

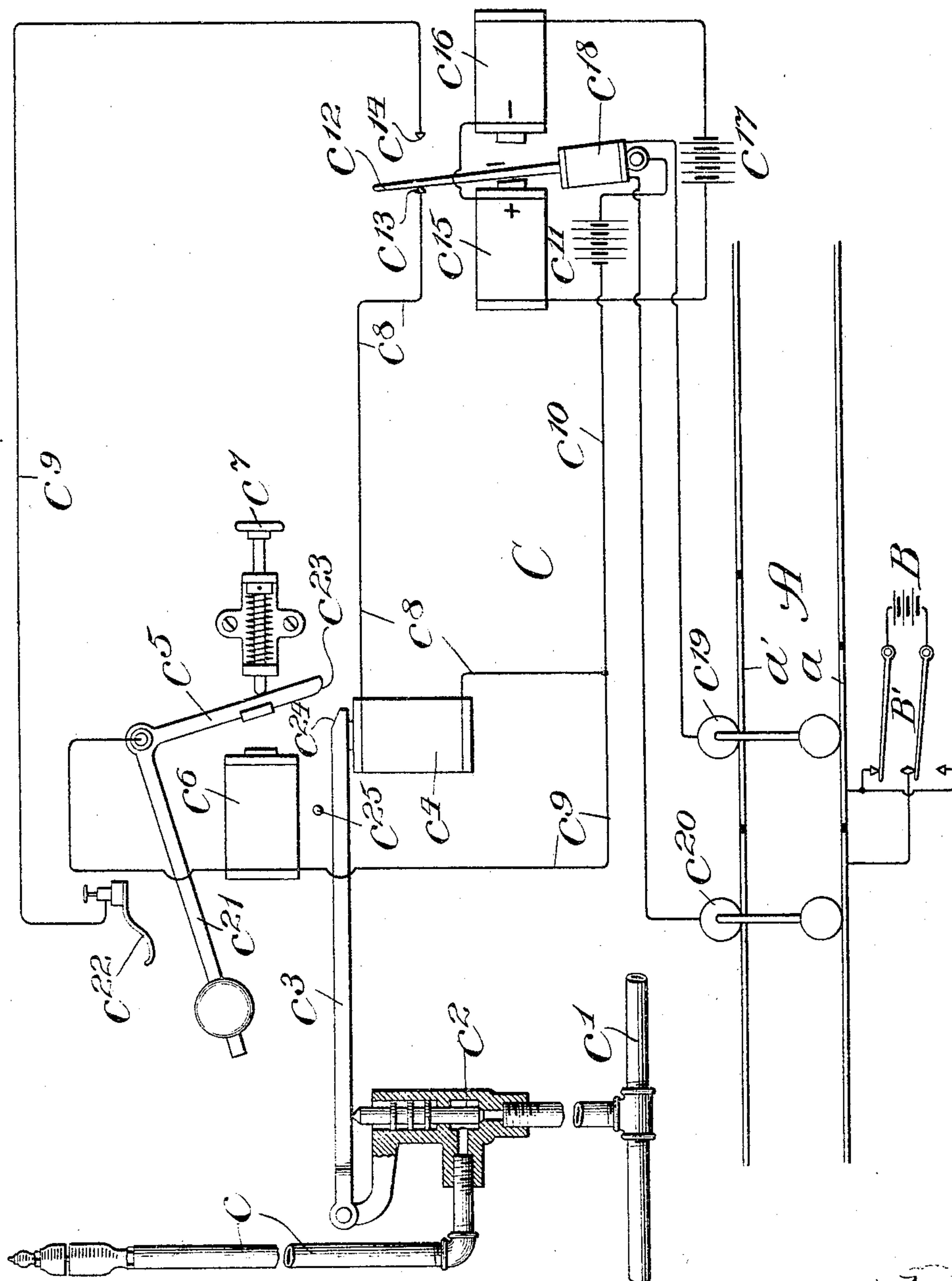
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H. V. MILLER.

### TRAIN CONTROLLING MECHANISM.

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# UNITED STATES PATENT OFFICE.

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## TRAIN-CONTROLLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 791,984, dated June 6, 1905.

Application filed January 14, 1905. Serial No. 241,005.

*To all whom it may concern:*

Be it known that I, HENRY V. MILLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Train-Controlling Mechanism, of which the following is a specification.

My invention pertains particularly to means for controlling train movements; and my primary object is to provide improved mechanism for automatically sounding a warning-signal in the engine-cab and stopping the train in case the track becomes blocked.

The invention is illustrated by a view, which is diagrammatic in its nature, in the accompanying drawing.

In the construction illustrated, A represents a block-junction of a railway-track, the track-rails having relatively short insulated sections  $a$   $a'$  interposed at the junction, B a train-controlling battery joined through a pole-changer  $B'$  to the short section of the track and the advance end of the succeeding section of the track, and C train-carried mechanism controlled from the track.

The mechanism C comprises a combination whistle and vent  $c$ , connected with the brake train-pipe  $c'$  and controlled by a valve  $c^2$ ; an armature-lever  $c^3$ , controlling the valve and belonging to an electromagnet  $c^4$ ; an armature-lock  $c^5$ , itself constituting an armature for an electromagnet  $c^6$ ; a spring-retracted manually-operated armature-closing device  $c^7$ ; parallel partial circuits  $c^8$   $c^9$ , through which the magnets  $c^4$   $c^6$ , respectively, are energized at proper times; a common conductor  $c^{10}$ , joining said partial circuits to a battery  $c^{11}$ , with which is connected an armature  $c^{12}$ , which vibrates between contact-points  $c^{13}$   $c^{14}$ , with which the partial circuits  $c^8$   $c^9$  are provided, respectively; oppositely-polarized magnets  $c^{15}$   $c^{16}$ , controlling the armature  $c^{12}$  and energized by a common battery  $c^{17}$ , and a solenoid  $c^{18}$  in a transient or train-carried partial circuit with track-engaging conductors  $c^{19}$   $c^{20}$  and serving to polarize the armature  $c^{12}$  either positively or negatively, according to the position of the pole-changer  $B'$  when the train is in the position indicated in the drawing.

The valve  $c^2$  controls a passage leading from the train-pipe to the whistle and vent  $c$ , as shown, and the valve is in the form of a plunger or piston having a projecting stem upon which the pivoted armature  $c^3$  bears. The armature  $c^5$  is in the form of a pivoted bell-crank lever having a weighted arm  $c^{21}$  interposed in the course of the conductor  $c^9$  and adapted to engage a contact member  $c^{22}$ . The short arm of the lever, being the arm presented to the magnet  $c^6$ , is provided with a beveled surface  $c^{23}$ , which serves to engage a beveled surface  $c^{24}$  at the extremity of the armature  $c^3$ , whereby the armature  $c^3$  will be depressed through the medium of the armature  $c^5$  when the plunger  $c^7$  is actuated, say, by the engineer in regaining control of his train after the automatic blowing of the whistle and setting of the air-brakes. The movement of the armature  $c^3$  is limited by a stop  $c^{25}$ , which prevents it from moving far enough to obstruct the action of the armature  $c^5$ .

Ordinarily the pole-changer  $B'$  is held so that in the safety condition of the track the positive pole of the battery B is connected with the rail-section  $a$ . As is now well understood in the art, this commonly is accomplished by an electromagnet connected with the rear ends of the track-rails of the advance block, the advance ends of which are connected with a track-battery, so that when a train is in the advance block, for instance, the magnet will be deenergized and drop its armatures, thereby reversing the connections at the local partial circuit in which the battery B is contained. It now will be understood that when the train is traveling under normal conditions of safety the armature  $c^{12}$  occupies the position shown in the drawing and the armature  $c^3$  is held solely by its magnet  $c^4$ . When the train reaches a block-junction where the local controlling-battery B has had its connections with the track altered, as by the track being blocked ahead, the polarity of the armature  $c^{12}$  changes, the armature swings to the contact  $c^{14}$ , and the magnet  $c^4$  is deenergized, permitting the armature  $c^3$  to fly back and the valve  $c^2$  to open. This causes the whistle to be blown and the train-pipe to



be vented, thereby setting the brakes in a well-understood manner. The engineer, warned by the whistle, immediately presses the plunger  $c^7$ , thereby rocking the armature  $c^5$  to the circuit-closing position, where it is held by its magnet until the armature  $c^{12}$  shifts back to the contact  $c^{13}$ , as it will do when a block-junction is encountered where the pole-changer  $B'$  occupies the normal safety position. In the meantime the engineer proceeds under caution until he notes the release of the armature  $c^5$  by its magnet, which is notice to him that safety conditions have been reestablished. While the magnet  $c^6$  holds the armature, the latter locks the armature  $c^3$  against its magnet, and when the armature  $c^{12}$  swings under the influence of a direct or unreversed current from the battery  $B$ , thereby breaking the circuit of the magnet  $c^6$ , it reestablishes the circuit of the magnet  $c^4$  in time to insure the holding of the armature  $c^3$  by the latter magnet.

The improved construction is characterized by great certainty of operation, insuring against negligence and disability of the engineer, while at the same time the provision is such that the engineer need not lose control of his train for more than the instant required to press the plunger  $c^7$ .

The track-engaging conductor  $c^{19}$  of the transient or portable partial circuit which contains the coil  $c^{18}$  may be an engine, and the track-engaging conductor  $c^{20}$  may be the tender of the engine, properly insulated from the engine in a manner now well understood.

Changes in details of construction within the spirit of my invention are feasible. Hence no undue limitation should be understood from the foregoing detailed description.

What I regard as new, and desire to secure by Letters Patent, is—

1. The combination with a local partial electric circuit, of transient mechanism comprising a transient partial electric circuit containing a magnet through which the local partial circuit may be completed, an armature controlled from said magnet, a valve, an electric device controlling said valve and controlled by said armature, and manual controlling means whereby the operator may gain control of said valve after automatic actuation thereof, for the purpose set forth.

2. The combination with a local partial electric circuit, of transient mechanism comprising a partial electric circuit having therein a magnet adapted to operate when the circuit is completed through the local partial circuit, an armature controlled by said magnet, a valve, an armature controlling said valve, an armature-lock controlling said second-named armature, and electric circuits controlling said second-named armature and said armature-lock and themselves controlled by said first-named armature, for the purpose set forth.

3. The combination with the air-pressure

system of the brake mechanism of a railway-train, of a vent, a valve controlling the vent, an armature controlling the valve, and controlling means for said armature including a transient partial electric circuit adapted to be completed through a local partial circuit and manually-operated means serving to restore the armature after it has been released by its magnet, for the purpose set forth.

4. The combination with the air-pressure system of the brake mechanism of a railway-train, of a vent, a valve controlling the vent, an armature controlling the valve, and controlling means for said armature comprising a magnet for the armature, an armature-lock, a magnet controlling the armature-lock, circuits controlling said magnets, an armature controlling said circuits, and a transient partial circuit having therein a magnet controlling said last-named armature, for the purpose set forth.

5. The combination with the air-pressure system of the brake mechanism of a railway-train, of a vent, a valve controlling the vent, a magnet having an armature controlling said valve, a magnet having a normally open armature which may serve as a lock for said first-named armature, manually-operated means for closing said armatures, circuits controlling said magnets, and a transient partial circuit having therein a magnet controlling said circuits, for the purpose set forth.

6. The combination with a track having both track-rails electrically divided to form blocks, generators connected with the track-rail sections at the block-junctions and forming with the rail-sections local partial circuits, and transient mechanism comprising a transient partial circuit having track-engaging conductors and a magnet provided with an armature, a train-pipe provided with a vent, a valve controlling said vent, and electric controlling means for said valve controlled by said armature, for the purpose set forth.

7. The combination with a track having both track-rails electrically divided to form blocks, generators connected with the track-rail sections at the block-junctions and forming with the rail-sections local partial circuits, and transient mechanism comprising a transient partial circuit having track-engaging conductors and a magnet provided with an armature, a train-pipe provided with a vent, a valve controlling said vent, magnets having circuits controlled by said armature, armatures for said last-named magnets, one of which forms a lock for said valve and the other of which forms a lock for the valve-locking armature, and means for closing said last-named armatures after they have been automatically opened, for the purpose set forth.

HENRY V. MILLER.

In presence of—

J. H. LANDES,  
F. M. WIRTZ.