In the drawings wherein like characters of reference denote corresponding parts in the different views—

Figure 1 is a diagrammatic view illustrating the application of my improved direction valve to a train control system;

Figure 2, a longitudinal section through the direction valve;

Figure 3, a transverse section through the direction valve; and

Figure 4, an end view of the direction valve.

Referring to the drawings in detail, A designates the train line pipe of an ordinary air brake system, and B the usual control or engineer's valve for admitting and exhausting air from said train line pipe to release and set the train brakes in the usual well known manner. C and D designate a pair of ramp valves, also connected with the supply and with the train line pipe, and so constructed as normally to permit control of the brakes by means of the engineer's valve B, but to cause either an exhaust of train line pressure or cutting off of the supply from the train line, or both, when the operative one of them, according to the direction in which the train is to be moved or is moving, is shifted from its normal running position. As is understood valves C and D are adapted to be actuated under predetermined conditions by suitable mechanism located along the tracks to vent the train line, and as a consequence, set the brakes and bring the train to an automatic stop, and since the respective ramp valves operate independently, one to control forward and the other backward movements of the train, the purpose of my improved direction valve indicated at E is manifest, namely, to assure that the proper ramp valve is in running position according to the direction in which the train is to be moved or is moving.

As shown, direction valve E consists of a casing 10 provided with a bore 11 within which is rotatably mounted a plug 12. Three evenly spaced ports, 13, 14 and 15, are formed in casing 10 in the same transverse plane with a pair of relatively communicating ports 16 and 17 formed in the plug 12, and said ports 16 and 17 are so spaced that when plug 12 is in one predetermined rotated position, port 16 is alined with port 14, port 17 is alined with port 15 and port 13 is blanked, while in another predetermined rotated position of the plug, port 16 is alined with port 13, port 17 is alined with port 14 and port 15 is blanked.

Formed on or fixed to the plug 12 is a pair of relatively diverging hollow arms 18 and 19, which arms are in communication through a bore 20 in the plug with the aforesaid ports 16 and 17.

My improved direction valve is adapted to be mounted at any convenient location on a locomotive adjacent to a reciprocatory part

of the locomotive valve gear, preferably adjacent to the reach rod 21 connecting the usual reversing lever with the well known link motion, a roller or other protuberance 22 being provided on said reach rod for cooperation with the hollow arms 18, 19, so that when the reversing lever is moved forward to set the link motion and cylinder valves of the locomotive for forward running, said roller will contact with arms 19 and as a consequence rotate the plug 12 to aline ports 16, 17 with ports 14, 15 and blank port 13, while vice versa, when the reversing lever is moved to the rear to reverse the direction of the locomotive, said roller will contact with arm 18 and move the same to the rear and as a consequence rotate the plug 12 to aline ports 16, 17 with ports 13, 14 and blank port 15. Only a limited amount of movement of the reversing lever is required to impart the necessary rotation to the plug to aline and disaline the ports mentioned, the arms 18, 19 being of such length that continued movement of the reversing lever either forward or to the rear will result merely in the roller 22 moving beyond one or the other of arms 18 or 19 as the case may be, in which connection it will be observed that when arm 19 is rotated forwardly by the roller 22, arm 18 is simultaneously rotated into position to be engaged by the roller when the latter subsequently is moved to the rear, and when arm 18 is rotated to the rear, arm 19 is simultaneously rotated into position to be engaged by the roller when the latter subsequently is moved forward. Thus it is apparent that valve E is controlled automatically and that the ports therein must bear one or the other of the predetermined relations aforementioned according to the direction in which the train is to be moved.

Connecting the engineer's valve B with port 14 of valve E is a pipe 23, while connecting ports 13 and 15 of said direction valve with ramp valves A and B, respectively, are pipes 24 and 25. The ramp valves are relatively connected by a pipe 26 and this pipe in turn is connected with the train line pipe A by a branch pipe or pipes 27.

The operation of my improved direction valve when connected as indicated with the engineer's valve and with the ramp valves and the train line is apparent and as follows: When the roller 22 is moved forward as a result of forward movement of the reversing lever to adapt the train for forward running, plug 12 is rotated to aline ports 16, 17 with ports 14, 15 and as a consequence, the supply to the train line from the engineer's valve is by way of pipe 23, through the direction valve to pipe 25 and ramp valve C, and through ramp valve C to pipes 26 and 27. The supply also reaches pipe 24 through pipe 26 and ramp valve D, but as is apparent, pipe 24 is blanked at the direction valve. Accordingly, the position of ramp valve C must be normal to permit the air supply to reach and charge the train, while the position of ramp valve D is immaterial, so long as it does not vent the train line to the atmosphere. On the other hand, when the roller 22 is moved to the rear as a result of rearward movement of the reversing lever to adapt the train for backward running, plug 12 is rotated to aline ports 16, 17 with ports 13, 14, and as a consequence, the supply to the train line from the engineer's valve then is by way of pipe 23, through the direction valve to pipe 24 and ramp valve D, and through ramp valve D to pipes 26, 27. In this instance the supply also reaches pipe 25 through pipe 26 and ramp valve C, but as is apparent, pipe 25 is blanked at the direction valve. Accordingly, the position of ramp valve D must now be normal to permit the air from the supply to reach and charge the train line, but the position of ramp valve C is immaterial, so long as it does not vent the train line to the atmosphere. Thus it is apparent that control valve E is effective automatically to assure that the proper ramp valve is in normal running position according to whether the train is to be moved forward or backward.

Since the hollow arms 18, 19 are in communication with ports 16, 17, said arms manifestly are subject to train line pressure in either of the aforementioned positions of valve E. Consequently, in the event of a break or fracture occurring in either or both of said arms, the train line pressure will escape through said break or fracture to the atmosphere and as a result, setting of the brakes and stopping of the train will occur.

From the foregoing description considered in connection with the accompanying drawings, it is believed that the construction, operation and advantages of my improved direction valve will be fully understood. It is desired to point out, however, that various changes and desirable additions may be made in and to the arrangement shown within the spirit and scope of my invention as defined in the appended claim.

I claim:—

In automatic train control apparatus, the combination with a main pressure supply pipe and a pair of auxiliary pressure supply pipes; of a valve including a casing and a rotatable plug therein for connecting said main pressure supply pipe with said auxiliary pressure supply pipes, said plug and said casing having radially disposed ports therein so arranged that in one position of the valve the main pressure supply pipe is connected with one of said auxiliary pres-

sure supply pipes and in another position of the plug the main pressure supply pipe is connected with the other auxiliary pressure supply pipe, and a hollow operating arm on one end of said plug whereby fracture thereof vents one of said auxiliary pressure supply pipes according to the rotated position of the plug within the casing, said hollow handle being in communication with the ports in said plug through an axial passage in the plug.

In testimony whereof I hereunto affix by signature.

DAVID J. BISSELL, JR.