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PATENTED MAR. 17, 1908.

R. C. MILLARD.
SAFETY APPLIANCE FOR RAILWAY TRAINS.

APPLICATION FILED JULY 17, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

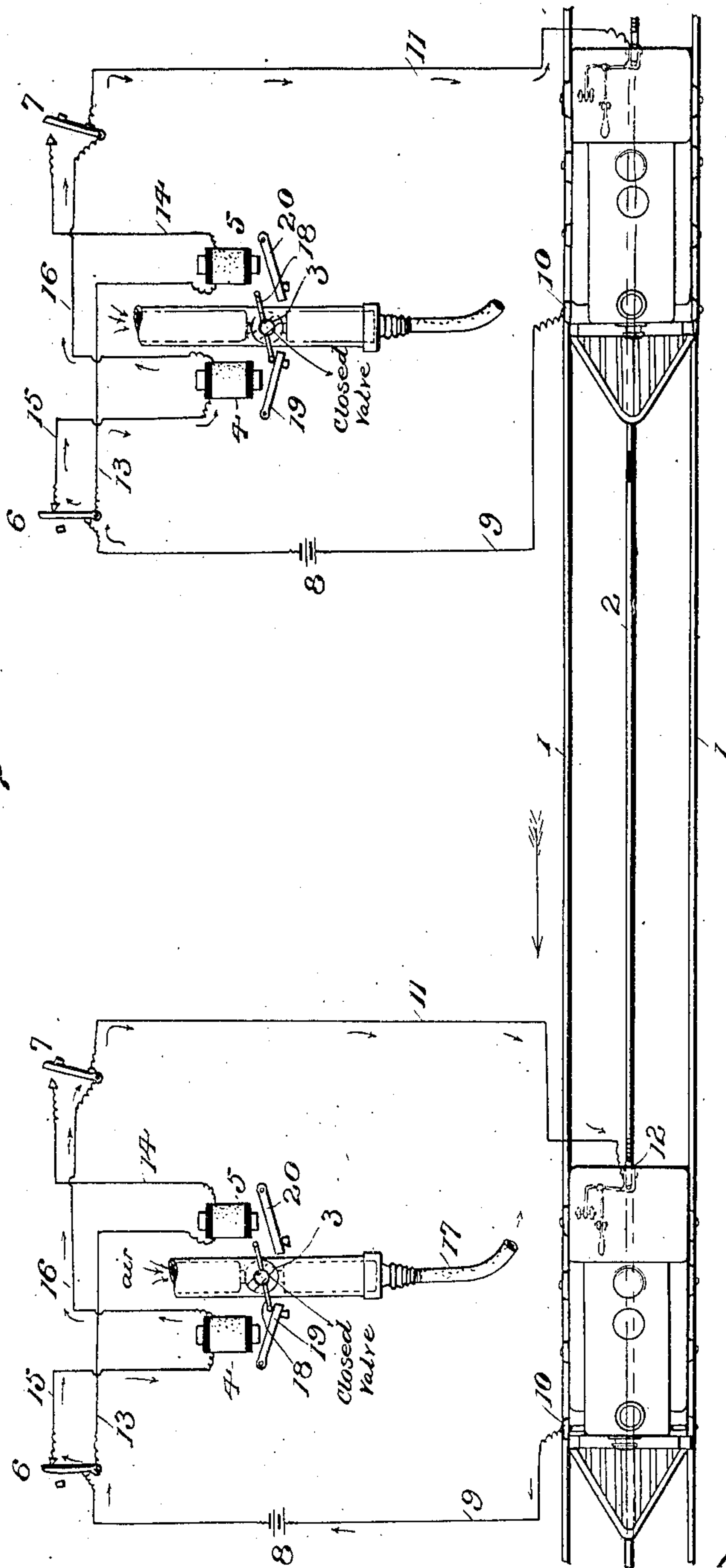
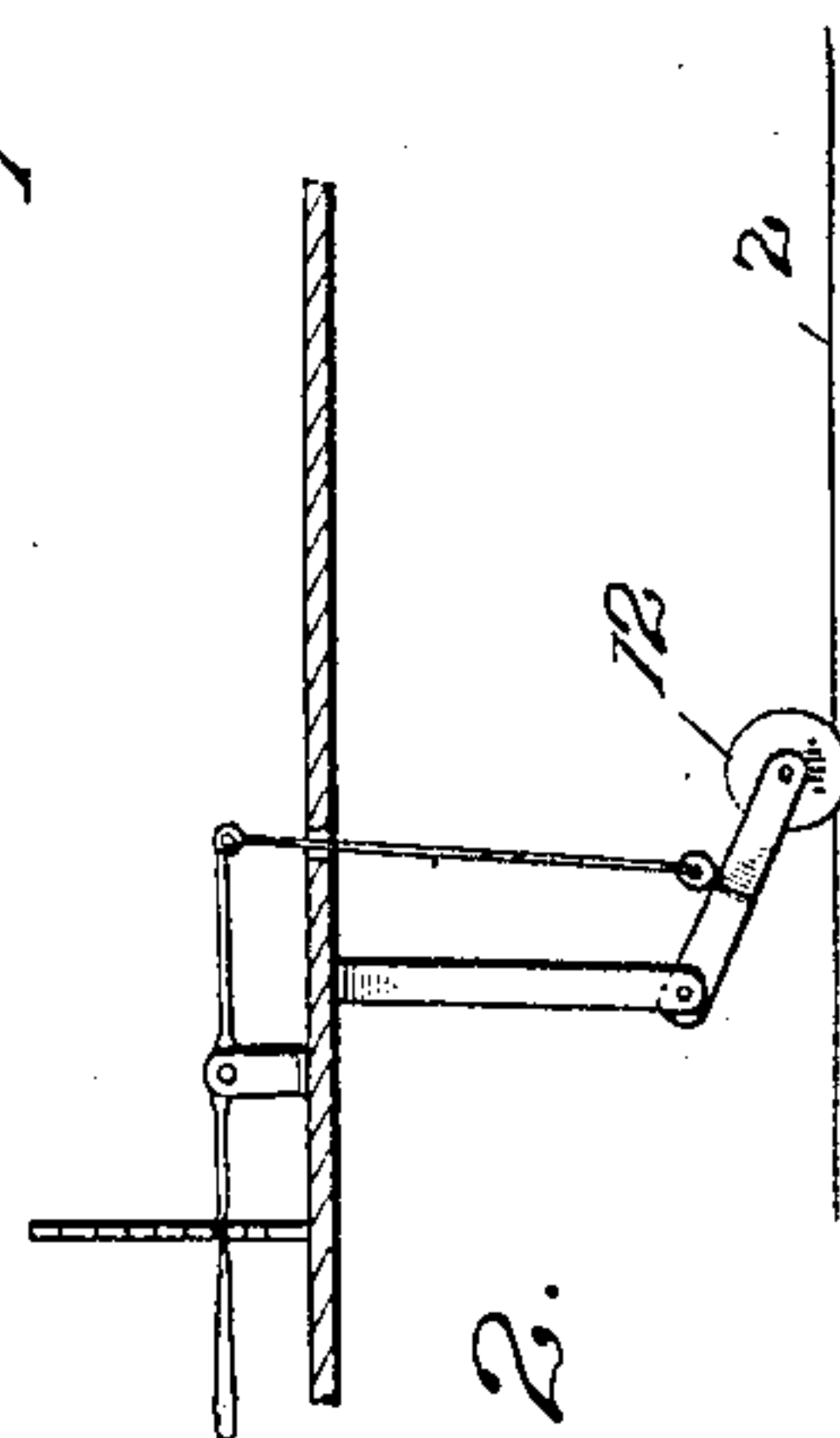


Fig. 2.



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3 SHEETS—SHEET 2.

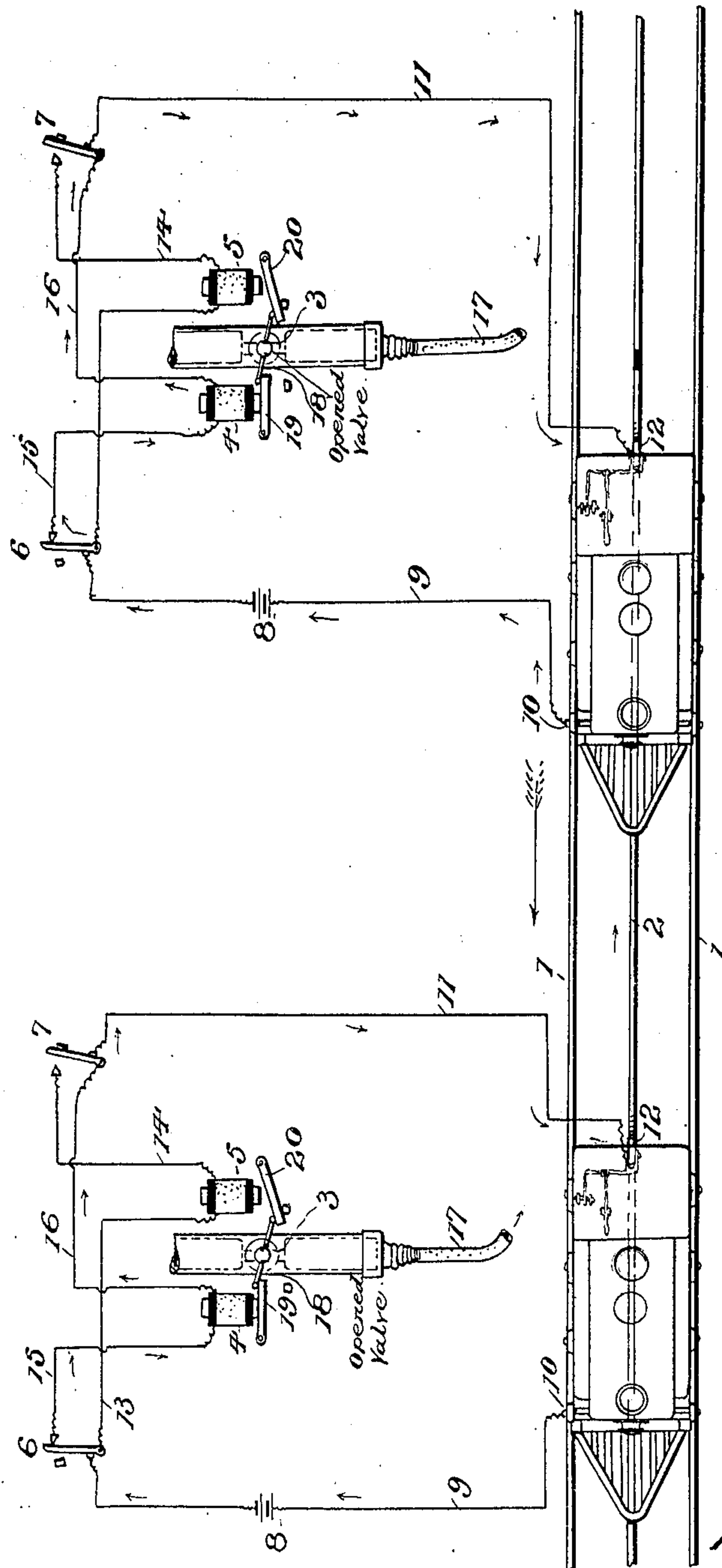


Fig. 3.

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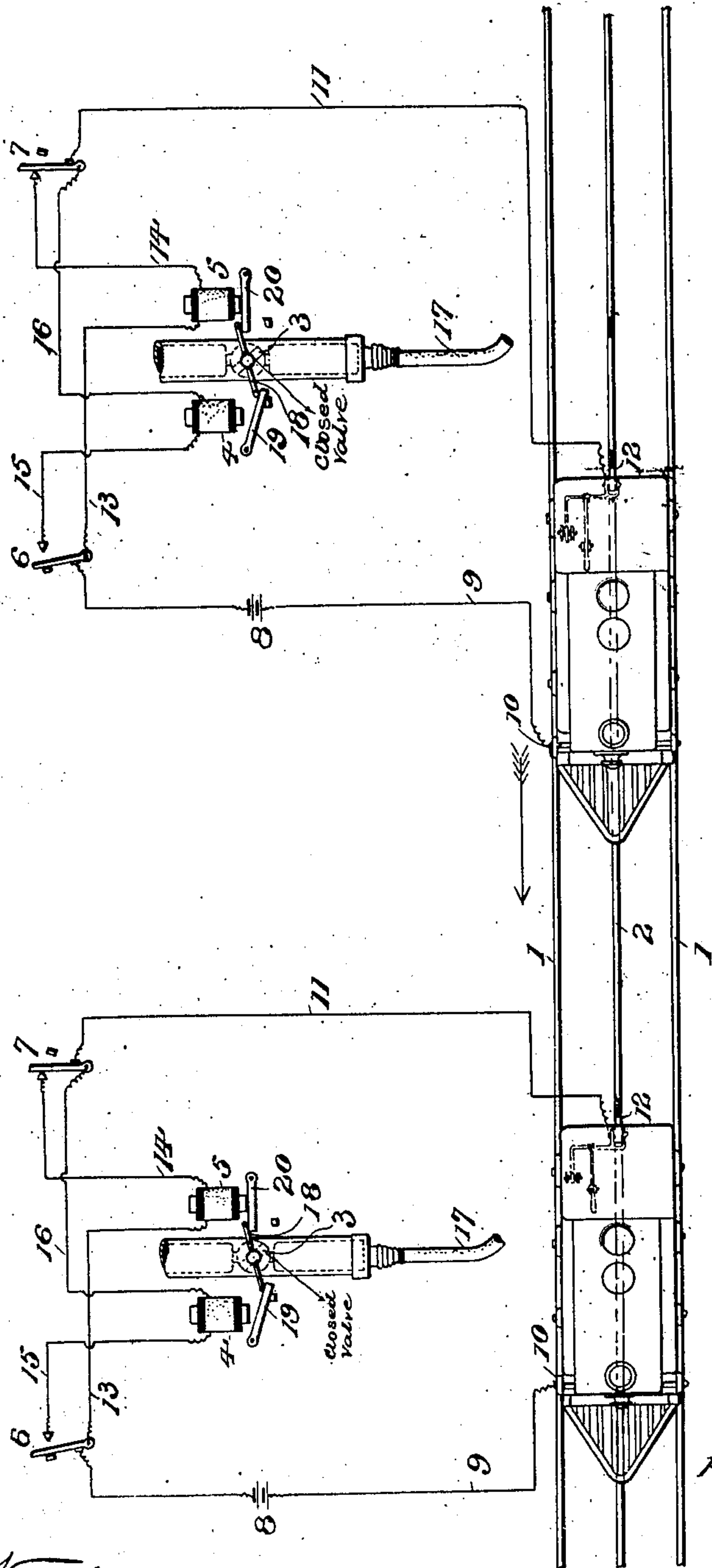
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3 SHEETS—SHEET 3.

Fig. 4.



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SAFETY APPLIANCE FOR RAILWAY-TRAINS.

No. 882,157.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed July 17, 1907. Serial No. 384,245.

To all whom it may concern:

Be it known that I, ROBLEY C. MILLARD, citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Safety Appliances for Railway-Trains, of which the following is a specification.

It is common in the operation of railway systems to subdivide the line of railway into blocks or sections and to provide coöperating means mounted upon the train to give warning in the event of two trains occupying the same block or section.

The present invention has relation to systems of the character aforesaid, and in addition provides for automatic control of the train so as to prevent either head-on or rear-end collisions.

In accordance with this invention the main line of pipe connecting the several cars of a train and normally containing air under pressure for controlling the brake apparatus, is provided with an electrically controlled valve which under favorable conditions is actuated to vent the main pipe and admit of a setting of the brakes, said valve under normal conditions being closed, to admit of the brakes being inactive or held out of operation.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings.

While the invention may be adapted to different forms and conditions by changes in the structure and minor details without departing from the spirit or essential features thereof, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Figure 1 is a diagrammatic view of a section of railway track showing two locomotives traveling in the same direction, the valves and the electric means for controlling said valves. Fig. 2 is a detail view of the trolley. Fig. 3 is a view similar to Fig. 1, showing the locomotives in the same section or block, and the valves to relieve pressure in the main pipe lines to admit of automatic application of the brakes. Fig. 4 is a view similar to Fig. 3, the switches being reversed so as to send the current through the controllers by means of which the valves in the

main pipe lines are closed to admit of releasing the brakes and permitting the locomotives to advance.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

It is to be understood that each train is to be similarly equipped and since the locomotive is the essential element it is usually provided with the safety appliances and in the present instance is illustrated as representative of a train, car or like moving part. The railway track is shown at 1, and may be of usual construction, the rails being electrically bonded in the accustomed way, to admit of their use as return conductors. The third rail 2, is representative of a conductor for conveying the electric current to the safety appliance of the trains or the like moving part. The line of railway is subdivided into block sections of any desired length, usually about one mile while the rails of the track are bonded to form in effect, continuous conductors, for return of the current, the third rail 2 is divided into sections which latter are electrically insulated in any way to prevent the formation of a gap which would cause the trolley or brush to jump.

Each train, that is, locomotive or like moving part, is similarly equipped and is provided with a valve 3, electric controls 4 and 5 and switches 6 and 7. Each electric control 4 and 5 consists of an electro-magnet and its armature, said electro magnet being included in a circuit together with switches 6 and 7, each circuit containing a battery or current generator 8. One wire as 9, is electrically connected with a wheel 10, and the opposite wire 11 is electrically connected with a trolley or brush 12, arranged to operate on the third rail or electric conductor 2.

The trolley or brush 12 may be of any design and is mounted so as to be raised or lowered and is under control of the engineer, motorman, or other operator of the train. A wire 13 connects the switch arm or blade of the switch 6 with one terminal of the helix of the electro-magnet 5 and a wire 14 connects the opposite terminal of said helix with the fixed contact of the switch 7. A wire 15 connects the fixed contact of the switch 6 with one terminal of the helix of the electro-magnet 4, the opposite terminal of said helix being connected by wires 16 with the switch blade or arm of the switch 7.

When the switch 6 is closed and the switch 7 is opened, a current passing through the circuit represented by the wires 9 and 11, energizes the electro-magnet of the controller 4 and moves the valve 3 to open the same thereby permitting the confined air to escape with the result that the valve controlling communication between the air reservoir and the brake cylinder is opened, and air passing into the brake cylinder sets the brakes. The operation of the brakes serves the two-fold office of retarding the speed of the train and at the same time admonishing the engineer or operator that the block or section is occupied, thereby giving ample opportunity for the engineer or operator to act as may be deemed advisable to avert an accident. The engineer or operator may then open the switch 6 and close the switch 7 thereby causing the current to pass through the electro-magnet of the electric controller 5, and operating the valve 3 to close the same with the result that the brakes are released, the engineer approaching cautiously with his engine under control so as to stop in an instant, should the exigency arise.

The valve 3 may be of any construction and is interposed in the length of the main line 17, and is adapted to be opened and closed by electric controllers 4 and 5. A cross head 18 attached to the operating part of the valve has its opposite ends extending into the path of the armatures 19 and 20 of the electric controllers 4 and 5. Upon energizing the electric controller 4 its armature 19 is attracted and operates the valve 3 to open the same, and upon vitalizing the electric controller 5 its armature 20 being attracted, moves the valve 3 in the opposite direction and closes the same.

As is well known in pneumatic brake systems for railways, the venting of the main pipe line effects the application or set of the brakes, and so long as the main pipe line remains closed, the brakes are held out of action. Under normal conditions, that is when one train only occupies a block or section the circuit including the electric controllers remains open, but in the event of two trains similarly equipped, occupying the same block or section, the safety circuits of each are closed, and the brakes automatically set and at the same time engineers or operators warned of impending danger.

It is to be understood that the switches 6 are normally closed and the switches 7 open, as indicated most clearly in Fig. 1, hence upon

closing of the safety circuits by two trains occupying the same section, the electric controllers 4 are energized, and the valves 3 opened, thereby venting the main pipe line with the result that the brakes are automatically set. The engineers may then bring their trains to a standstill, or may open the switches 6 and close the switches 7, thereby releasing the brakes and at the same time advancing cautiously with their engines under control to immediately bring them to a standstill as they approach, thereby averting a casualty.

Having thus described the invention, what is claimed as new is:

1. In railway safety appliances, the combination of a valve for venting the main pipe line controlling the brake mechanism, electric controllers for said valve, the one for opening the same to vent the main pipe line to effect a setting of the brakes, and the other to close said valve to release the brakes.

2. In combination with railway safety appliances, the combination of a valve in the main pipe line for controlling the brake apparatus, electric controllers for operating said valve both to open or close the same, and switches for controlling the current to send the same either through one electric controller or the other, according as the valve is to be opened or closed.

3. In railway safety appliances, the combination of a valve for controlling the brake mechanism, an electric circuit, electric controllers in the circuit for opening or closing said valve, and switches in said circuit for directing the current through one or the other of said electric controllers, according as the valve is to be opened or closed.

4. In railway safety appliances, the combination of a valve for controlling the brake mechanism, a cross head having connection with the operating part of said valve, electric controllers each consisting of an electro magnet and its armature, the latter having a portion extending in the path of the aforesaid cross head, an electric circuit including said electric controllers and switches for directing the current through one or the other of the electric controllers, according as the valve is to be opened or closed.

In testimony whereof I affix my signature in presence of two witnesses.

ROBLEY C. MILLARD. [L. s.]

Witnesses:

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