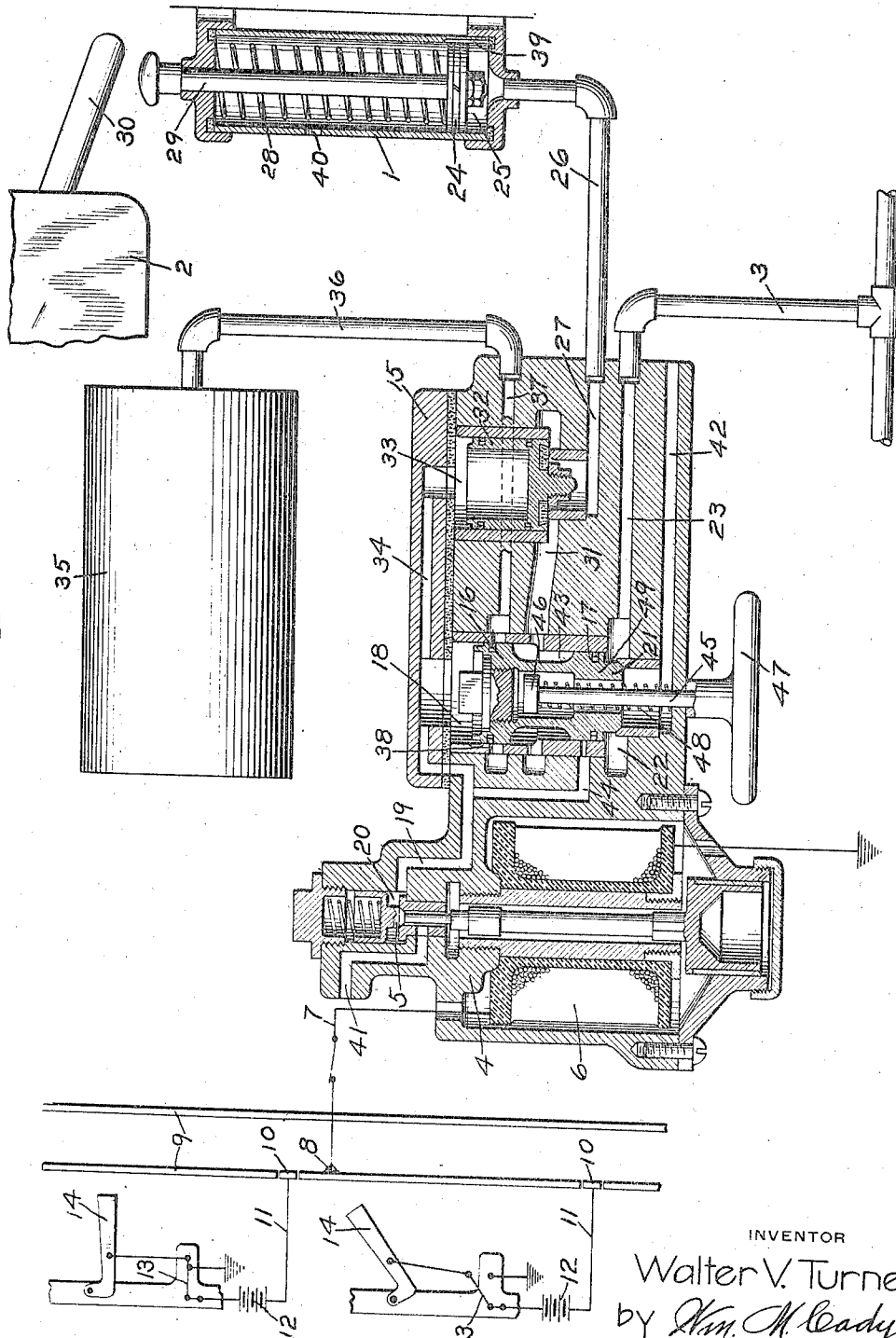


W. V. TURNER,
 AUTOMATIC TRAIN CONTROL DEVICE.
 APPLICATION FILED MAR. 28, 1917.

1,294,979.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC TRAIN-CONTROL DEVICE.

1,294,979.

Specification of Letters Patent. Patented Feb. 18, 1919.

Application filed March 23, 1917. Serial No. 157,934.

To all whom it may concern:

Be it known that I, WALTER V. TURNER, a citizen of the United States, residing at Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Automatic Train-Control Devices, of which the following is a specification.

This invention relates to automatic train control devices employed to control the movement of railway trains.

While devices of the above character are designed to automatically control the movement of a train, it is highly desirable that the operator watch the signals and handle the train himself so far as possible rather than rely entirely upon the automatic operation of the train controlling apparatus.

The principal object of my invention is to provide means for penalizing the operator, whenever the train is controlled by the operation of the automatic train control apparatus.

For accomplishing the above object, I propose to provide a device adapted to be operated upon actuation of the automatic train control apparatus for preventing the release of the brakes until manually operated, and preferably this device is placed in an inconvenient location, such as underneath the car, so that the operator is compelled to get off the car, in order to reset the device and permit the release of the brakes, before the train can proceed.

In the accompanying drawing, the single figure is a diagrammatic view, partly in section, of an automatic train control apparatus embodying my invention.

The automatic train control apparatus may comprise a device 1 for automatically operating a circuit breaker 2, an emergency brake pipe 3 adapted to be connected to a valve device which is operated upon a reduction in brake pipe pressure for effecting an application of the brakes, and a magnet valve device 4 for effecting the venting of fluid from the brake pipe and adapted to be controlled by a track circuit.

The magnet valve device 4 may comprise a valve 5 and a magnet 6 having one terminal of its coil connected to ground and the other terminal connected by wire 7 to a brush 8 adapted to engage one of the rails of the track 9.

Insulated rail sections 10 may be provided along the track and each section may be connected to a wire 11 containing a source of current 12. In order to energize the insulated rail sections, a switch 13 controlled by the movement of the usual signal arm 14 may be provided, the switch 13 being closed when the signal arm is in danger position and opened when the arm is in clear position.

According to my invention, the penalizing device may comprise a casing 15 to which the magnet valve device 4 may be attached and containing a piston having differential piston heads 16 and 17.

The chamber 18 adjacent to the piston head 16 is connected by passage 19 to valve chamber 20 containing the valve 5 and the piston head 17 carries a valve 21 contained in valve chamber 22 which is connected by passage 23 with brake pipe 3.

The automatic circuit breaking device 1 may comprise a piston 24 contained in piston chamber 25 which is connected by pipe 26 to a passage 27 in casing 15.

The piston 24 is subject to the pressure of a coil spring 28 and is provided with a stem 29 adapted to engage the operating arm 30 of the circuit breaker 2.

Communication from passage 27 to a passage 31 is controlled by a valve piston 32 having the chamber 33 at one face connected by passage 34 to piston chamber 18.

In operation, fluid under pressure is supplied from a source of fluid pressure, such as main reservoir 35, through pipe 36 to passage 37, from which fluid is supplied in the normal position of the differential piston, through a feed groove 38, to piston chamber 18 and thence through passage 34 to piston chamber 33.

In the normal position of piston 24, as shown in the drawing, piston chamber 25 is connected by a groove 39 to the spring side of the piston which is open to an exhaust port 40. The seated area of valve piston 32 is therefore normally subject to atmospheric pressure, so that the fluid pressure in piston chamber 33 will hold the valve piston seated.

If the train passes a track section 10 which has been energized by the movement of the signal arm 14 to danger position, the magnet 6 will be energized to open valve 5 and vent

fluid from piston chamber 18 to an exhaust port 41. The pressure in chamber 18 being thus reduced, brake pipe pressure acting in valve chamber 22 on the exposed area of the differential piston operates to lift the piston and permit the venting of fluid from the brake pipe 3 to the exhaust port 42, to thereby cause an emergency application of the brakes.

10 The opening of valve 21 exposes the full area of the differential piston to brake pipe pressure, so that same is rapidly shifted to its extreme outer position, in which passage 37 is connected by the annular groove 43 with passage 31. Fluid from reservoir 35 then flows to the exposed area of valve piston 32, and since the opposite side has been vented to the atmosphere, the valve piston is operated to open communication from passage 31 to passage 27 and thence to piston 24. Said piston is then operated to throw the circuit breaker arm 30 and thus open the power circuit.

25 When the differential piston is in its outer position, a passage 44 connects piston chamber 18 with exhaust port 42, so that possible leakage of fluid from the reservoir 35 past the piston head 16 will not build up a pressure in chamber 18.

30 Since reservoir pressure now acts in the annular groove 43 of the differential piston, a differential fluid pressure is exerted on the piston which maintains the same in its outer position and consequently the brake pipe pressure cannot be increased to effect the release of the brakes until the piston is moved back to its normal position.

35 For this purpose a pull rod 45 having collar 46 is mounted within a cavity formed in the differential piston and is provided with an operating handle 47. The pull rod is yieldingly held in normal position by a spring 48 and when the differential piston has been shifted to its outer position, the same may be returned to normal position by manipulating the handle 47 to pull out the rod 45, so that the collar engages a shoulder 49 of the piston and the piston is shifted to close the exhaust passage 42 and also cut off communication from the reservoir 35 to the circuit breaker controlling piston.

As hereinbefore stated, the resetting device is preferably located in a place which is not too easily accessible, so that the operator is subjected to some inconvenience and delay if he allows the train to be controlled by the operation of the automatic train control apparatus, instead of handling the train himself.

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

1. An automatic train control system comprising a brake pipe, a reduction in pressure in which is adapted to effect an application of the brakes, a piston device for venting fluid from the brake pipe, means controlled from the track for varying the fluid pressure on said piston device to operate same, and a pull rod adapted to be manually operated for engaging said piston to return same to its normal position.

2. In an automatic train control system, the combination with a brake pipe, a reduction in pressure in which is adapted to effect an application of the brakes, fluid operated means for controlling a power circuit breaker, a piston device for venting fluid from the brake pipe and for varying the fluid pressure on said means, a valve controlled from the track for varying the fluid pressure on said piston device to operate same, and manually operated means for returning said piston device to release position.

3. In an automatic train control system, the combination with a brake pipe, a reduction in pressure in which is adapted to effect an application of the brakes, a differential piston device for venting fluid from the brake pipe, means controlled from the track for varying the fluid pressure on one side of said piston device to operate the same, means for supplying fluid under pressure to the differential area of said piston device upon movement to the open position for holding same in said position, and a manually operated device for returning said piston device to normal position.

In testimony whereof I hereunto set my hand.

WALTER V. TURNER.