March 27, 1951 J. MERRYWEATHER 2,546,468

TRAIN CONTROLLING DEVICE

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Fig. 1.

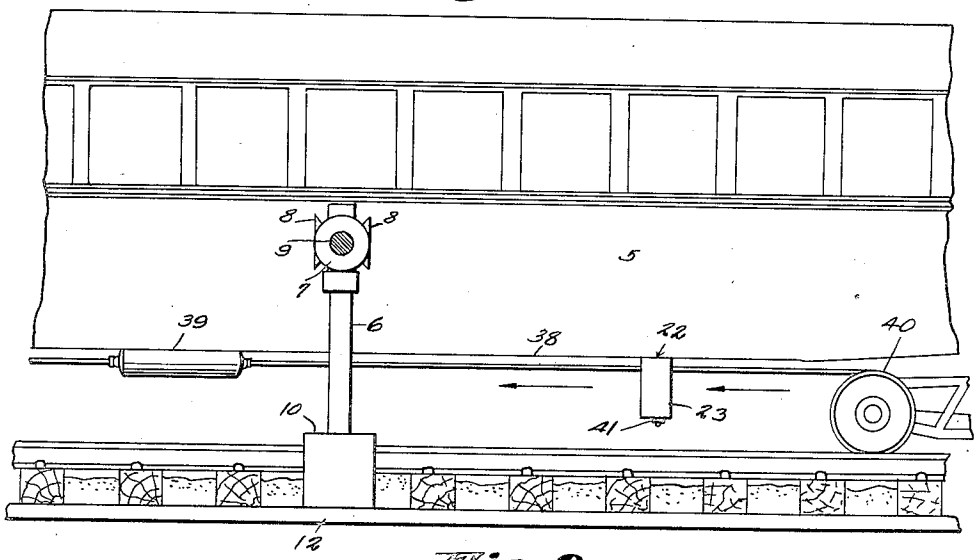

Fig. 2.

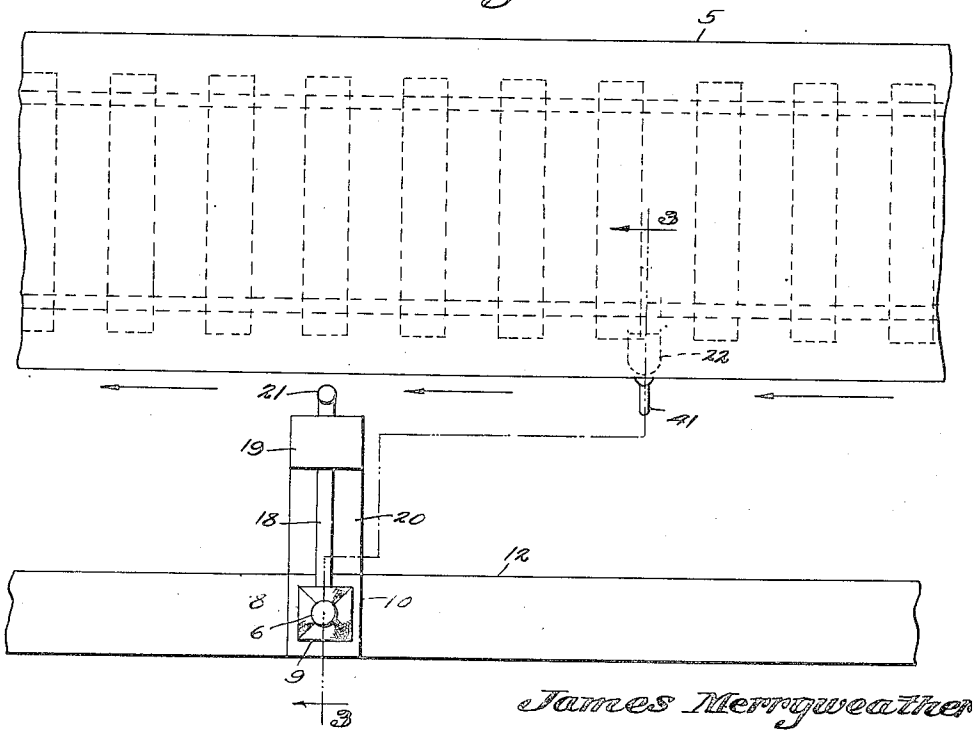

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Fig. 3.

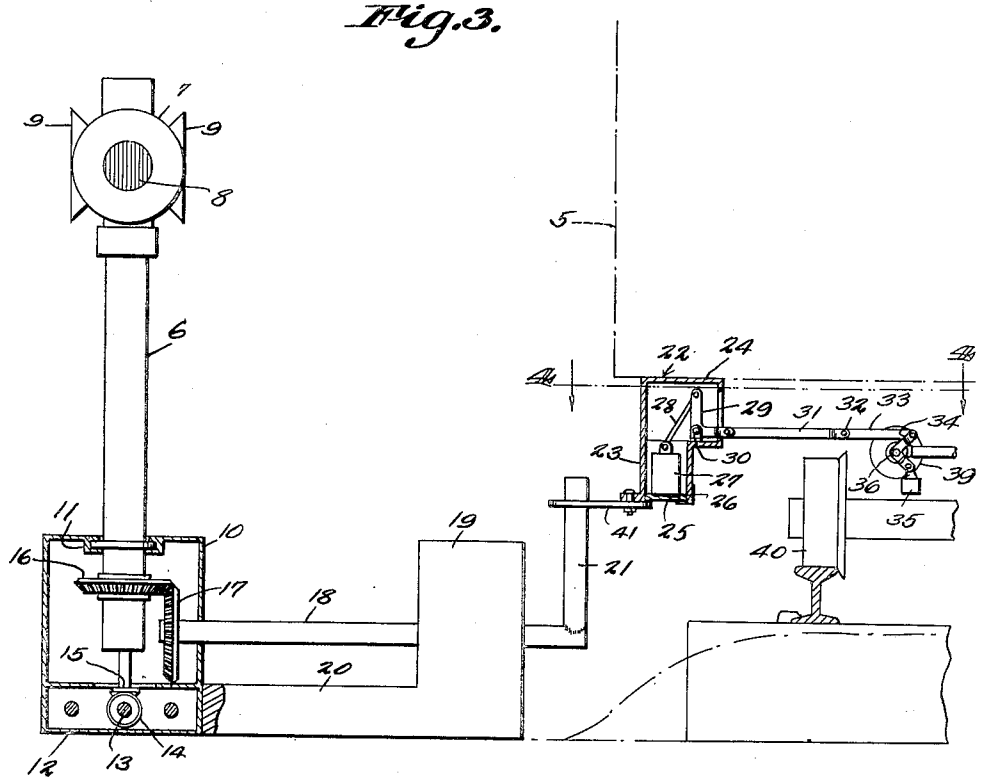
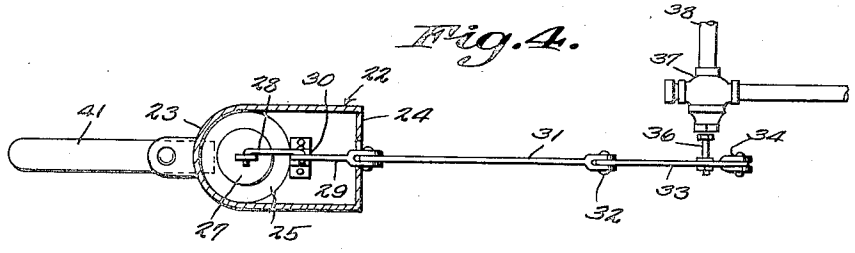


Fig. 4.



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TRAIN CONTROLLING DEVICE

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1 Claim. (Cl. 246—200)

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This invention relates to a train controlling device, and more particularly has reference to a mechanism adapted to effect automatic operation of the air brake system of a train under certain specified danger conditions.

By way of back ground, it may be noted that safety devices for preventing such train accidents as derails, rear end collisions, head on collisions, and the like, have long been a matter of serious concern to the railroad industry, and much time and effort has been devoted to the development and perfection of any device which will reduce railroading accidents.

So far as I am aware, such safety devices as have been developed in the past, while in many instances tending to reduce considerably the possibility of accident, nevertheless have not proved to be wholly satisfactory, because at some point in the operation of said devices, the human element has had to play a part. To my knowledge, it has been the human factor which has been the weak link in most instances, in the chain of sequences set into motion for the purpose of preventing a train accident under a danger condition.

To this end, it is the main purpose of the present invention to provide a train controlling device which will be completely automatic in operation, so that a train can be halted under a danger condition immediately and without dependence at any point, from beginning to end of the operation of the safety device, upon a human or humans.

Another important object is to provide a device as described which will in every instance have the result of preventing a train from entering a block which is not clear, the device being so designed as to apply the air brakes of any train automatically, to prevent its entering the block in which there is any danger condition, such as a washed out bridge, derail, or any other situation which would cause said train to have an accident.

Another important object is to provide a device of the character described which can be mounted on a train at low cost, the device being specifically designed to permit its manufacture at comparatively little expense, and to permit its maintenance costs to be reduced to a complete minimum.

Another important object is to provide a device of the character described which can be mounted on a train with little or no modification of the air brake system, and which is used in conjunction with the conventional block signal system, the device being so designed as to permit its installation on rolling stock already in use, with a minimum of expense.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in

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the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings:

Figure 1 is a fragmentary side elevational view of a train equipped with the device.

Figure 2 is a top plan view.

Figure 3 is an enlarged section on line 3—3 of Fig. 2.

Figure 4 is a section on line 4—4 of Fig. 3.

Referring to the drawings in detail the reference numeral 5 designates a train on which the device constituting the subject of invention is mounted. It may be noted that the device will preferably be mounted on the engine, and it may be further noted that identical devices would preferably be mounted at opposite sides of the engine, so as to be operable regardless of the direction in which the train is moving.

A conventional block signal post is designated 6, this having at its upper end the block signal 7. The post is adapted to be rotated through ninety degrees, and when in one extreme position, signals the fact that the block ahead is not clear by showing the red light 8. In the other extreme position, the block ahead is signaled as being clear by showing of the green light 9.

Post 6 extends upwardly from the housing 10, the post being supported for rotation in the housing as at 11. Below housing 10 is the block signal channel 12, containing the rod 13, that is adapted to rotate the gear 14 in mesh with gear 15 of the post. Thus, it will be readily seen that whenever the block next ahead of the signal is not clear for any reason, the block signal will be actuated by electrical or mechanical means to present the red light 8 to the on-coming train 5. Under present conditions, the engineer of the on-coming train, noting that the block ahead is not clear, applies the air brakes to bring the train to a stop.

The above described construction of a block signal is more or less conventional, and it is not intended that the invention embrace the particular construction of a block signal operating as described. The main difficulty, heretofore, has been that the human element is present, in that the block signal does not do more than show a visible indication of danger ahead, whereupon the stopping of the train must depend upon the alertness of those on the train. This human factor too often cannot be depended upon, and has been the cause of many train accidents in the past, and is still the cause, from time to time, of serious derails or collisions.

In accordance with the invention, I mount on the post 6 the beveled gear 16, in mesh with the beveled gear 17 carried on one end of a rock shaft 18, that is journaled for rotation in the bearing member 19 upstanding from the support 20.

Rigid with the other end of the rock shaft 18,

and disposed perpendicularly thereto, is the trip arm 21. In this connection, and as readily noted from Fig. 3, trip arm 21 will extend straight upwardly against every train that comes along. If there should be a broken rail, open switch, train going in on a side track, road bed or bridge washed out, or any similar occurrence that might affect the track circuit, trip 21 cannot be pulled down. If the block is clear, trip 21 can be pulled down before the train reaches it. After the train passes by, trip 21 will go back into position extending straight upwardly, as it is on a closed circuit and stands up against every train.

That portion of the safety device that is mounted on the train 5 includes a housing generally designated 22, this housing having the cylindrical extension 23, that merges at its upper end into the lateral extension 24. I believe it will be apparent that the particular shape of the housing 22 can be varied within the scope of the invention as claimed.

The lower end of the housing 22 is formed open, but is normally kept closed by a trap door 25 which is hinged to the pipe or cylinder 23 as shown in 26. This trap door supports within the pipe or cylinder 23 the weight 27, having pivotally connected to its upper end one end of the link 28. Link 28 is pivotally connected at its other end to one end of the bell crank 29, that is fulcrumed intermediate its ends within the lateral extension 24, as shown at 30. One end of the lateral extension 24 is open, and the bell crank lever 29 extends therethrough. Connected to the projecting end of the bell crank lever 29 is the link 31, which is pivotally connected at its other end, as at 32, to the link 33. Link 33 is in turn pivotally connected to the bell crank lever 34, having depending from its other end the counterweight 35. Intermediate its ends, the bell crank 34 is secured to the valve rod 36, so that movement of the bell crank 34 will rotate the valve rod 36 so as to open valve contained within the pipe fitting 37, that is included in the air line 38 extending from the air tank 39. The opening of the valve causes the air to be applied to brake the wheels 40 of the train, so as to bring the train immediately to a stop.

This entire sequence is controlled by the trip member 41, pivoted for swinging in a horizontal plane on the pipe or cylinder 23. Trip member 41, as readily seen from Fig. 2, projects laterally beyond the sides of the train 5, and the upstanding trip arm 21 is disposed in the path of the trip member 41 when the train moves past the block signal.

Thus, assuming that there is a danger condition in the block ahead, trip arm 21 will be rigidly supported in an upright position, and will remain in this position as long as the danger condition exists. Accordingly, as an on-coming train 5 passes the block signal, the trip member 41 will be struck by the upstanding trip arm, and this will cause the trap door 25 to swing open under the weight of the weight 27. The trap door will swing open because the inner end of the trip member 41, which normally supports the trap door in closed position, will be swung away from the trap door, thus to permit the trap door to open.

As the trap door opens, weight 27 will drop downwardly, swinging bell crank lever 29 to the left in Fig. 3. Through the medium of the link 31 and 33, the bell crank 34 will in turn be swung to the left, rocking the valve rod 36 to one extreme position, in which position the valve will

be open. Thus, the air brakes will be caused to be applied immediately and automatically.

It may be noted that the device presents no strain on the valve mechanism, because the bell crank lever 29, when swung to valve opening position, engages the far side of the housing 22, so as to relieve the strain or pull upon the valve, while still nevertheless holding the valve in open position.

It will be understood that the weight of the weight 27 and the counterweight 35 will be so related as to cause the operation of the entire mechanism swiftly, but without undue jerking movement or strain upon any of the parts.

From the above, it is believed that the operation of the invention will be clear, and it may be further noted that the stated objects of the invention are met thereby, in that a device inexpensive of manufacture and low in maintenance costs is provided, that will operate in each and every instance to set the air brakes of a train whenever there is any danger condition whatsoever in the block ahead, said device operating entirely without dependence upon the human element:

What is claimed is:

Automatic brake operating means for trains including an arm mountable rotatably beside a train track, said arm being adapted at one end for rotation by a block signal shaft located adjacent said track, a crank on the other end of said arm extended vertically and upwardly on partial rotation of said arm in one direction and extended horizontally on partial rotation of said arm in the opposite direction, a housing secured to and depending from the underside of the train and located entirely under the train, a lower extension formed on the other end of the housing, a hinged trap door normally closing the bottom end of said lower extension, a weight supported in said lower extension of the housing upon the trap door, a trip member pivotally mounted on said bottom end of the lower extension for horizontal swinging movement and having one end normally underlying the door and the other end extended horizontally and outwardly for striking by said crank when the crank is extended upwardly, thus to swing the trip member out of its normal position to cause opening of the trap door under pressure of said weight, said crank when extended horizontally being located in a horizontal plane located substantially below the plane of swinging movement of the trip member, a bell crank pivoted in the upper portion of the housing, a link connecting the upper end of the weight to one end of the bell crank, a second bell crank adapted for rigid connection to a valve shaft of a train brake system extending under the train, means linking the other end of the first bell crank to one end of the second bell crank, and a smaller weight depending from and counter-weighting the other end of the second bell crank.

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