C. J. GRAHAM & J. A. FARRIS.

AUTOMATIC STOP FOR TRAINS.

APPLICATION FILED FEB. 15, 1916.

1,200,339.

Patented Oct. 3, 1916.

2 SHEETS—SHEET 1.

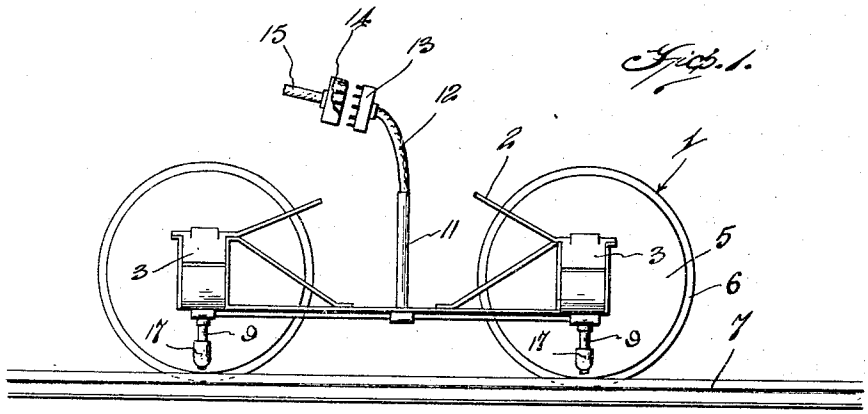


Fig. 1.

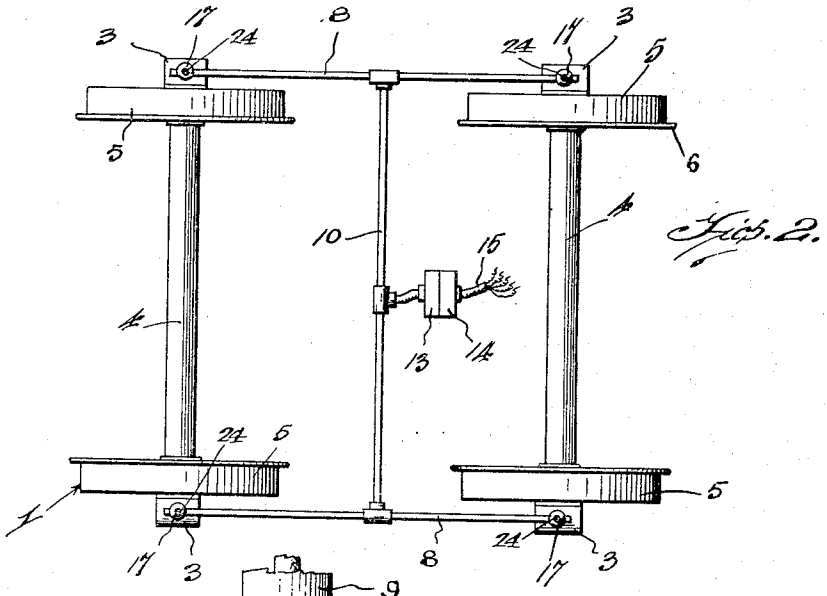


Fig. 2.

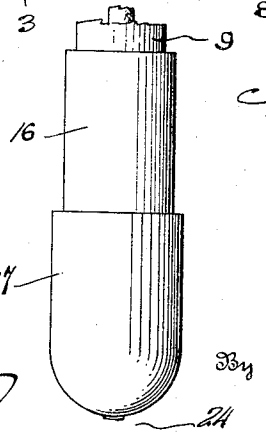


Fig. 3.

Witnesses
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2 SHEETS—SHEET 2.

Fig. 4.

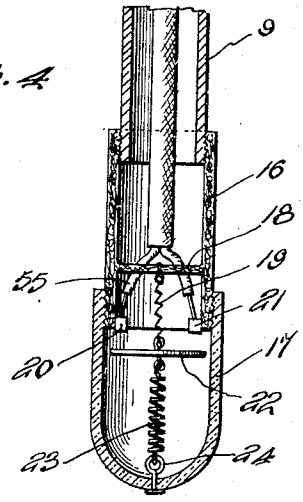


Fig. 5.

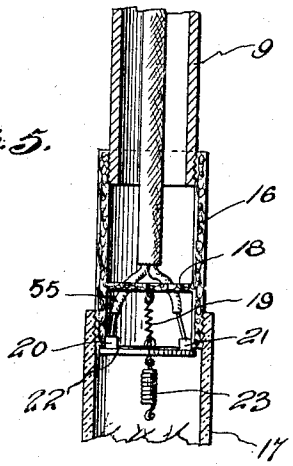


Fig. 6.

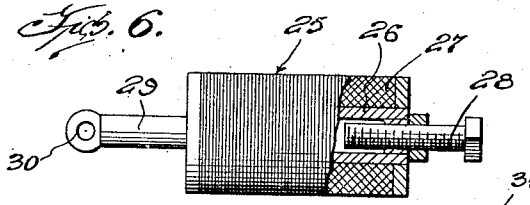
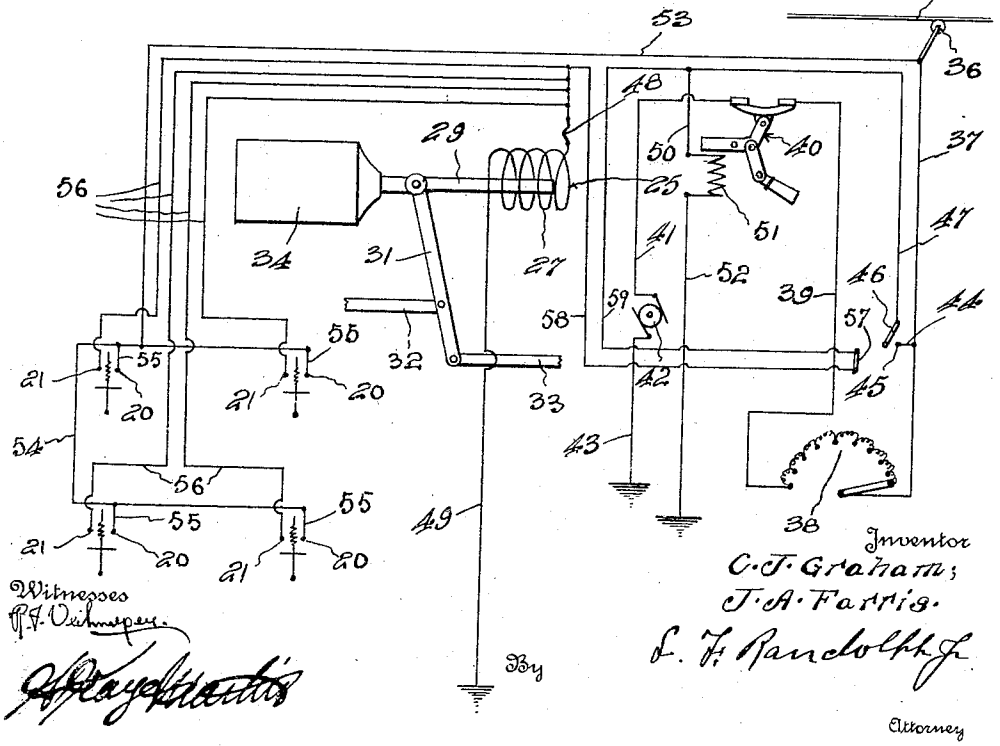


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

CLARENCE J. GRAHAM AND JOSEPH A. FARRIS, OF CHICAGO, ILLINOIS, ASSIGNORS OF ONE-THIRD TO JAMES WILGUS AND PERCY WILGUS, BOTH OF CHICAGO, ILLINOIS.

AUTOMATIC STOP FOR TRAINS.

1,200,339. Specification of Letters Patent. **Patented Oct. 3, 1916.**

Application filed February 15, 1916. Serial No. 78,502.

To all whom it may concern:

Be it known that we, CLARENCE J. GRAHAM and JOSEPH A. FARRIS, citizens 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 Stops for Trains; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in automatic stops for trains and is adapted for use in connection with the air brake system of the train to automatically apply the brakes should any one of the trucks of the train jump the track.

Another object of the invention is to provide a device which will automatically cut out the power to the motor and simultaneously apply the brakes independently of the air brake system.

A further object of the invention is to provide a device which is adapted to be operated by the motorman or engineer of the train so that in case of necessity an emergency stop may be made by the simple throwing of a switch positioned within the cab of the train.

Still another object of the invention is to provide a novel form of circuit closer adapted to be carried on the truck of the train so that as soon as one of the cars jumps the track the stop will be automatically operated to bring the train to a stand still.

A further and more specific object of the invention is to provide a device in which it is possible to carry additional parts so that in event of the jumping of the truck from the track and the consequent stopping of the train the additional parts may be placed in position after the truck has been replaced and the train may proceed as usual.

With these and other objects in view, the invention consists in the novel combination and arrangement of parts which will be fully set forth in the following specification and accompanying drawings, in which:—

Figure 1 is a fragmentary side elevation of a truck showing this improved safety appliance attached thereto. Fig. 2 is a bottom plan view of Fig. 1. Fig. 3 is a detail side elevation of the safety appliance. Fig. 4 is a vertical sectional view through the device illustrated in Fig. 3. Fig. 5 is a view similar to Fig. 4 showing the bulb broken and the various parts in operative position. Fig. 6 is a side elevation partly in section of the solenoid coil used for applying the brake, and Fig. 7 is the wiring diagram.

Referring to the drawing the numeral 1 designates as an entirety a car truck of the usual construction comprising a frame 2 carrying the journal boxes 3 in which the axles 4 of the wheels are rotatably mounted. The wheels are designated by the numeral 5 and are provided with the usual flanges 6 and the tread surfaces of said wheels run on the tracks 7 in the ordinary way.

Supported beneath the journal boxes and extending longitudinally of the trucks are the conduits 8 provided at opposite ends with the downwardly extending stems 9 through which the circuit closer which will be more fully hereinafter described are secured. The longitudinal conduits 8 are connected by transversely extending conduits 10 having the upstanding portions 11 formed centrally thereof through which the cable 12 extends. This cable carries five wires as illustrated in the wiring diagram and is provided at its upper end with the connection plug 13 which coöperates with the socket 14 in connecting the cable 12 with the cable 15 which is carried by the body of the car. It will thus be seen that when so desired the truck may be removed without disturbing the wiring by simply disconnecting the plug 13 from the socket 14. As shown in the wiring diagram, it will be seen that one of the five wires contained within the cables 12 and 15 is connected to one terminal of each circuit closer while the remaining wires lead to the other terminals of the circuit closers.

The circuit closers above referred to each comprise a cylindrical body 16 provided with internal screw threads near its upper end which are adapted to coöperate with the threads on the lower end of the conduit 9, while the lower end of the body 16 is provided with external screw threads on which the upper end of the bulb 17 is threaded. A transversely extending bar or web 18 is formed within the body or tube 16 and

forms a connection for the upper end of the spring 19, the use of which will appear as the description proceeds.

Mounted at the lower terminal of the tube 16 are the contacts 20 and 21 to which the conductor wires are connected and these contacts are adapted to be bridged by a disk 22 mounted within the glass bulb 17 as clearly shown in the drawings. The lower end of the spring 19 is connected to the disk 22 while its upper end is connected to the web or bar 18 and it will thus be seen that the spring will normally tend to pull the disk into engagement with the contacts 20 and 21. A suitable retractile coil spring 23 of greater strength than the spring 19 is connected to the under side of the disk and to an eye 24 which is swivelly mounted in the lower end of the bulb 17 and this spring 23 normally tends to hold the disk away from engagement with the contacts. It will thus be seen that when the bulb is broken the spring 19 moves the disk into engagement with the contacts but under normal circumstances the spring 23 will prevent the bridging of the contacts and the operation of the stop mechanism.

Upon reference to Fig. 6 it will be seen that the solenoid is designated generally by the numeral 25 and comprises the usual solenoid core 26 having the wire coil 27 wound thereon and the core is provided at one end with internal screw threads into which the adjusting screw 28 is adapted to be threaded. This adjusting screw is adapted to prevent the sliding core 29 of the solenoid from moving into the same beyond a predetermined point, the position of which is determined by the adjustment of the screw. It will be noted that if so desired a suitable lock nut may be provided for the screw 28 to insure the same holding the proper adjustment. The end of the sliding core 29 of the solenoid is provided with a suitable eye 30 for connection with the brake lever 31 to which the brake rods 32 and 33 are connected. As shown in the drawing it will be noted that the brake cylinder 34 is positioned in longitudinal alinement with the solenoid 25 and it will thus be seen that the solenoid may be readily attached to the ordinary brake mechanism without in any way changing the construction thereof.

Referring now to the wiring diagram the numeral 35 designates the trolley wire or third rail or any other suitable conductor on which a suitable trolley 36 runs. Connected to the trolley 36 is the conductor wire 37 which connects at its opposite terminal to the controller 38 having connected thereto the wire 39 which leads through the circuit breaker 40 and which is connected by said circuit breaker to the wire 41 which in turn leads to the motor 42 having its opposite terminal grounded through the wire 43. It will thus be seen that when the controller 38 is moved over the various points, the current will flow from the wire 35 into the trolley 36 through the wire 37, controller 38 and wire 39 through the circuit breaker 40 and wire 41 into the motor 42 from whence it passes through the wire 43 to the ground and back to the power source. It will thus be seen that the car will travel in the ordinary way. In order that the car may be stopped in an emergency by the motorman, the branch wire 44 is connected to the wire 37 and leads to a contact 45 which coöperates with the switch arm 46, which switch arm is in turn connected to the wire 47 leading through a suitable fuse 48 into one terminal of the solenoid 25. The opposite terminal of the coil 27 of the solenoid is connected by means of the wire 49 to the ground and it will thus be seen that as soon as the switch arm 46 is moved into engagement with the contact 45, the current will flow from the trolley wire 35 into the trolley 36 through the wire 37, wire 44, contact 45, switch arm 46, wire 47, wire 59, switch 57, into the wire 58 and fuse 48 into the coil 27 of the solenoid 25 from whence the current will pass through the wire 49 back through the ground to the power source. In this way it will be seen that the coil 27 will be excited thereby causing the sliding core 29 to move inwardly and operate the brake lever 31. Simultaneously with the energization of the solenoid 25, the current will pass from the wire 35, trolley 36, wire 37 to the switch consisting of the contact 45 and arm 46 and wire 47 into the branch wire 50 from whence it passes through the trip coil 51 of the circuit breaker 40 into the wire 52 and to the ground thereby operating said circuit breaker to discontinue the flow of current to the motor 42.

From the foregoing it will be seen that the emergency stop may be made by throwing the switch arm 46 into engagement with the contact 45 thereby automatically turning out the motor circuit and applying the brakes.

In order that the automatic operation of the motor cutout and the application of the brakes may be had immediately upon the jumping of one of the trucks from the track the branch wire 53 is connected to the trolley 36 and leads to the wire 54 positioned within the conduits 8 and 10. This wire 54 is provided with a plurality of branches 55 the terminals of which are connected to the contacts 20. The contacts 21 of the automatic circuit closers are connected through independent wires 56 to the wire 47 and it will thus be seen that when one of the bulbs 17 breaks the disk 22 will move upwardly thereby bridging the contacts 20 and 21 thereby completing the circuit through the solenoid 25 and through the trip coils 51 of

the circuit breaker 40 and bringing the train to a stop.

A suitable cutout switch 57 which forms a circuit breaker for the wire 47 is positioned in the cab of the car and is connected to the wire by wires 58 and 59. This switch is provided for the safety of workmen during the time that the car is being repaired or overhauled and at such time the switch must be thrown open so as to render the portion of the brake solenoid impossible.

From the foregoing it will be apparent that a particularly simple and efficient means is provided for readily stopping a train either in an emergency or upon the leaving of one of the trucks from the track and yet allowing the same to be readily started after the emergency has passed.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that such changes may be made in the combination and arrangement of parts as will fall within the spirit and scope of the appended claims.

What is claimed is:—

1. In an automatic train stop, a brake solenoid, a circuit breaker arranged in parallel with the brake solenoid, and a circuit closer mounted on each truck in a train whereby when one of said trucks leaves the track the brake solenoid and circuit breaker will be operated.

2. In an automatic train stop, a train circuit, a controller in said circuit, a motor in said circuit, a circuit breaker for controlling said circuit, a control circuit, the circuit breaker being operated by the control circuit to break the train circuit, a brake solenoid in the control circuit and means to automatically complete the control circuit when one of the trucks of a train becomes derailed.

3. In an automatic train stop, a brake solenoid, a circuit breaker, said circuit breaker and solenoid being arranged in parallel in an electric circuit and means to close said circuit upon the leaving of the track of one of the trucks of the train.

4. In an automatic train stop, a train circuit, a controller in said circuit, a motor in said circuit, a circuit breaker for controlling said circuit, a control circuit, the circuit breaker being operated by the control circuit to break the train circuit, a brake solenoid in the control circuit and means to automatically complete the control circuit when one of the trucks of a train becomes derailed, and means to manually complete the control circuit.

5. In an automatic train stop, a train circuit, a controller in said circuit, a motor in said circuit, a circuit breaker for controlling said circuit, a control circuit, the circuit breaker being operated by the control circuit to break the train circuit, a brake solenoid in the control circuit and means to automatically complete the control circuit when one of the trucks of a train becomes derailed, and means to manually complete the control circuit, and a switch for cutting out the brake solenoid to prevent accidental setting of the brakes when repairs are being made to a car.

In testimony whereof we affix our signatures in presence of two witnesses.

CLARENCE J. GRAHAM.
JOSEPH A. FARRIS.

Witnesses:
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PERCY E. WILGUS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."