W. E. ADAMS.

AUTOMATIC SAFETY STOP SIGNAL.

APPLICATION FILED OCT. 3, 1908.

928,834.

Patented July 20, 1909.

2 SHEETS—SHEET 1.

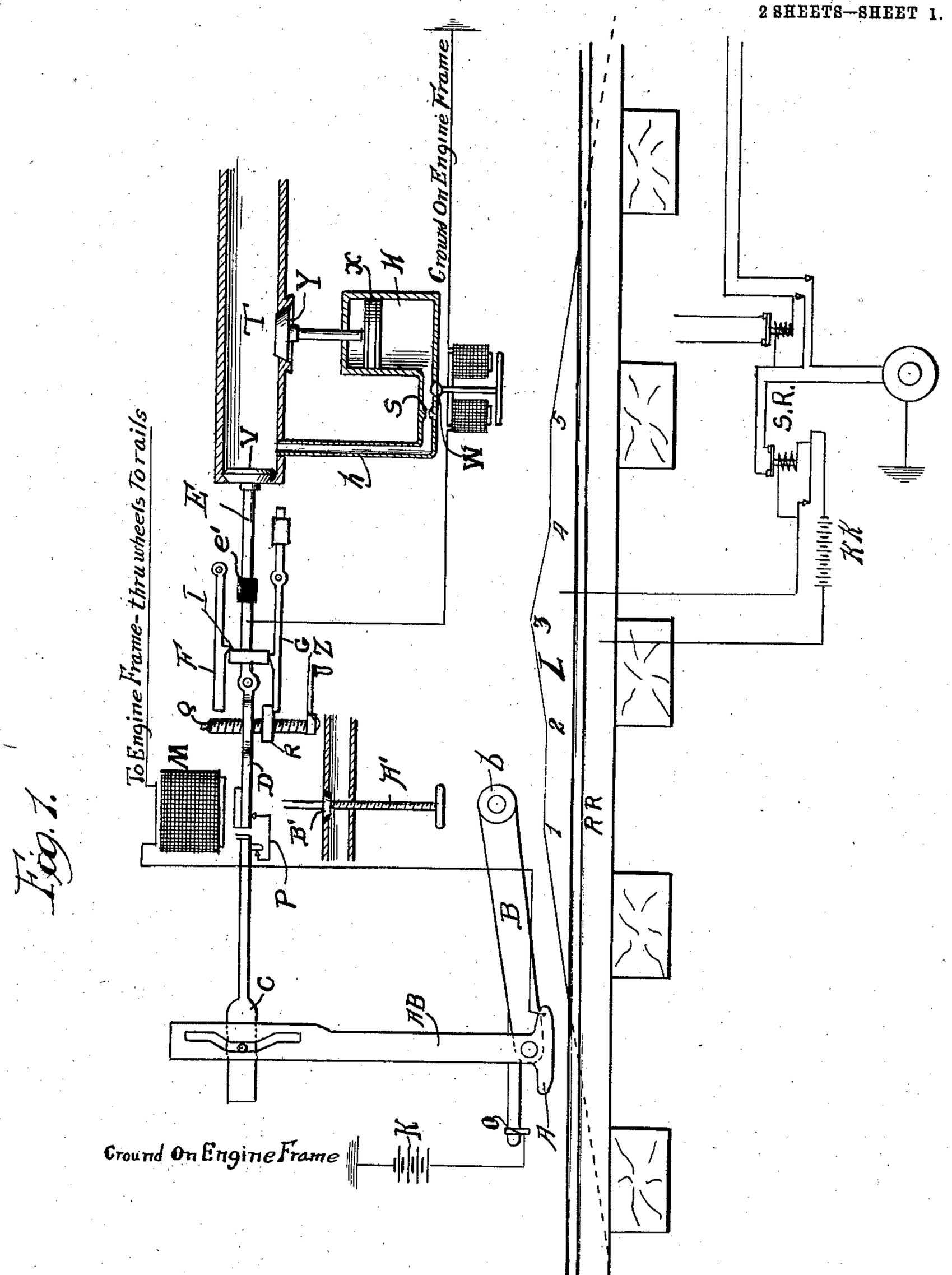

Fig. 1.

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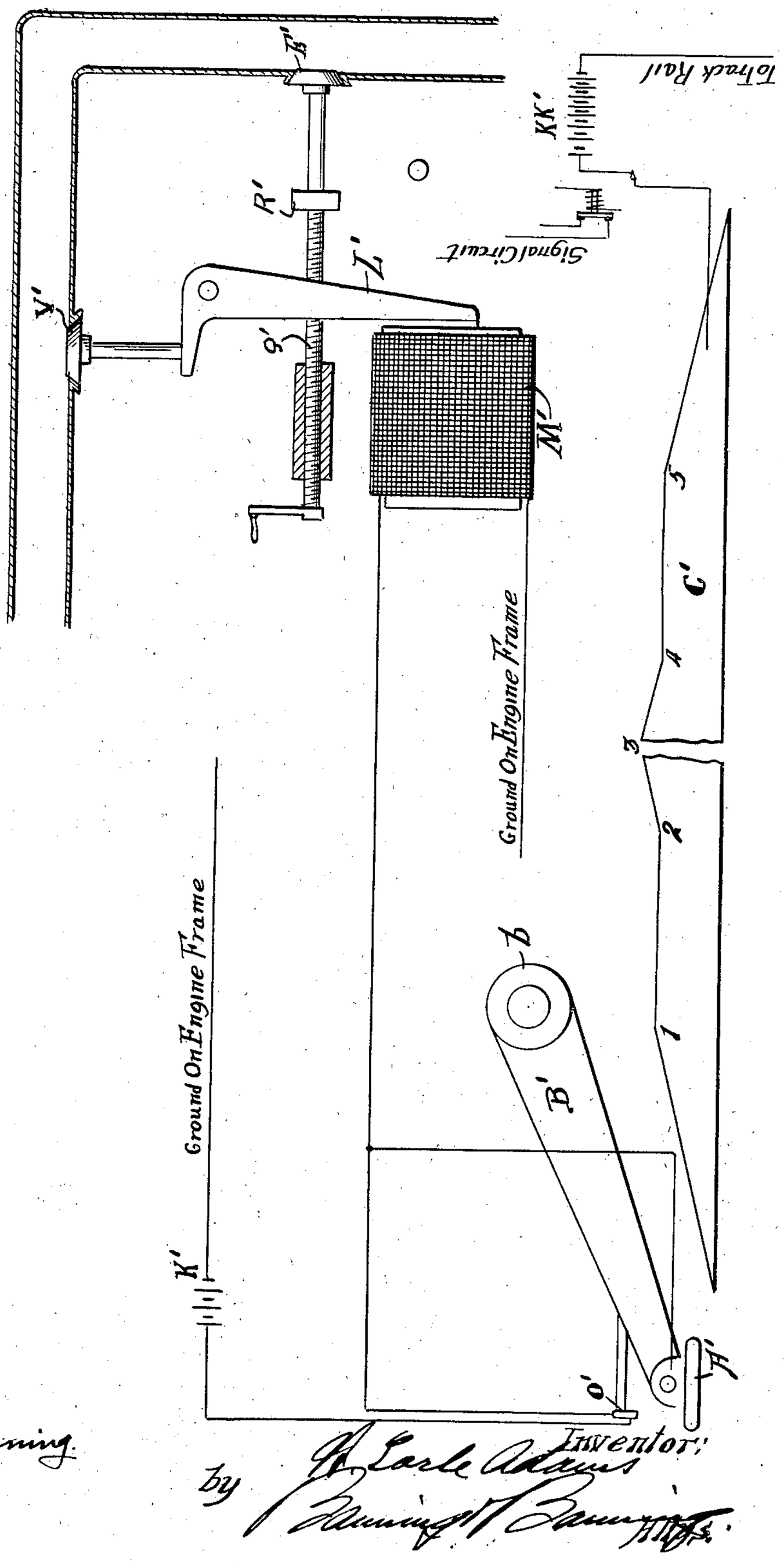

Fig. 2.

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UNITED STATES PATENT OFFICE.

WARRINGTON EARLE ADAMS, OF CHICAGO, ILLINOIS.

AUTOMATIC SAFETY STOP-SIGNAL.

No. 928,834. Specification of Letters Patent. Patented July 20, 1909.

Application filed October 3, 1908. Serial No. 456,047.

To all whom it may concern:

Be it known that I, WARRINGTON EARLE ADAMS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Safety Stop-Signals, of which the following is a specification.

This invention relates to an improved construction in automatic safety stop signals, applicable more especially for use upon railway systems; and has for its object, to utilize electro-mechanical means, in case the train or car has passed the danger signal without stopping, the device automatically opening the train pipe, thus setting the brakes.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a diagrammatic view, illustrating this improved automatic safety stop signal apparatus; and Fig. 2 a modified construction of electrical means for opening the train pipe.

A trip rail L is preferably positioned centrally or alongside one of the railroad tracks, the upper edge of which comprises a series of inclined sections numbered, as shown, from 1 to 5, respectively, the highest point thereof being at 3.

In connection with the regular visual automatic signal is placed the relay SR for controlling part of the circuit of the battery KK, one side of the battery being connected to the trip rail L and the other side to the track rail RR. Where an automatic signal is not used, the battery KK may be connected to the trip rail through contact on any style of visual signal.

An arm B has its end *b* pivotally carried by an engine or car, but is insulated therefrom, said arm carrying a shoe A at the lower end of a rod AB, which is pivotally attached to the arm B and extends upwardly therefrom, said rod engaging the outer end of a slide C. Positioned in close proximity to the other end of the slide C is the rod D having its further end connected to the piston stem E, which in turn controls the movement of the valve V at the mouth of the train pipe T, it being understood that the valve V is insulated by coupling *e'* in stem E; and an electro-magnet M is positioned to one side of the rod D and controls the movement of the rod sidewise. The closed electrical circuit of battery K on the engine or car frame holds the valve W of the cylinder H closed, said cylinder being connected to the train pipe through the auxiliary pipe or passage *h*, having a contracted opening S for limiting the flow of air and holding the valve Y which is seated at the side of the train pipe closed by means of a piston X traveling in the cylinder H.

As the engine or car reaches position alongside the trip rail L, the shoe A upon the guide lever B and rod AB is raised about half the full motion when the shoe has advanced to the point 2 on the trip rail. In the event that the road is clear, the battery KK works through the relay SR or contact on home signal through the trip rail L by means of contact shoe or other contact means A to electro-magnet M alongside the rod D, to the engine frame or track rails to battery, the electro-magnet M raising the rod D so as to permit forward movement of rod C without opening the valve V.

As the shoe travels off the trip rail L, all of the parts of the apparatus resume their normal position. When the contact shoe A reaches point 1 on the trip rail L, the circuit of battery K is opened at O, and at point 2—3 another opening is made at P, letting the small valve W in the passage adjacent to the cylinder H open and air escape from beneath the piston X faster than the same can be supplied through the contracted opening S. If the circuit remains open long enough, the valve Y automatically opens, thus setting the brakes; but if the circuit is quickly closed, the parts return to normal position, the small valve W closing, and pressure on the piston X rises to train pipe pressure. This circuit also includes the rod D and part of the stem E through contact at P, and the contact at P is closed only when the rod D is in normal position.

In the event that the road is not clear, the slide C engages the rod D and forces the valve V in the mouth of the train pipe T open, thus setting the brakes. As the valve V in the train pipe opens, a collar I is caught by a latch F, thus holding the rod D and valve stem E in advanced position. In order to release the brakes thus set, a time release QRZ is operated, the same comprising

a threaded body Q having a nut R thereon and a crank or handle Z for operating the same. In order to release the brakes, the crank Z is manipulated until the latch F is raised by the nut R, thus releasing the collar I therefrom. The toothed bar G is then disengaged by returning the adjustable nut R, the valve parts resuming their normal closed position.

If the lever B or AB is torn away or parts of the circuit of battery K break, or if the circuit is disarranged for any reason, the brakes will always set through the electro-magnet M losing its energy. The battery KK being outside, and the battery K not being strong enough of itself to operate the electro-magnet M if it should become short-circuited, any defect in the circuit will always give the danger indication. The circuit of battery K is not necessary to the operation of this automatic safety stop signal, but is used as a supplemental precaution against accident to the regular mechanical opening of the valve.

Fig. 2 of the drawing shows a modified form of construction in which the magnet M′ operates on a lever L′ serving as a support for a valve V′ controlling the air in the train pipe. If the route is clear, the battery KK′ is thrown into multiple with the battery K′ assisting in the energizing of the electro-magnet M′ holding the lever L′ in position. When battery K′ circuit is opened by contact O′ on shoe A′ reaching the position of 3 on the trip rail, and as shoe A′ passes off of trip rail C′, all parts resume normal working position. If the route is not clear, circuit of battery K′ is open in shoe A′ reaching positions 2 to 3. Electro-magnet M′ is deënergized, allowing pressure on train pipe to open valve V′.

The shoe A′ contacting the rail C′ energizes magnet M′ and serves to keep the lever L′ in contact therewith, and the valve V′ seated. When, however, the danger signal is set and the rail C′ is dead, no energy will then be applied to the magnet M′, and the pressure in the train pipe will open the valve V′, thus set the brakes. Before the engineer can proceed, it will be necessary for him to turn the screw threaded stem Q′ until the nut R′ contacts the lever L′ and returns it to normal position. While this is being accomplished, the valve E′ will be opened and before the brakes can be released it will be necessary to turn the screw threaded stem Q′ back until the valve E′ again becomes seated. Under normal conditions, the magnet M′ is energized by the battery K′ working through the contact O′ from the arm B′.

In case the train should stop at a point where the shoe A will rest on the point 3 of the trip rail L, in order to release the brakes the screw threaded shank A′ must be raised far enough to move the lever D away from the lever C and allow the valve V to return to its seat. The screw threaded shank A′ is then returned to its normal position, seating the valve B′, unlocking the brake and allowing the train to proceed.

What I claim as new and desire to secure by Letters Patent is:

1. In an automatic safety stop signal, a trip rail provided with graduated surfaces, a contact shoe for engaging the trip rail, an electrical circuit in connection with the trip rail and home signal, an auxiliary circuit in connection with the contact and electro-magnet, adapted to be broken at a point on the trip rail, and a connection between the trip rail, home circuit and electro-magnet, substantially as described.

2. In an automatic safety stop signal, a trip rail provided with graduated surfaces, a contact shoe for engaging the trip rail, an electrical circuit in connection with the trip rail and home signal, an auxiliary circuit in connection with the contact and electro-magnet, adapted to be broken at a point on the trip rail, a connection between the trip rail, home circuit and electro-magnet, and an arm actuated by the electro-magnet to prevent the openings of the train pipe valve, substantially as described.

3. In an automatic safety stop signal, a trip rail provided with graduated surfaces, a contact shoe for engaging the trip rail, an electrical circuit in connection with the trip rail and home magnet, an auxiliary electrical circuit in connection with the contact and electro-magnet, adapted to be broken at a point on the trip rail, a connection between the trip rail, home circuit and electro-magnet, an arm actuated by the electro-magnet to prevent the opening of the train pipe valve, a secondary valve on the train pipe having its piston chamber in communication with the train pipe, an escapement valve in the piston chamber, and means for operating the escapement valve to open the secondary valve in the train pipe, substantially as described.

4. In an automatic safety stop signal, a trip rail provided with graduated surfaces, a contact shoe for engaging the trip rail, an electrical circuit in connection with the trip rail and home magnet, an auxiliary electrical circuit in connection with the contact and electro-magnet, adapted to be broken at a point on the trip rail, a connection between the trip rail, home circuit and electro-magnet, an arm actuated by the electro-magnet to prevent the opening of the train-pipe valve, a secondary valve on the train pipe having its piston chamber in communication with the train pipe, an escapement valve in the piston chamber, and an auxiliary electro-magnet energized from the stem of the train pipe valve for operating the escapement valve, substantially as described.

5. In an automatic safety stop signal, a

trip rail provided with graduated surfaces, a contact shoe for engaging the trip rail, an electrical circuit in connection with the trip rail and home circuit, an auxiliary electrical circuit in connection with the contact and electro-magnet, adapted to be broken at a point on the trip rail, and means for raising the valve rod, restoring the train pipe pressure, and releasing the brakes, substantially as described.

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