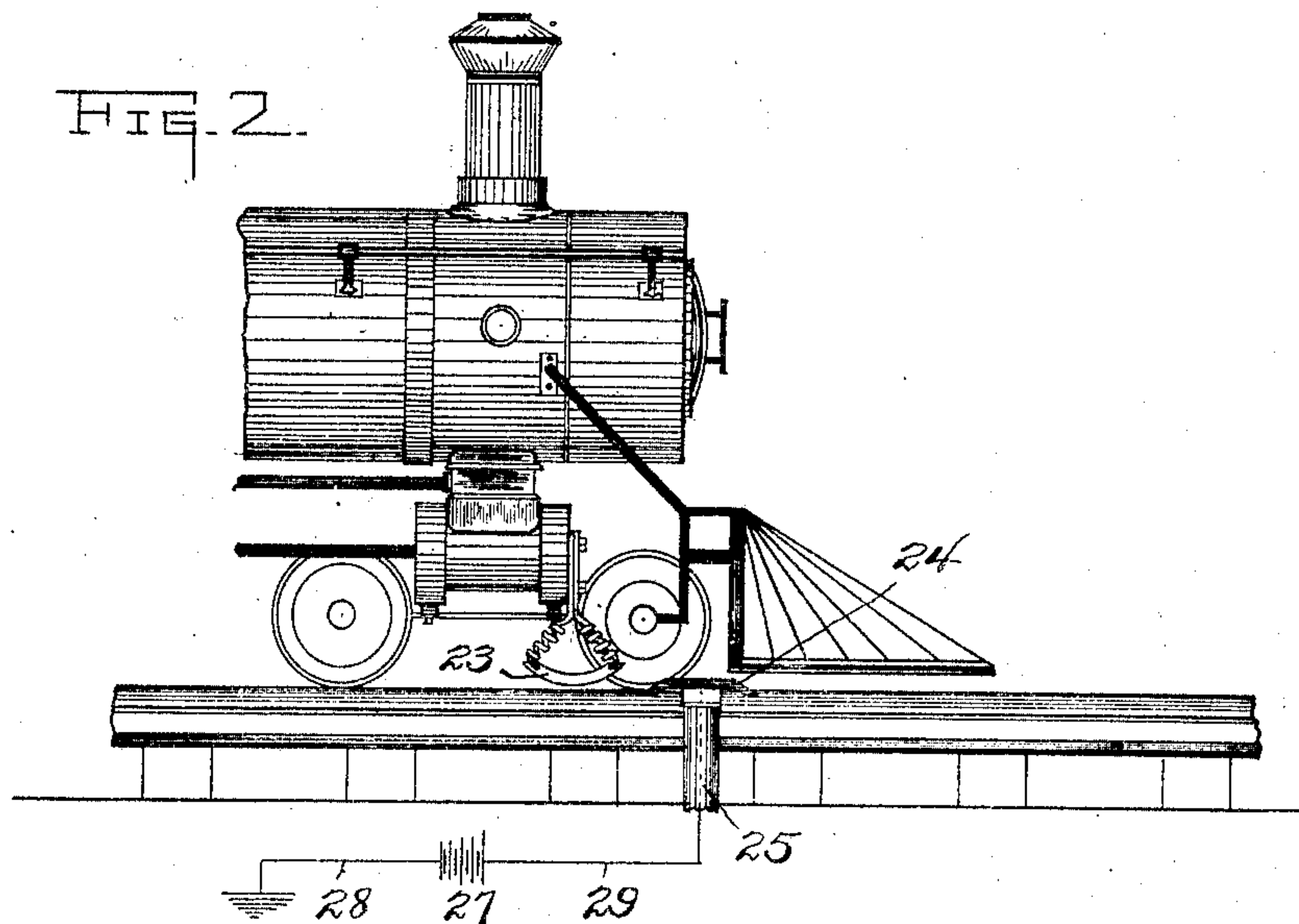
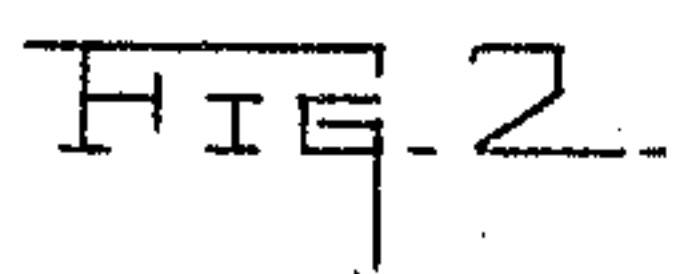


AUTOMATIC TRAIN STOPPING DEVICE.

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Patented July 18, 1911.



Edward,
C. A. M. M. M. M. M.

Franklin A. Pierce.
By *H. E. Doulap*,
Attorney.

UNITED STATES PATENT OFFICE.

FRANKLIN A. PIERCE, OF WHEELING, WEST VIRGINIA, ASSIGNOR OF ONE-FIFTH TO JOSEPH GATEWOOD AND JACOB THONEN AND ONE-EIGHTH TO W. J. DUFFY, OF McMECHEN, WEST VIRGINIA, ONE-EIGHTH TO THOMAS FITZGERALD, OF BALTIMORE, MARYLAND, ONE-SIXTEENTH TO JOHN E. OSWALD AND JOHN T. TRAVERS, OF BELLAIRE, OHIO, ONE-TWENTIETH TO PHILIP CONNIFF, OF WHEELING, WEST VIRGINIA, AND ONE-SIXTEENTH TO J. R. ONDERDONK AND ONE-EIGHTH TO A. P. PRENDERGAST, OF BALTIMORE, MARYLAND.

AUTOMATIC TRAIN-STOPPING DEVICE.

998,260.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANKLIN A. PIERCE, a citizen of the United States of America, and resident of Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Automatic Train - Stopping Devices, of which the following is a specification.

My invention relates to new and useful improvements in train-stopping devices, and it has for its chief object to provide automatic means whereby the brakes of a railway train are applied and said train stopped without the intervention of the engineer upon said train's passing a warning semaphore or track-signal unheeded.

A further object of the invention is to provide on the engine or other portion of a railway train a simple and inexpensive device, having connection with the ordinary air-brake system, which is adapted to be initially set in operation for applying the brakes by suitable electrical circuits connected therewith, one of which circuits is closed rendering it operative by the engagement of suitable contacts, one contact being carried by the engine or other portion of the train, while the other contact is carried by a movable portion of the semaphore or signal.

With these and other objects in view, the invention finally consists in the particular construction, arrangement and combination of parts which will hereinafter be fully described, reference being herein had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 is a diagrammatic view of the invention, the release-valve being shown in longitudinal section, and Fig. 2 is a detail view, a portion of the engine being shown in side elevation.

Referring to said drawings, in which like reference-numerals designate like parts throughout the several views—1 indicates a release-valve which is adapted for mounting in any convenient position on the engine, said valve consisting, in part, of a head 2, a piston-chamber 3 and a slide-valve chest 4, the latter being in open communication

with the piston-chamber 3 in front of the piston 5 and having connection through a pipe 6 with the train line. Attached to the front face of said piston 5 is a slide-valve 7 having a port 8 therethrough which, at the end of the piston's forward stroke, registers with an exhaust port 9 in the side of said slide-valve chest.

Leading through the head 2 is a series of communicating ports 10, 11, 12 and 13 which admit of the passage of air from the main reservoir of the engine to the piston-chamber 3 behind the piston, said port 10 having communication at its outer end with a pipe 14 leading to said main reservoir. The ports 12 and 13 are in alinement and are directed centrally and longitudinally through said head 2 and have projecting there-through the piston-rod 15 on which said piston 5 is carried. Said port 13 is restricted in size with respect to the port 12, but is sufficiently large to admit of the ready passage of air by the piston-rod, and a seat 17 is formed at the junction of said ports 12 and 13 for the reception of a cut-off valve 16 carried by said piston-rod. The port 10 is substantially horizontal, while the end of the port 11 communicating therewith is at substantially a right angle thereto.

An electromagnet 18 is rigidly supported upon the upper end of a pin-valve 19 which is vertically movable in a hole or guide-way 20 in said head 2, said pin-valve normally standing with its point projected into said port 11 in front of the inner end of the port 10, effectually closing communication between said ports 10 and 11. One pole of said magnet 18 is suitably grounded through a wire 21 upon the iron mass of the engine, while the opposite pole is connected by a wire 22 with a suitable contact-plate 23 carried in an appropriate position on the engine for making contact with a contact-plate 24 located adjacent to the rails of the track near a semaphore or other track-signal. Said contact-plate 24 is arranged in any appropriate manner to be controlled by the movement of the movable portion of said semaphore or track-signal, as, for instance, upon the vertical portion of an in-

insulated rocker 25 whose crank-arm 26 is connected in any suitable manner with said semaphore to be operated thereby for raising and lowering said contact-plate. A battery 27 has one side 28 suitably grounded, while its other side 29 is connected to said contact-plate 24.

Appropriately supported, as by a bracket 30, over the magnet 18 is a second magnet 31 which is connected by a wire 32 to one side of a battery 33 carried on the engine, the opposite side of said battery being connected by a wire 34 to a contact-plate 35 mounted upon, but insulated from, the outer end of the piston-rod 15.

Carried by the magnet 31 is a fixed contact 36 which is connected by wire 37 to the opposite pole of said magnet, and carried by the magnet 18 is a similar fixed contact 38 which is connected by a wire 39 to a suitable contact-bracket 40 carried by the outer end of the head 2 at a point adjacent to the path of movement of the piston-rod 15 and normally in contact with the contact-plate 35 carried by said piston-rod.

As is obvious, when contact is made between the contact-plates 23 and 24, as when a moving train passes by a semaphore whose signal arm is set to indicate "danger ahead," the magnet 18 becomes excited and is immediately raised up by the attraction of the magnet 31 bringing the contacts 36 and 38 into contact, completing an electrical circuit which consists of said contacts, the magnet 31, battery 33, contact-plates 35 and 40, and circuit-wires 32, 34, 39 and 37. This action raises the pin-valve 19 from the port 11, allowing the main reservoir pressure of air to pass unobstructedly to the piston-chamber 3 behind the piston 5, causing said piston to move forward until the port 8 of the slide-valve 7 registers with the exhaust-port 9, whereupon the train line is vented, producing an emergency application of the brakes. When the piston reaches the limit of its forward movement, the cut-off valve carried by the piston-rod seats, preventing the main-reservoir pressure from further entering the piston-chamber, and the air in said chamber behind the piston is gradually allowed to exhaust through a port 41 provided at a suitable point. A spring 42 having one end seated against the front end of the slide-valve 7 and its opposite end suitably held, as in a socket 43 at the end of the slide-valve chamber 4, is compressed by the forward movement of the slide-valve, and gradually forces said slide-valve and the piston back to their normal positions as the air behind said piston exhausts to the atmosphere through the port 41. Immediately said spring forces the slide-valve back far enough to cut off communication between the ports 8 and 9, the train line may again be recharged. At the same time that, or

slightly before, the piston reaches the limit of its forward movement, the contact-plate 35 carried by the piston is withdrawn from contact with the contact-bracket 40, breaking the circuit through the electromagnets and consequently allowing the magnet 18 to drop to its normal position, and, through the then seated pin-valve 19, closing communication between the ports 10 and 11.

It will be seen from the foregoing that by my invention means are provided whereby when a semaphore is set to indicate that a train is to be brought to a stop a train passing said semaphore unheeded will automatically be brought to a standstill, the brakes being automatically applied.

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

1. In a device of the type set forth a release valve comprising a head, a piston chamber and a valve chest having a port, said head having a port therein leading into the piston chamber and having a second port communicating with the main reservoir of the air brake system and with said first port, a piston in the piston chamber having a rod extending in said first named port, and carrying a valve to close said first named port, a valve in the valve chest carried by said piston and formed with a port, and a valve controlling the admission of air from said main reservoir to the piston.

2. In combination with the train line and the main reservoir, means arranged between said line and reservoir actuated by the pressure from the main reservoir to enable the train line pressure to exhaust, said means including a piston and rod therefor, means carried by said rod to shut off the pressure from the main reservoir when said piston is in position to enable the train line pressure to exhaust, and means operated by the piston during its movement to exhaust position to close communication with said main reservoir.

3. In combination with the train line and the main reservoir, means for exhausting air from said train line, means operated by the main reservoir pressure for actuating said means to exhaust position, means for controlling the pressure from said main reservoir to said actuating means, and means controlled by the movement of said actuating means of the exhausting means for releasing said controlling means when said exhausting means is in operative position.

4. In combination with the train line and the main reservoir, means actuated by the pressure from the main reservoir for effecting the exhaust of the pressure from the train line, means for admitting said main reservoir pressure to said means to operate the same, and means actuated during the movement of said first named means to ex-

haust position to cut-off said main reservoir pressure.

5. In combination with the train line and the main reservoir, means actuated by the pressure from the main reservoir for effecting the exhaust of the train line pressure, means included in an electric circuit for automatically admitting said main reservoir pressure to said first named means when said circuit is closed, and means actuated by said first named means for breaking said circuit when said first named means is in exhaust position to cut off said main reservoir pressure.

6. In combination with the train line and the main reservoir, a release valve interposed between the two embodying a piston actuated by the main reservoir pressure to enable the train line pressure to exhaust, means for controlling the admission of the main reservoir pressure to said piston, means included in an electrical circuit for operating said last named means to open position, and means operated by said piston to break said circuit to permit said controlling means to move to closed position.

7. In combination with the train line and the main reservoir, means including a piston actuated by the main reservoir pressure to effect the exhaust of the train line pressure, means to return said piston to normal position after actuation, and means operated by said piston during its movement to exhaust position to automatically cut-off said main reservoir pressure.

8. In combination with the train line and the main reservoir, means actuated by the main reservoir pressure to effect the exhaust of the train line pressure, means for controlling the main reservoir pressure, and means operated by said first named means to cause said controlling means to assume closed position when said piston is in exhaust position.

9. In combination with the train line and the main reservoir, means actuated by the main reservoir pressure to effect the exhaust of the train line pressure, and means for automatically cutting off the main line pressure when said first named means is in exhaust position.

10. In combination with the train line and the main reservoir, a spring pressed valve actuated by the main reservoir pressure to effect the exhaust of the train line pressure, and means automatically actuated by said valve when the latter is in exhaust position to cut off the main reservoir pressure.

11. In combination with the train line and the main reservoir, a spring pressed ex-

hausting valve operated by the main reservoir pressure to effect the exhaust of the train line pressure, said valve being connected to and controlled in its movement by a piston, and means carried by the piston rod for cutting off the main reservoir pressure when the train-line exhausting position is reached.

12. In combination with the train line and the main reservoir, a piston carrying a valve and a rod, said piston having communication with the main reservoir, to be operated by the main reservoir pressure, means included in an electrical circuit for controlling said communication, and means on said rod included in said circuit whereby upon movement of said piston to exhaust position said circuit will be broken to enable said controlling means to assume closed position and thereby cut off the main reservoir pressure.

13. In combination with the train line and the main reservoir, exhausting means for the train line pressure operated by the main reservoir pressure, said means including a piston carrying a slide valve, means for restoring said exhausting means to normal position, and means carried by the piston rod for cutting off the main reservoir pressure when said exhausting means reaches operative position.

14. In combination with the train line and the main reservoir, a valve actuated by the main reservoir pressure to effect the exhaust of the train line pressure, means to admit the main reservoir pressure to said valve to operate the same, means movable with the valve to cut-off the main reservoir pressure when said valve is in exhausting position, and second cut-off means automatically operated by said valve when the same moves to exhaust position.

15. In automatic emergency brake applying mechanism, a valve casing connected to the train pipe and having an exhaust open to the atmosphere, a valve slidably mounted on one side of the casing to control said exhaust, means for holding the valve to the side of the casing, means for holding it normally over the exhaust, a cylinder, a piston in the cylinder having its rod secured to the said valve, and means for admitting fluid pressure to said piston to move the valve from the exhaust.

In testimony whereof I affix my signature in presence of two subscribing witnesses.

FRANKLIN A. PIERCE.

Witnesses:

H. E. DUNLAP,
E. A. LENKARD.