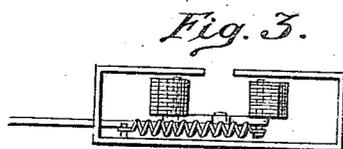
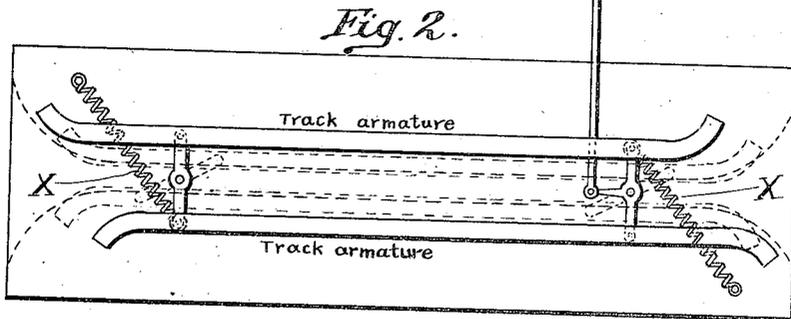
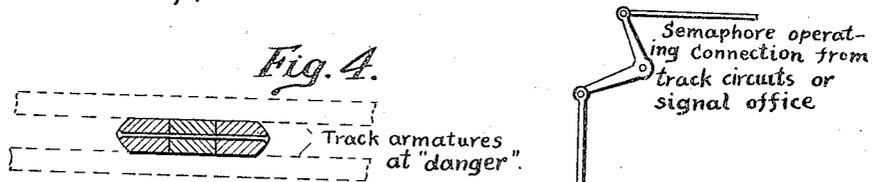
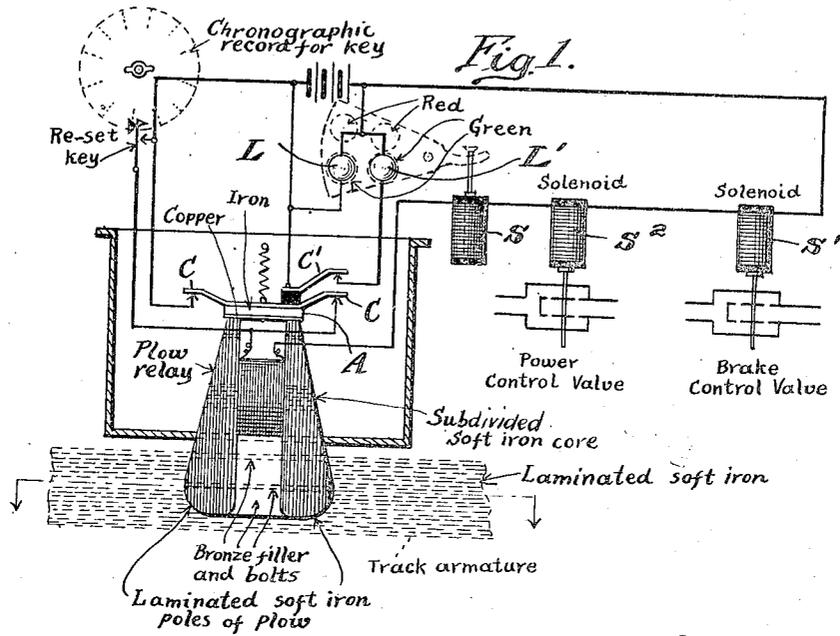


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E. E. CLEMENT.
AUTOMATIC STOP FOR RAILWAYS.
FILED JAN. 11, 1921.



Inventor
Edward E. Clement

UNITED STATES PATENT OFFICE.

EDWARD E. CLEMENT, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO AZEL FORD, OF WASHINGTON, DISTRICT OF COLUMBIA.

AUTOMATIC STOP FOR RAILWAYS.

Application filed January 11, 1921. Serial No. 436,416.

To all whom it may concern:

Be it known that I, EDWARD E. CLEMENT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful improvements in Automatic Stops for Railways, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to safety systems for railways, and especially to automatic stopping devices for cars or locomotives. The object of the invention is to produce a normally energized or "closed-circuit" system not only on the car or locomotive, but including the mechanism which is operated from the track or by the semaphore operating devices. In other words, it is desired to have the connecting link between the moving vehicle and the track normally held by positively acting forces to "clear" in such manner that any failure of operation, as well as the normal or intended reversal of operation, will cause the parts to register and operate so as to indicate "danger" and to stop the vehicle.

I attain my object by providing a plow on the vehicle, which at convenient intervals such as the ends of block sections, passes through or over magnetic bodies, which have a tendency to place themselves in the path of the plow to make magnetic contact therewith. On the plow I mount a relay, having double poles, one pair extending upwardly and normally carrying magnetic flux to hold an armature which closes contacts included in the circuit of the relay winding; the other pair extending downwardly and constituting magnetic shunt poles, which when brought into magnetic contact or close proximity to the track bodies, will divert the magnetic flux from the upper to the lower poles and weaken the attraction of the armature so that it will be momentarily released to break the circuit of the energizing winding of the relay. The magnetic bodies on the track have a normal tendency to move into shunting position, and are positively held to "clear."

In the accompanying drawings illustrating the invention, which are diagrammatic in their nature, since mechanical detail forms no part of the present invention:

Fig. 1 represents the plow and relay and connected circuits carried on the vehicle,

with a broken section of the track armature in passing contact with the plow;

Fig. 2 represents in plan the parts on the track;

Fig. 3 is an end view of parts in Fig. 2; and

Fig. 4 shows the plow in section as it passes between the track bodies or "armatures."

The drawings are inscribed with explanatory legends which make detailed description unnecessary. The following explanation, however, is given for certainty.

In Fig. 1, the electric circuit may be assumed as carried up into the cab of a locomotive. It includes two signal lamps L and L', a spectacle frame with red and green windows, controlled by solenoid S, the solenoids S' and S² controlling balanced valves connecting air to suitable operating mechanism for the brakes and for the steam or other driving power, respectively, and the winding of the plow relay. Bridge contacts C are included in the connection to the relay winding, while a separate insulated contact C' is included in the circuit of lamp L', these contacts C and C' being carried on the armature A, which tends constantly to leave the upper poles of the plow relay under the influence of a spring. The energizing circuit of the plow relay is a series circuit including the several solenoids, contacts C and battery, and may be traced as follows: battery, S', S², S, plow relay, contacts C, and back to battery. For closing a series circuit through the solenoids, battery and relay, independently of the contacts C when they are open, a short circuit or shunt is connected around the bridge contacts C which shunt circuit is normally open at a key accessible to the engineer and marked "Reset key." The shunt circuit is as follows: battery, S', S², S, winding of the relay, key, battery. This key has a pointed stylus to punch a hole in a chronograph card, clock driven, whenever it is depressed.

In Fig. 2 are shown two parallel soft iron bodies marked "Track armature," which are connected by links for parallel motion to and from each other, each being horizontally laminated as indicated in Fig. 1.

In full lines these armatures are shown in Fig. 2 in retracted position, to which they are held by positive or energized action of the track wires or rods forming part of the

block signalling system. When released, either by failure of this mechanism or by operation thereof, the armatures are forced together by springs marked X. When retracted they are out of the path of the plows on passing vehicles, a sufficient distance to leave a wide air gap between them and the plow as it passes. When drawn together the armatures are in position to make contact with a passing plow as indicated in Fig. 4.

The operation of this system is as follows:

When starting a run, the "re-set" key is pressed, the plow relay is energized closing contact C', and lamp L' lights, the other lamp L constantly burning, (controlled by any desired form of switch) as a test on the battery. The circuit of lamp L' may be traced from battery, through lamp L', contact C' back to battery. At the same time the plow relay is energized and pulls down its armature, which locks by closing the relay circuit through right hand end of contact C, winding of relay, solenoids S, S² and S', battery, back to left-hand end of contact C; the solenoids are all energized, the spectacle frame over the lamps L and L' is raised to show "clear" (its upper windows being red and its lower windows green, or other color as practice may dictate) the throttle and air breaks are placed under control of the engineer, and the system is thus energized or positively held to clear.

In running, the engineer has before him a constant test on his battery, his solenoids and his plow relay. If the lamp L' goes out, either the plow relay has let go or there is trouble in the lamp or circuit. If the lamps both go out the trouble is in the battery, etc. In passing over blocks which are clear, and the signals properly set to indicate that fact, the cab apparatus remains normal, as described. If a semaphore danger signal is set to danger, the track armatures at that point will also be released or

set to danger, i. e., they will have moved together into position to engage the plow as it passes. When this occurs, the flux of the plow relay will be diverted or "shunted" through the lower poles and the track armatures, the upper poles will become magnetically weakened and release the armature, which will immediately be raised by its spring or equivalent means, and as it starts to retract, breaks the relay circuit. This deprives all the solenoids of current, they let go, the spectacle frame drops to show the lights red, the power is cut off, and brakes put on, to stop the train. It cannot again be started except by the engineer in recorded use of the "re-set" key. Accidental derangement of the track connections or other causes leading to failure of the holding means for the track armatures, will release them and produce the same result.

I claim:

1. An automatic stop system comprising operating parts on the vehicle controlled by a relay also on the vehicle having an armature normally attracted and maintaining its own energizing circuit closed, with a magnetic body on the track adapted when in danger position to short circuit the magnetic flux of said relay through itself, to release said armature and de-energize the relay.
2. A railway signaling system having operating parts actuated by a self-locking electromagnetic relay carried on the vehicle and a shunt for the magnetic circuit of said relay on the track.
3. A railway signaling system having a self-locking electromagnetic relay carried on the vehicle, a relatively high resistance magnetic circuit for said relay controlling operating parts on the vehicle, and a relatively low resistance magnetic circuit for the said magnet on the track.

In testimony whereof I affix my signature.
EDWARD E. CLEMENT.