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AUTOMATIC SPEED CONTROL VALVE FOR TRAINS

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AUTOMATIC SPEED-CONTROL VALVE FOR TRAINS.

Application filed May 1, 1923. Serial No. 635,898.

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 Automatic Speed-Control Valves for Trains, of which the following is a specification.

My invention relates to automatic train control apparatus of the type including a ramp valve or valves adapted to be actuated by suitable track mechanism to, at predetermined times, operate to effect a reduction in train line pressure, and as a consequence, set the brakes and bring the train to an automatic stop, such apparatus being disclosed in my copending application Serial Number 635,895.

More particularly my invention relates to an automatic speed control valve adapted to be connected with a ramp valve of the character mentioned and with a manually operable valve and adapted to operate in such manner, upon manipulation of the manually operable valve, following actuation of the ramp valve, as to effect a reduction in train line pressure with consequent setting of the brakes only in the event the train is exceeding a predetermined low rate of speed, whereby, if desired, the train may proceed cautiously into a zone or block of trackage that is guarded by track mechanism set in position to actuate the ramp valve.

My improved automatic speed control valve further embodies mechanism automatically operable independently of any other part of the apparatus to effect a reduction in train line pressure with consequent setting of the brakes and stoppage of the train in the event the latter exceeds a predetermined high rate of speed.

My inventive idea whereby the foregoing results may be accomplished, is capable of embodiment in different mechanical structures, one of which is illustrated in the accompanying drawings, but it is to be understood that the structure shown is merely intended as a disclosure of my invention in a preferred form and that various changes and desirable additions may be made in and to the same within the spirit and scope of my invention as defined in the appended claims.

In the accompanying drawings, the figure is a vertical section of my improved speed control valve showing diagrammatically, its association with a ramp valve and a manually operable valve.

Referring to the drawings in detail, it will be observed that my improved speed control valve consists of a vertically arranged, elongated casing 10 within the upper end of which is slidably fitted a piston 11, which piston has a rod 12 secured thereto that extends above the casing where it is connected with governor mechanism 13 of any well known or preferred type, said governor mechanism being operated by a belt or gearing, or in any other suitable manner, as, for instance, from one of the axles of the locomotive upon which the valve is mounted. Normally, that is, when the locomotive is at rest and the governor mechanism is idle, the piston 11 is disposed at its uppermost limit of movement within the casing 10, but is moved downward by the governor mechanism a greater or less distance according to the speed of the train, as is manifest.

Provided in casing 10 is an atmospherically opening port 14 that is blanked by the lower end of the piston 11 when the latter is in its normal or uppermost position, but that is unblanked by an annular, elongated channel 15 in said piston when the latter is moved a predetermined distance downward. The channel 15 is of such length as to at all times maintain communication with a port 16 in the casing directly above port 14, for all positions of the piston within the limit of its downward movement.

Also slidably fitted within the casing 10, below piston 11, is a second piston 17 that has a reduced lower end portion 18 operable within a similarly reduced portion 19 of the casing. The lower ends of both the piston 17 and its reduced portion 18 are formed as valves 20, 21 respectively, for cooperation, respectively, with seats 22, 23 formed within the casing, so that when said piston is moved downward and said valves become seated, communication is cut off between a pair of ports 24, 25 located in opposite sides of the casing.

Extending downward from the reduced portion 18 of piston 17 is a rod 26 that carries a valve 27 normally held closed against

a seat surrounding an opening 28 in the lower end of the casing by a coil spring 29, which coil spring reacts against said valve from a cap 30 threaded on the lower end of the casing in enclosing relation to said valve. Rod 26 is of such length that when valve 27 is closed, the valves 20, 21 are unseated and communication normally is established between ports 24, 25. When the piston 17 is moved downward, however, and the valves 20, 21 become seated and thereby cut off communication between ports 24, 25, valve 27 simultaneously is unseated and port 24 is placed in communication with the atmosphere through opening 28 in the lower end of the casing and openings 31 in cap 30.

Normally the pistons 11, 17 are relatively spaced and the latter is adapted to be moved downward by the former after the former has been moved downward a predetermined distance by the governor mechanism 13, the lower end of piston 11 being provided with a stud 32 that is adapted to contact with the upper end of piston 17 to accomplish this purpose. Stud 32 preferably is threaded in the piston 11, so that it may be adjusted whereby a greater or lesser amount of downward movement of said piston is necessary to effect downward movement of piston 17 as is apparent, this for a purpose that will presently appear.

The ramp operable valve that is associated with my improved speed control valve may be of any preferred construction, the only essentials being that in the first instance it establishes communication normally between the usual supply pipe and the train line pipe and cuts off communication of the supply and train line pipes with my improved speed control valve, and in the second instance, when it is actuated by a ramp device, that it places the train line in communication with my improved speed control valve. To this end said ramp valve is shown as including a casing 33 within which is rotatably mounted a plug 34 which plug is provided with a pair of relatively communicating ports 35, 36 adapted in a normal position of the plug to aline respectively, with a pair of ports 37, 38 in the casing 33, and in a ramp actuated position of the plug to aline respectively with a port 39 and aforesaid port 37. Depending from plug 34 is a shoe 40 that is adapted for contact with a ramp device thereby to actuate the plug from its normal position to aline ports 35, 36 with ports 39, 37.

Connecting port 39 of the ramp valve with port 16 of my speed control valve is a pipe 41 and in this pipe is arranged a suitable manually operable valve 42 that normally is open, placing pipe 41 in communication with the atmosphere, but which may be closed to direct all air entering said pipe 41 to port 16 of the speed control valve. Port 38 of the ramp valve is connected by a pipe 43 with the usual source of air supply, while port 37 of said ramp valve is connected by a pipe 44 with the train line pipe 45. In addition, said train line pipe is connected by pipes 46, 47, respectively, with ports 24, 25 of the speed control valve, and in the train line pipe, between pipes 46, 47, is arranged a normally closed cut off cock 48.

In view of the foregoing, the operation of my improved speed control valve is apparent and as follows:—Upon actuation of the shoe 40 of the ramp valve to aline ports 35, 36 in the plug 34 with ports 39, 37 in the casing, pipe 44 is placed in communication through said ports with pipe 41, and as a consequence, the air pressure in train line pipe 45 is exhausted through pipes 44, 41 to the atmosphere through the normally open valve 42. Thus the brakes will be applied and the train brought to a stop, unless the engineer is alert and manually closes valve 42, in which event the only escape for train line pressure is through ports 16, 14 of the speed control valve. If the train is moving above a predetermined low or cautious rate of speed when the ramp valve is actuated, piston 11 will be in uncovering relation to port 14 due to operation of the governor mechanism 13, and consequently, an exhaust of air from pipe 41 and the train line pipe will occur through port 16 annular channel 15 in the piston 11 and port 14. This will result in an application of the brakes and a reduction in the speed of the train until governor mechanism 13 raises piston 11 sufficiently to blank port 14, whereupon the exhaust of train line pressure will cease and the train accordingly be allowed to proceed at a reduced rate of speed.

If at any time the train attempts to exceed a predetermined high rate of speed, downward movement of piston 11, due to opration of the governor mechanism 13, will cause stud 32 to contact with and move piston 17 downward, which downward movement of piston 17 manifestly will result in cutting off the supply to the train line through pipe 47 and in the simultaneous exhaust of train line pressure through pipe 46 and the lower end of casing 10 which is opened due to unseating of valve 27 simultaneously with closing of valves 20, 21. Thus the brakes will be applied and the speed of the train reduced until governor mechanism 13 lifts piston 11 and permits spring 29 to close valve 27 and open valves 20, 21, whereupon pressure will again be admitted to the train line to release the brakes and allow the train to proceed at its reduced rate of speed. This operation manifestly will take place regardless of actuation of any other part of the mechanism.

I claim:—

1. In automatic train control apparatus,

the combination with the train pipe of an ordinary air brake system, of a valve connected with and at all times effective to vent the train pipe to cause an automatic application of the brakes in the event the train exceeds a predetermined high rate of speed, and also effective at predetermined times irrespective of the amount of pressure in said train pipe to vent the latter and cause an automatic application of the brakes in the event the train exceeds a predetermined low rate of speed.

2. In automatic train control apparatus, the combination with the train pipe and the fluid pressure supply pipe of an ordinary air brake system, of a ramp operable valve normally establishing communication between the supply pipe and the train pipe and operable at predetermined times to deny such communication, and a speed control valve connectible with the train pipe through said ramp valve when the latter is operated to deny communication between the supply pipe and the train pipe, whereby the train pipe is vented in the event the train at predetermined times exceeds a predetermined low rate of speed.

3. In automatic train control apparatus, the combination with the train pipe and the fluid pressure supply pipe of an ordinary air brake system, of a ramp operable valve normally establishing communication between the supply pipe and the train pipe and operable at predetermined times to deny such communication, and a speed control valve connectible with the train pipe through said ramp valve when the latter is operated to deny communication between the supply pipe and the train pipe, whereby the train pipe is vented in the event the train at predetermined times exceeds a predetermined low rate of speed, said speed control valve having a direct connection with the train pipe whereby the latter is vented in the event the train exceeds a predetermined high rate of speed, regardless of operation of said ramp operable valve.

4. In automatic train control apparatus, the combination with the train pipe of an ordinary air brake system, of a speed control valve having direct and indirect independent connections with the train pipe whereby the latter is vented whenever the train exceeds a predetermined high rate of speed and whereby the train pipe is vented at predetermined times when the train exceeds a predetermined low rate of speed.

5. In automatic train control apparatus, the combination with the train pipe of an ordinary air brake system, of a speed control valve connected with the train pipe and including independently movable elements one of which is effective at predetermined times to cause venting of the train pipe when the train exceeds a predetermined low rate of speed and the other of which is movable by the former to cause venting of the train pipe when the train exceeds a predetermined high rate of speed.

6. In automatic train control apparatus, the combination with the train pipe of an ordinary air brake system, of a speed control valve connected with the train pipe and including an atmospherically opening port, and speed controlled mechanism maintaining said port normally closed and operable when the train exceeds a predetermined rate of speed to open said port and place the same in communication with the train pipe, thereby to vent the latter.

7. In automatic train control apparatus, the combination with the train pipe of an ordinary air brake system, of a speed control valve connected with the train pipe and including independently movable elements one of which is effective at predetermined times to cause venting of the train pipe when the train exceeds a predetermined low rate of speed and the other of which is movable by the former to cause venting of the train pipe when the train exceeds a predetermined high rate of speed, and an adjustable contact device carried by one of said elements for engagement with the other whereby venting of the train pipe may be effected through said speed control valve at different rates of speed of the train.

8. In automatic train control apparatus, a train pipe, and automatically operable means always effective when the speed of the train exceeds a predetermined high rate to vent said train pipe, and effective at predetermined times independent of the amount of pressure in said train pipe to vent the latter when the speed of the train exceeds a predetermined low rate.

In testimony whereof I hereunto affix my signature.

DAVID J. BISSELL, JR.