

Q. T. HOWARD & W. M. STARK.

SAFETY APPLIANCE.

APPLICATION FILED DEC. 31, 1906.

935,605.

Patented Sept. 28, 1909.

2 SHEETS—SHEET 1.

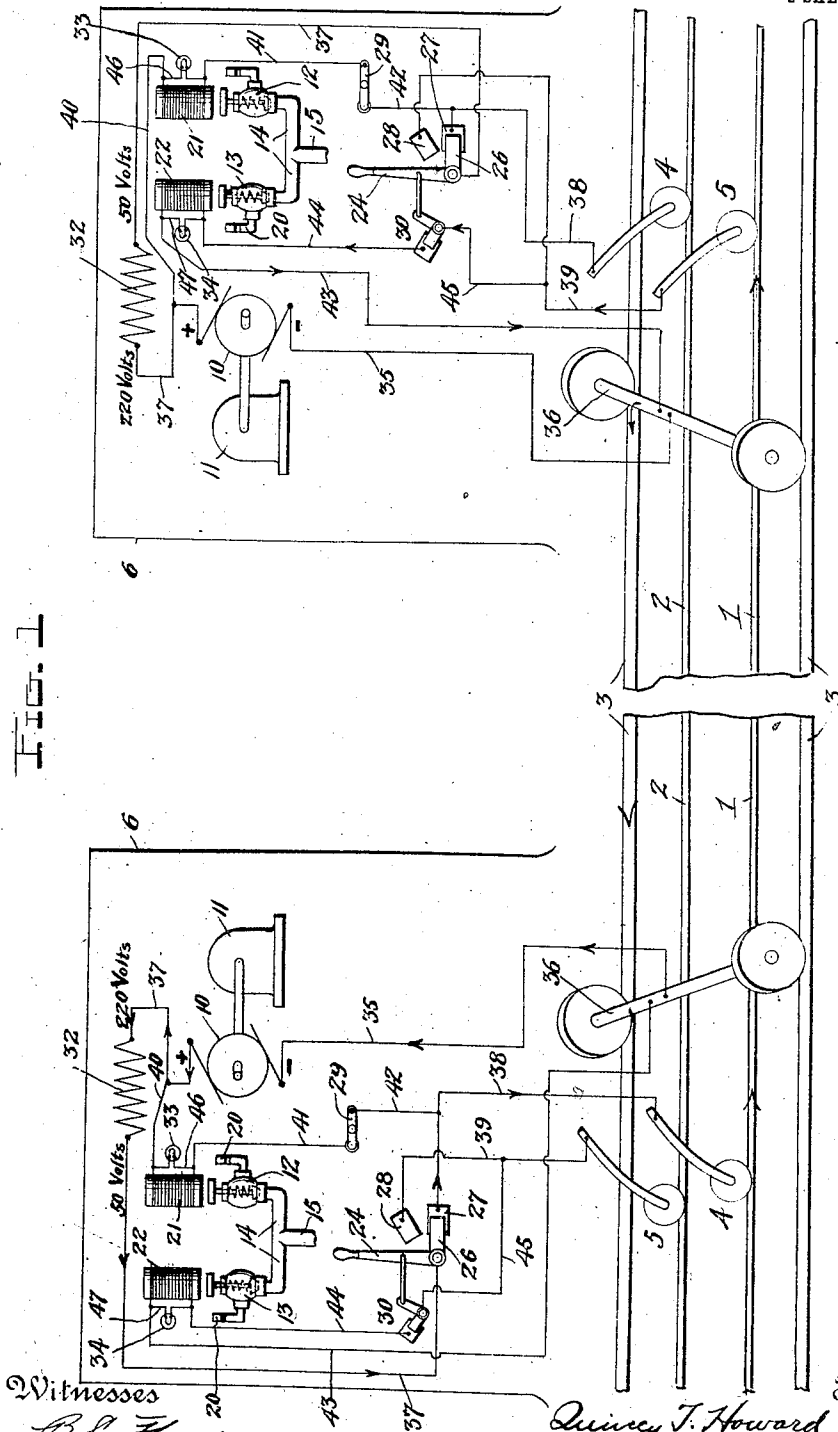


FIG. 1

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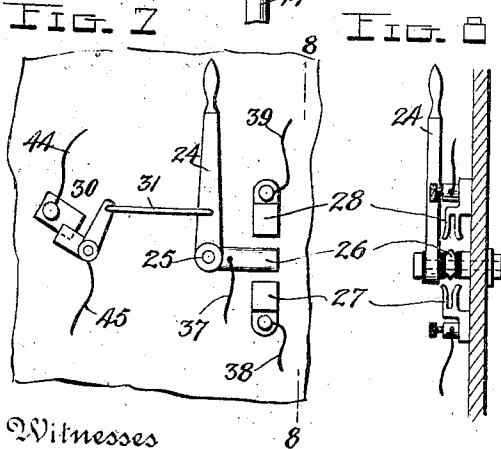
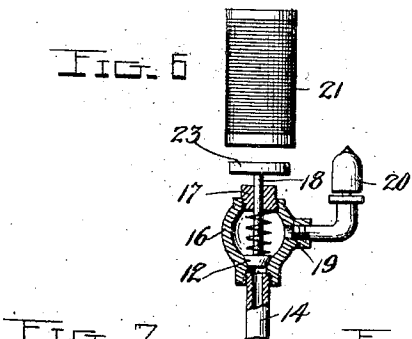
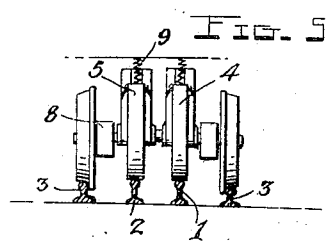
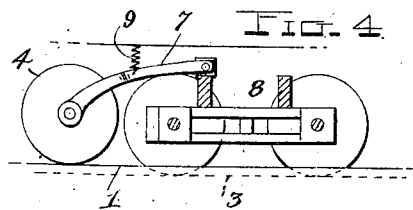
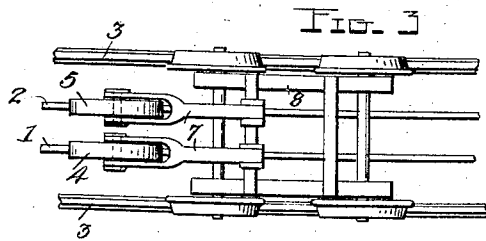
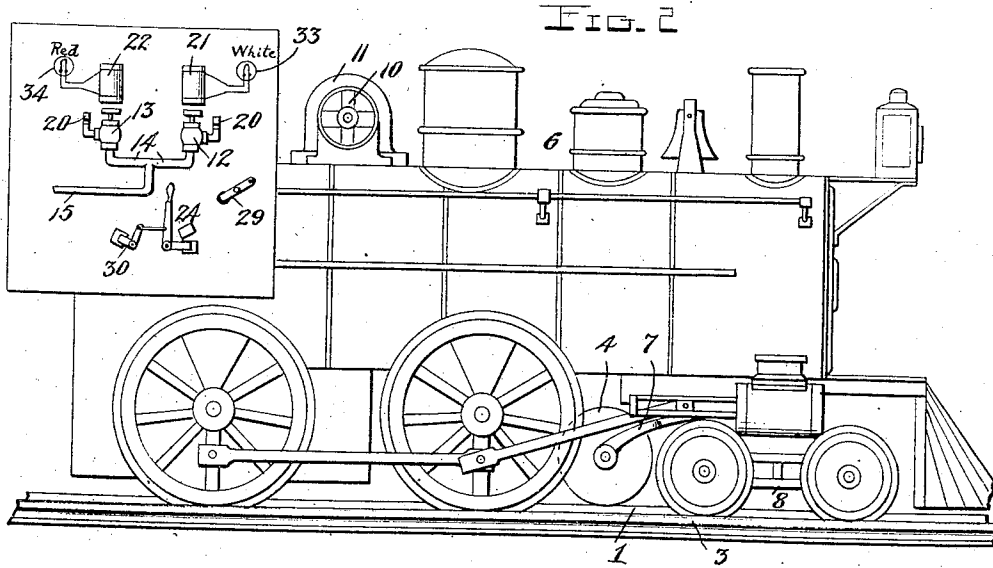
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

QUINCY T. HOWARD AND WILLIAM M. STARK, OF MUSCATINE, IOWA.

SAFETY APPLIANCE.

935,605.

Specification of Letters Patent. Patented Sept. 23, 1909.

Application filed December 31, 1906. Serial No. 350,275.

To all whom it may concern:

Be it known that we, QUINCY T. HOWARD and WILLIAM M. STARK, citizens of the United States, residing at Muscatine, in the county of Muscatine and State of Iowa, have invented certain new and useful Improvements in Safety Appliances, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in electrical safety appliances for steam and other railways.

One object of the invention is to provide an improved means for automatically applying the air brakes upon two trains which are approaching each other on the same track, when they come within a predetermined distance of each other, thus removing the danger of either head-on or rear-end collisions.

Further objects and advantages of the invention, as well as the structural features by means of which these objects are attained, will be made clear by an examination of the following specification, taken in connection with the accompanying drawings, in which,

Figure 1 is a diagrammatic view representing a railway track and two steam locomotives equipped with our improved safety appliances; Fig. 2 is a diagrammatic side elevation of a steam locomotive showing the preferred arrangement of the parts of the apparatus thereon; Fig. 3 is a detail top plan of a portion of the front truck of the locomotive, showing the contact track and trolley wheels upon the latter; Fig. 4 is a detail longitudinal section through the parts shown in Fig. 3; Fig. 5 is a detail, rear end elevation of the parts shown in Fig. 3; Fig. 6 is a detail view partly in section and partly in elevation of one of the spring valves by means of which the air brakes are set, the operating magnet for said valve and the signal whistle controlled thereby being also shown; Fig. 7 is a detail view showing the controlling lever by means of which the engineer may control the electric circuits of the apparatus to stop trains, and open or close switches, crossing gates and the like; Fig. 8 is a vertical section on the plane indicated by the line 8-8 in Fig. 7.

In the practice of our invention, we equip the railway track with two electrical con-

ductors 1, 2. These conductors are preferably arranged between the track rails 3, as shown. They may be of any suitable form and construction and are adapted to be engaged by contact devices 4, 5, carried by each of the locomotives or other vehicles 6 adapted to travel over the track. If desired, the conductor rails 1, 2 may extend continuously from end to end of the track, but we preferably provide them only at switches, crossings, curves, and other dangerous places. For convenience, we will term the conductor 1, the right conductor rail, and the conductor 2, the left conductor rail and will also term the devices 4, 5, respectively, the right and left contact or trolley wheels. These devices 4, 5 may be of any suitable form and construction, but we preferably employ wheels adapted to run upon the rails 1, 2 and journaled for rotation in the end of hangers 7 pivotally mounted, preferably upon the front truck 8 of the locomotive. These hangers are suitably insulated from the truck and the frame of the locomotive and are held in contact with the conductor rails by springs 9, as will be readily seen upon reference to Figs. 3, 4 and 5 of the drawings. When our improved apparatus is used upon electric cars or trains, the current is taken from the trolley wire, but when it is used upon a steam railway, as herein shown, the current is supplied by dynamos 10, one of which is carried by each of the locomotives 6 and preferably mounted upon its top and directly connected to a steam turbine 11. Each of the locomotives 6 is further equipped with two valves 12, 13 which control outlet branches 14 of the train pipe 15 of the air brake system of the locomotive.

The valves 12, 13 may be of any suitable form and construction, but we preferably employ spring seated valves of the type clearly shown in Fig. 6. This valve has its casing 16 provided with an adjustable plug 17 through which the stem 18 of the valve slides. The valve casing 16 is also provided with an outlet nipple 19 to which is connected a whistle or other suitable alarm device 20. The valves 12, 13 are adapted to be opened by magnets 21, 22, each of which has its armature 23 connected to the stem 18 of the valve which it is adapted to actuate. The magnets 21, 22 are electrically connected to the right and left contact devices 4, 5, as presently explained, and they are pref-

erably located, respectively, upon the right and left hand sides of the interior of the cab of the locomotive. Each of the locomotives is further equipped with a controlling switch lever 24 which is pivotally mounted at 25 and has a contact plate or arm 26 adapted to be alternately engaged with contact plates 27, 28. Switches 29 and 30 are provided in the locomotive cab adjacent to the controlling lever 24 and are adapted to control the circuits through the right and left magnets 21, 22, as presently explained. The switch 30 which controls the left magnet 22 is preferably connected to the lever 24 by a link 31 so that it will be simultaneously operated with the same, as will be readily understood upon reference to Fig. 7. The switches 29, 30 may be of any desired form and construction. Each of the locomotives carries a resistance 32 which is included in the circuit of the dynamo 10, and is preferably in the form of an adjustable rheostat. Signal lights 33, 34, are also provided upon the right and left hand sides of the interior of the locomotive cab and are connected respectively with the right and left hand magnets 21, 22. These lights are preferably different colored, so as to more readily distinguish them, the right hand one 33 being preferably white, and the left hand one 34 preferably red.

The electrical connections of the above enumerated parts are the same on each locomotive and are clearly shown in Fig. 1 of the drawings. One pole of the dynamo 10 is connected by a conductor 35 to the frame of the locomotive conventionally illustrated at 36, so that a current of electricity may flow from either of the track rails 3 through the wheels and frame of the locomotive and the conductor 35. The other pole of the dynamo 10 is connected to the contact 26 of the lever 24 by a conductor 37 in which the resistance 32 is located. The right contact 27 of the switch 24 is connected by a conductor 38 to the right contact wheel 4 and the left contact 28 is connected by a conductor 39 to the left contact wheel 5. It will thus be seen that the dynamo 10 may be thrown into circuit with either of the contact wheels 4, 5 by shifting the contact 26 of the switch 24 upon either of the contacts 27, 28. The right magnet 21 is connected by a conductor 40 to the conductor 37, in advance of the resistance 32, and by a conductor 41 to the switch 29. The latter is connected by a conductor 42 to the conductor 38 which leads to the right contact wheel 4. Thus the right magnet 21 is in a shunt circuit which includes the dynamo 10, the switch 29, and the right contact wheel 4. The left magnet 22 is connected by a conductor 43 to the frame 36 of the locomotive and by a conductor 44 to the contact plate 28 of the switch 30. The lever of the latter is

connected by a conductor 45 to the conductor 39 which leads to the left contact wheel 5. The right hand or white signal light 33 is in a shunt circuit 46 between the conductors 40, 41 and the left or red light 34 is in a shunt circuit 47 between the conductors 43, 44.

By means of the above described apparatus two trains approaching each other on the same track will be automatically stopped when they come within a predetermined distance of each other. Assuming two locomotives to be approaching each other head-on, as shown in Fig. 1, the circuits may be traced as follows: Starting from the positive pole of the dynamo 10 of the left hand locomotive 6, the current passes through the conductor 37, the resistance 32, the remaining part of the conductor 37, contacts 26, 27 of the switch 24, conductor 38, contact wheel 4, and the contact rail 1. The latter becomes the left contact rail of the track beneath the other or right hand locomotive and the circuit through this locomotive is as follows: from the left conductor rail 1 through the left contact wheel 5, conductor 39, conductor 45, switch 30, conductor 44, left magnet 22, and red light 34, conductor 43, locomotive frame 36 and track rails 3. From the latter the current passes up through the frame of the first locomotive, that is, the left hand one and then up through the conductor 35 to the negative pole of the dynamo 10. Thus the left magnet 22 on the right hand locomotive is energized so as to attract its armature 23 and open the valve 13 so that the air brakes on that train will be applied and at the same time the signal whistle 20 will be sounded and the red lamp 34 lighted.

Simultaneous with the operation of the left magnet 22 on the right hand train, the right magnet 21 on the left hand train will be energized in the following manner: The current leaving the dynamo 10 is preferably of about 220 volts and after passing through the resistance 32 is reduced to about 50 volts, which latter is the voltage in the conductor 38. Hence the current for the dynamo 10 in passing through the shunt circuit in which the magnet 21 is included energizes the latter and thus the valve 12 is opened. This shunt circuit is as follows: the conductor 40, the magnet 21 and white light 33, conductor 41, switch 29 and conductor 42 to conductor 38. In this way both of the approaching trains will be simultaneously stopped. The engineer on the left hand train by opening the switch 29 may throw out of circuit the right magnet 21 and close the valve 12 so that he may advance slowly and determine the cause of the stoppage of his train without danger of a collision or wreck. Should one train be overtaking another and come within a predetermined

distance of it, both trains will be similarly stopped. The engineer by shifting the contact 26 of the switch 24 from the right contact 27 to the left contact 28 of said switch may send a current through the left contact rail 2 and thus stop a train approaching him from the rear.

Since both of the locomotives are equipped with the same apparatus each one will affect the other in the same way when they approach each other head on, provided the switches 24 are in their normal positions. Should the apparatus upon one of the locomotives be out of working order only two of the magnets will be energized.

While we have shown and described the preferred embodiment of our invention, we wish it understood that we do not limit ourselves to the precise showing herein set forth and that various changes in the form, and arrangement of the parts and the electrical connections may be made without departing from the spirit of the invention, as defined by the appended claims.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:—

1. In a railway safety apparatus of the character described, the combination with a track and electrical conductors arranged along the same, of a vehicle to travel over said track, electrical contact devices carried by said vehicle for engagement with said conductors, means for controlling the brake system of said vehicle, electromagnets for actuating said brake system controlling means, a source of electric current supply, a resistance, a switch, an electric circuit including said source of electric current supply, said resistance, said switch, one of said contact devices, and the frame of said vehicle, a shunt circuit connected to the first-mentioned circuit on opposite sides of said resistance and including one of said electromagnets, and another circuit including the other of said electromagnets, the other of said contact devices, said switch and the frame of said vehicle, substantially as set forth.

2. In a railway safety apparatus of the character described, the combination with a track and electrical conductors arranged along the same, of a vehicle to travel over said track, electrical contact devices carried by said vehicle for engagement with said conductors, means for controlling the brake system of said vehicle, electromagnets for actuating said brake system controlling means, a source of electric current supply, a resistance, a switch, an electric circuit including said source of electric current supply, said resistance, said switch, one of said contact devices, and the frame of said vehicle, a shunt circuit connected to the first-mentioned circuit on the opposite side of

said resistance and including one of said electromagnets, another circuit including the other of said electromagnets, the other of said contact devices, said switch and the frame of said vehicle, and switches, interposed in the last-mentioned circuit and said shunt circuit, substantially as set forth.

3. In a railway safety apparatus of the character described, the combination with a track and electrical conductors arranged along the same, of a vehicle to travel over said track, electrical contact devices carried by said vehicle for engagement with said conductors, means for controlling the brake system of said vehicle, electromagnets for actuating said brake system, controlling means, a source of electric current supply, a resistance, a switch, an electric circuit including said source of electric current supply, said resistance, said switch, one of said contact devices, and the frame of said vehicle, a shunt circuit connected to the first-mentioned circuit on the opposite side of said resistance and including one of said electromagnets, another circuit including one of said electromagnets, the other of said contact devices, said switch and the frame of said vehicle, cut-out switches included in the last-mentioned circuit and said shunt circuit, and an operative connection between one of the last-mentioned switches and the first-mentioned switch.

4. In a railway safety apparatus of the character described, the combination with a track and electrical conductors arranged along the same, of a vehicle to travel over said track, electrical contact devices carried by said vehicle for engagement with said conductors, valves for controlling the air-brake system of said vehicle, electromagnets for actuating said valves, a source of electric current supply carried by said vehicle, a controlling switch, electrical connections between said source of current supply, one of said magnets, said switch, one of said contact devices and the frame of said vehicle, and electrical connections between the other of said magnets, said switch, the other of said contact devices, and the frame of said vehicle, substantially as set forth.

5. In a railway safety apparatus of the character described, the combination with a track and electrical conductors arranged along the same, of a vehicle to travel over said track, electrical contact devices carried by said vehicle for engagement with said conductors, valves for controlling the air-brake system of said vehicle, electromagnets for actuating said valves, a source of electric current supply carried by said vehicle, a controlling switch, a resistance, cut-out switches, electrical connections between said source of electric current supply, said resistance, one of said magnets, said controlling switch, one of said cut-out switches, one

of said contact devices and the frame of said vehicle, and other electrical connections between the other of said magnets, the other of said cut-out switches, said controlling switch, the other of said contact devices and the frame of said vehicle, substantially as set forth.

6. In a railway safety apparatus of the character described, the combination with a track and electrical conductors arranged along the same, of a vehicle to travel over said track, electrical contact devices carried by said vehicle for engagement with said conductors, exhaust valves for controlling the air-brake system of said vehicle, signal whistles connected to the outlets of said valves, electromagnets for actuating said valves, signal lights, a dynamo carried by said vehicle, a resistance, a controlling switch having a contact for alternate engagement with two other contacts, electrical connections between the latter and said con-

tact devices, electrical connections between the other contact of said controlling switch, said resistance, said dynamo and the frame of said vehicle, two cut-out switches, electrical connections between one of said cut-out switches, one of said magnets, one of said lights, and the electrical conductors or connections upon opposite sides of said resistance, and other electrical connections between the other of said cut-out switches, the other of said magnets, the other of said lights, the other of said contact devices and the frame of said vehicle, substantially as set forth.

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

QUINCY T. HOWARD.
WILLIAM M. STARK.

Witnesses:

D. T. EATON,
E. C. DRY.