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PATENTED DEC. 11, 1906.

M. PRIVAT.

AUTOMATIC APPARATUS FOR PREVENTING COLLISION OF RAILWAY TRAINS.

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Fig. 1.

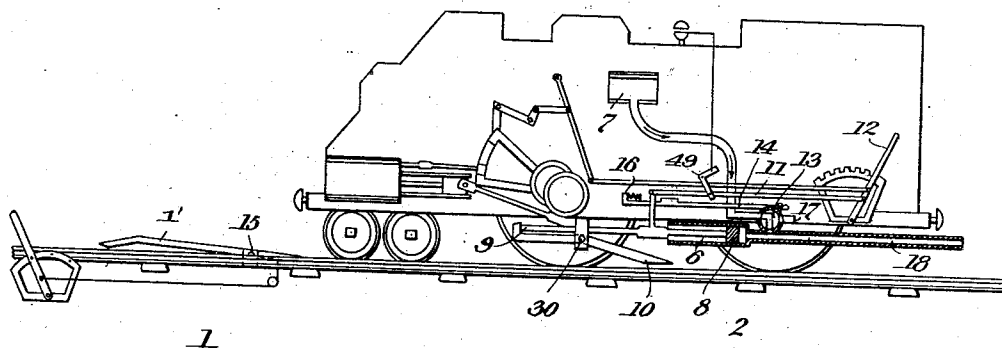


Fig. 2.

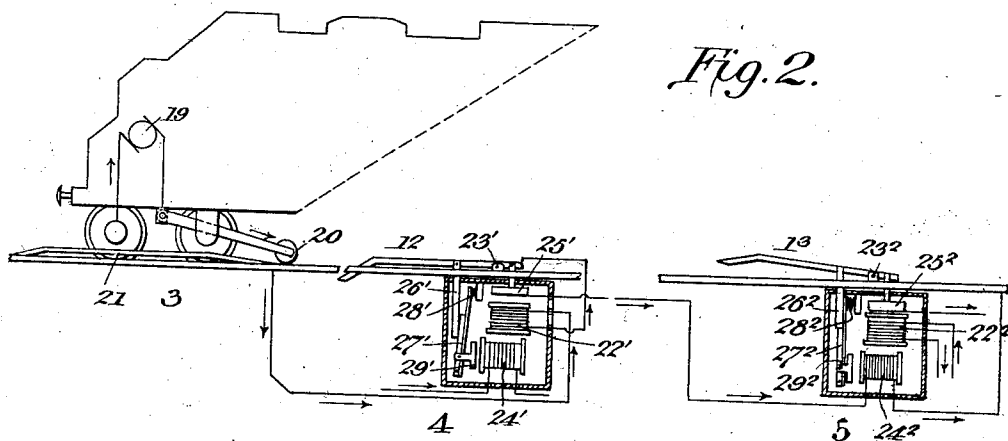
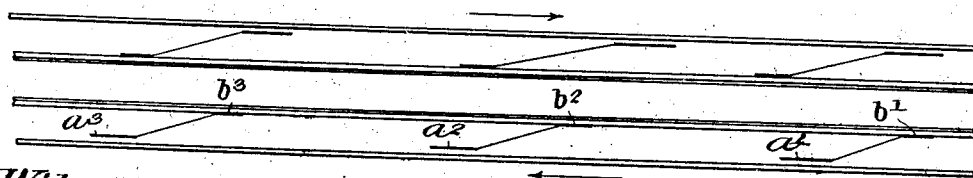


Fig. 3.



Witnesses:

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AUTOMATIC APPARATUS FOR PREVENTING COLLISION OF RAILWAY-TRAINS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MAURICE PRIVAT, a citizen of the French Republic, residing at 750 Rue Hemicycle, Angoulême, France, have invented certain new and useful improvements in Automatic Apparatus for Preventing Collision of Railway-Trains, &c., of which the following is a specification.

Said invention consists in substance of a plurality of electromagnetic devices arranged at intervals along the track, stops actuated by such magnetic devices moved into and out of working position, and mechanism carried by the motor-carriage actuated by the stops when in working position for automatically braking and stopping the motor-carriage and train.

The invention is fully described in the following specification, of which the accompanying drawings form a part, wherein similar characters of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 is a side view of a short section of track upon which is a locomotive, both locomotive and track being provided with my improved automatic coasting stopping devices. Fig. 2 is a similar view of a portion of a locomotive and track and the electromagnetic means for shifting the obstacles or stops into and out of working position; and Fig. 3 is a top plan view of a section of track, showing diagrammatically a number of stops and the electric circuits.

Each engine on the line is provided with an emergency stopping apparatus, Figs. 1 and 2, comprising a cylinder 6, communicating with the compressed-air supply of the brakes or with the steam-supply pipe of the boiler. In this cylinder 6 reciprocates a piston 8, the rod 9 of which is kept in its extreme outward position by the upward-turned end of the lever 10, vertically movable on a pivot 30. When the train is running, the heavier and rear arm of lever 10 is located at about ten centimeters above the upper surface of the rail, so as to clear all obstructions save the automatic stops. The piston-rod 9 is connected with the rod 11, which is in actuating connection with throttle-lever 12, and this rod 11 also actuates, during a part of its stroke, the three-way valve 13 by means of the rod 14, kept in its normal position by a spring abutting against the upturned end 16 thereof.

On the track are arranged at intervals ob-

stacles 1', Fig. 1, each composed of a rail having a length of about two meters and arranged parallel to the axis of the track. These obstacles or stop-rails are adapted to oscillate vertically on a pivot 15, arranged near one end so as to raise the other end about twenty centimeters above the level. When a train passes, this obstacle 1', Fig. 1, being raised offers to the lower end of the lever 10 an incline of about one-tenth, which is sufficient to raise the heavier arm of the beam so as to release the rod 9 of the piston and by allowing the steam to be cut off and reversed and the braking air-pressure to be put on to produce the stopping of the train without shock.

The rod 9 carries with it in its motion the rod 11, which produces the reversing of the steam distribution in the slide-chest of the locomotive by means of lever 12. The end of rod 11 before reaching the end of its stroke strikes against the end of rod 14 at 16, thus imparting motion to rod 14, actuating the three-way valve 13 of the braking device, which is vibrated, and, as shown in Fig. 1, the rod 11 of the bell-crank lever 49 also controls the whistle of the locomotive so as to sound it upon the actuation of lever 10.

The movement of the obstacle or stop 1' into and out of the working position in which it will contact with lever 10 so as to stop the train may be produced by any suitable signaling means and even by the passing trains themselves, and in this case each locomotive, Fig. 2, blocks the section into which it is entering and opens the section of track behind it, and to this end the movements of the obstacles or stops 1' 1', Fig. 2, are controlled by an electric circuit 3 4 5, and in this case a dynamo 19, usually driven from an axle, is arranged upon the locomotive which supplies the current to an over-riding trolley-pole arranged under the engine, as shown in Fig. 2. The wheel 20 of this trolley-pole moves at about five centimeters above the upper level of the rails on the left side of the track, the obstacle or stop being on the right side of the line and designated by the reference-letters a' a^2 a^3 , Fig. 3.

An electric contact-rail 21, having a length of four meters, of the shape shown and raising on a gradual incline from the level of the rail to about ten centimeters above this level, is located about four hundred to five hundred meters ahead of each obstacle or stop and on the opposite or left side of the track, the pur-

pose of which is to establish the electric circuit.

The trolley-wheel 20, when passing, is raised by and rolls upon the rail 21, thus closing the circuit and allowing the current to pass to the electromagnet 22' in the box 4, Fig. 2, arranged under the obstacle or stop 1², Fig. 2. This obstacle or stop is kept normally at about five centimeters above the rail and parallel to it and is about 2.10 centimeters long, and its pivot 23' is about ten centimeters from the rear end. Under the pivot 23' of the stop is arranged a box containing two electromagnets 22' and 24'. At the end of the small arm of the obstacle or stop 1² is suspended a counterweight 25', intended to decrease the force necessary for raising the longer arm of the obstacle or stop. This counterweight 25' is made of soft iron, and under it is mounted the electromagnet 22', so that when the latter is excited the counterweight 25' is attracted and the long arm of the stop is raised to twenty centimeters. After the passage of the current from trolley 20 to rail 21 has ceased the stop 1² has a tendency to fall under the influence of its own weight. However, to prevent this motion and to block the line until the trolley contacts with a second rail 21, arranged farther on, the box contains the following device:

At about fifty centimeters from the pivot 23' of the obstacle or stop 1² a downwardly depending stop-lever 26' is pivotally connected to the long arm of the stop 1², and this stop-lever projects into the box. When the obstacle or stop is raised twenty centimeters, as shown in Fig. 2 at 5, the rod 26² is raised five centimeters, and at this moment a second stop-lever 27², acted upon by a spring 28², slides under the end of the lever 26² and prevents the fall of the obstacle or stop and holds it in the raised position, so as to automatically contact with the operating-lever 10 of any train which may endeavor to enter that section while it is in such raised position, and thus stops such train. The stop-lever 27' is pivoted at the bottom, and secured to the same a short distance above the pivot-joint is a rod terminated by a block of soft iron 29', which is located adjacent to a second electromagnet 24', so that when a current is sent through electromagnet 24' the lever 27' is vibrated upon its pivot against the action of the spring 28', so as to free the counterweight 25' of the obstacle or stop 1², so that the latter will fall and the line becomes free for the passage of trains.

The second electromagnet 24² only receives electric current from the following station through the intermediary of counterweight 25' of said station, which only transmits the current after having contacted with the electromagnet 22'. It follows from this combination that any obstacle or stop raised by the

passage of a train can only fall so as to clear the track when the next obstacle has been raised.

It is evident that the first—that is, the purely mechanical—apparatus may be applied alone without the second or electrical apparatus; but the essential point of the whole system resides in the automatic and simultaneous action of all the parts adapted to produce the complete stop of a train without jar or stop—that is, the simultaneous action for this purpose of the brake, alarm-signals, whistle, and steam distribution when actuated from the track.

What I claim is—

1. In a device of the class described, a piston normally under fluid-pressure, mechanism actuated upon the movement of the piston for causing shutting off of the motor, and for putting in operation the brakes of the train, means for holding the piston in a retracted position against the fluid-pressure and means for releasing the piston upon contact of part of the means with a track-stop.

2. In a device of the class described, a piston normally under fluid-pressure, mechanism actuated upon the movement of the piston for causing shutting off, and reversal of the motor, and for putting in operation the brakes of the train, means for holding the piston in a retracted position against the fluid-pressure, and means for releasing the piston upon contact of part of the means with a track-stop.

3. In a device of the class described, a plurality of track-stops each comprising a lever longitudinal to the track pivoted adjacent to one end so as to vibrate vertically and inclined at the upper surface of the other end, an electromagnet for raising the long arm of the track-stop from its normal position, means for automatically locking the track-stop in the raised position, an electromagnet for releasing the locking means so as to allow the track-stop to return to its normal position, a circuit of conductors connecting the track-stop magnets of adjacent stops, means for electrically energizing the circuit upon the passage of a train, and means for causing the fall of a recently-raised track-stop, upon the passage of the train over the next stop, and the raising of such stop.

4. In a device of the class described, a plurality of track-stops each comprising a lever longitudinal to the track pivoted adjacent to one end so as to vibrate vertically and inclined at the upper surface of the other end, an electromagnet for raising the long arm of the track-stop from its normal position, means for automatically locking the track-stop in the raised position, an electromagnet for releasing the locking means so as to allow the track-stop to return to its normal position, a circuit of conductors connecting the track-stop magnets of adjacent stops, means car-

ried by the train for electrically energizing the circuit as it passes the stop-stations, and means for causing the fall of the last-raised track-stop, upon the passage of the train over the next following stop simultaneously with the raising of such stop.

5 5. In a device of the class described, the combination with a suitable track of a vehicle mounted upon the track, stops actuated upon the passage of the vehicle so as to block the track until the vehicle has passed into another block-section, mechanism carried by the vehicle for causing proper actuation of the stops and mechanism for stopping the 15 motor, reversing the same, setting the brakes and actuating a signal, also carried by the vehicle adapted to be automatically actuated upon contact with any of the stops when in the stopping position.

20 6. In a device of the class described, a railway-track, a vehicle traveling upon the track, a plurality of movable electromagnetically-actuated stops arranged in series along the track connected by proper electric circuits normally broken, means carried by the 25 vehicle for closing the broken circuits upon passage over the track, a source of electric energy carried by the vehicle for electrically energizing the circuits when so closed, in

such manner as to throw the stop just passed into the stopping position, and to throw a stop to the rearward of that into the clear or non-stopping position.

7. In a device of the class described, a railway-track, a vehicle traveling upon the track, a plurality of movable electromagnetically-actuated stops arranged in series along the track connected by proper electric circuits normally broken, means carried by the vehicle for closing the broken circuits upon passage over the track, means carried by the vehicle for electrically energizing the circuits when so closed, in such manner as to throw the stop just passed into the stopping position, and to throw a stop to the rearward of that into the clear or non-stopping position, and mechanism also carried by the vehicle for stopping the motor, reversing the same and setting the brakes adapted to be automatically actuated upon contact with any of the stops when in the stopping position.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAURICE PRIVAT.

Witnesses:

MADAME DARI,
LOUISE COUZINES.