S. L. ADELSON.

SAFETY APPARATUS FOR RAILWAYS.

APPLICATION FILED MAR. 18, 1908.

901,668. Patented Oct. 20, 1908.

2 SHEETS—SHEET 1.

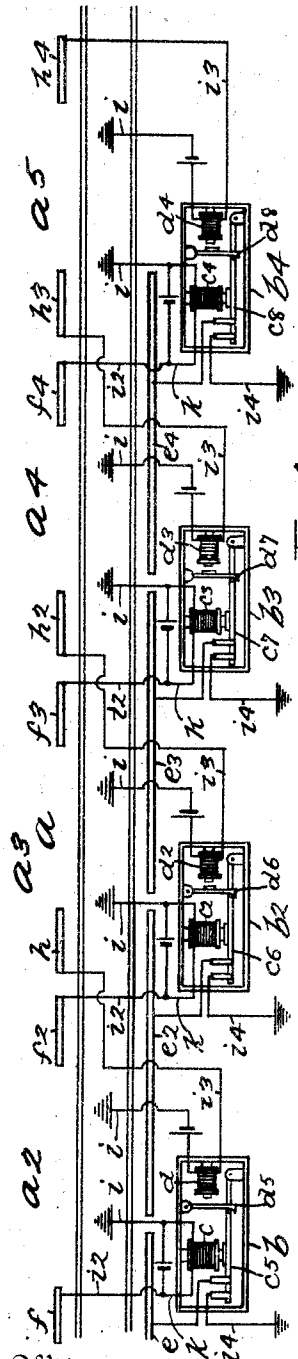


Fig. 1

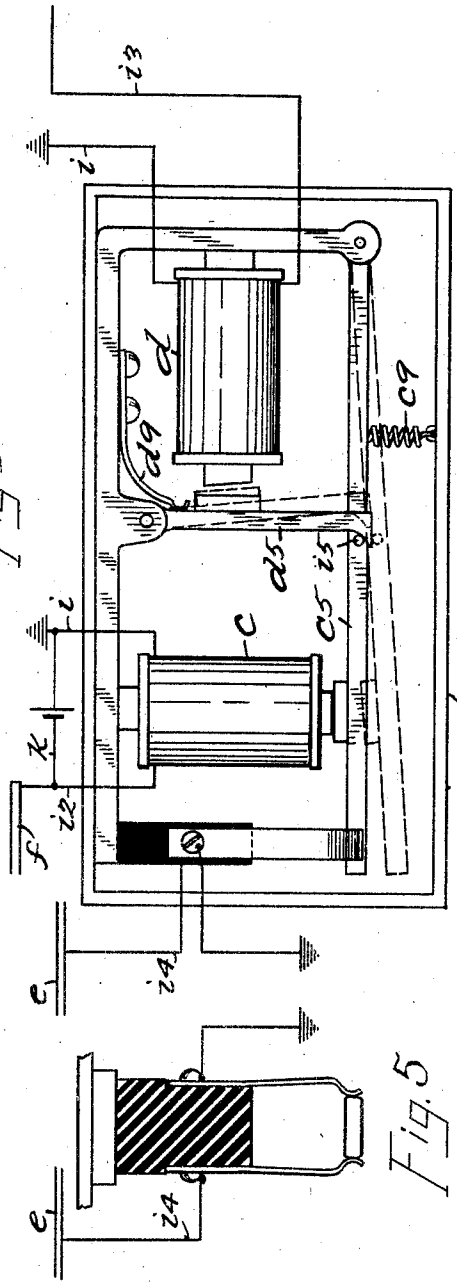


Fig. 4

Fig. 5

Witnesses:
George F. Bentley
W. Thos Booth

Inventor
Samuel L. Adelson
By Attorney
J. Chris Larsen

S. L. ADELSON.

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2 SHEETS—SHEET 2.

Fig. 2

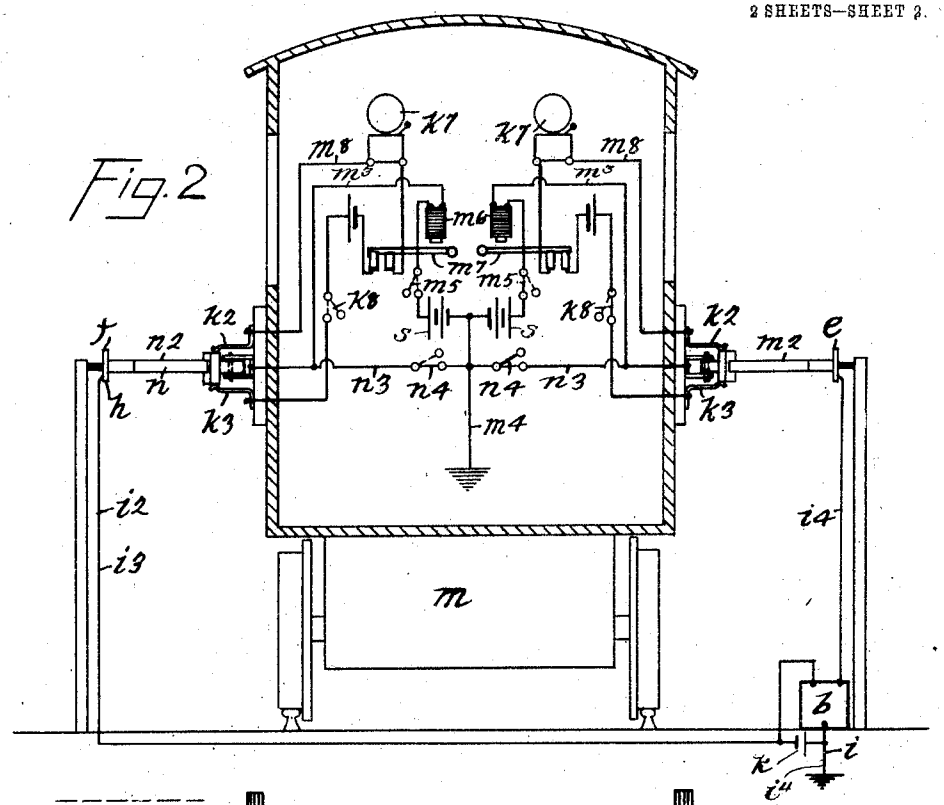
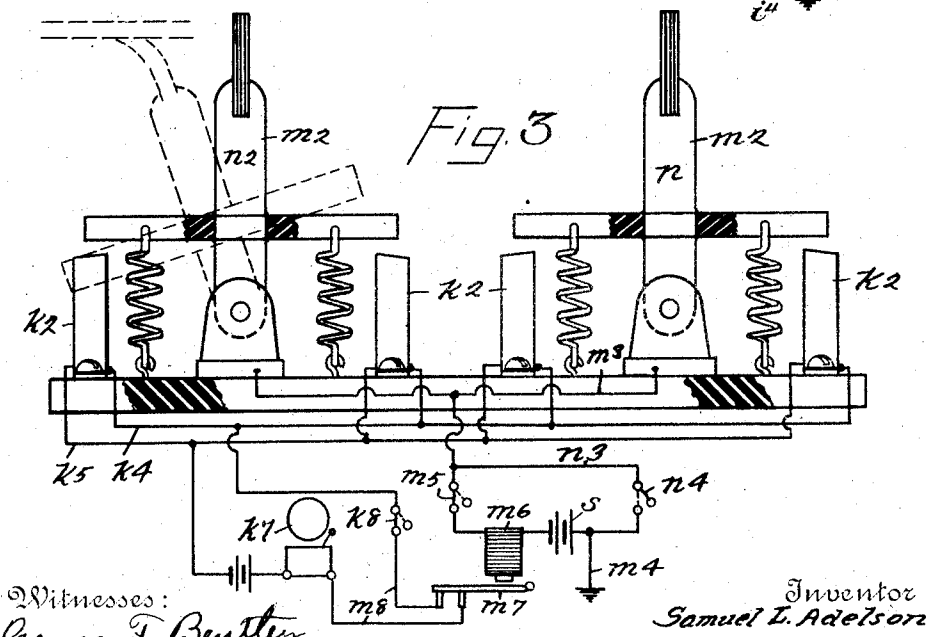


Fig. 3



Witnesses:
George F. Bentley
H. Thos. Booth

Inventor
Samuel L. Adelson
By Attorney J. Christiansen

UNITED STATES PATENT OFFICE.

SAMUEL L. ADELSON, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO MAURICE ADELSON, OF NEW YORK, N. Y.

SAFETY APPARATUS FOR RAILWAYS.

No. 901,668. Specification of Letters Patent. Patented Oct. 20, 1908.

Application filed March 18, 1908. Serial No. 421,825.

To all whom it may concern:

Be it known that I, SAMUEL L. ADELSON, a citizen of the United States of America, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Safety Apparatus for Railways, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to railways and the object thereof is to provide means for preventing collisions of the cars or trains on said railway, in either direction for single track railways, or rear end collisions, on double track railways; a further object being to provide such an apparatus which notifies the operator of a car or train that he is approaching another car or train within a predetermined distance; a further object being to provide such a device which is automatically set by a preceding car for warning a following car; a further object being to provide such a device which is automatically released when the preceding car has passed beyond the said predetermined distance; a still further object being to provide means whereby said warning is operated if an accident destroys the connections of the apparatus with the car and a still further object being to provide such a device which is positive in operation, simple in construction, comparatively inexpensive, well adapted for the purpose for which it is intended and which is an improvement over that shown, described and claimed in my patent of the United States of America, No. 807,009, of Dec. 12, 1905.

The invention is fully described in the following specification, of which the accompanying drawings form a part, in which the separate parts are designated by the same reference characters in each of the views, and in which:—

Figure 1 is a diagrammatic showing of the track apparatus used in my invention; Fig. 2 is a rear end of a car and showing, diagrammatically, the car apparatus; Fig. 3 is an enlarged plan view of the car apparatus; Fig. 4 is an enlarged plan view of one unit of the track apparatus, with its connections; and Fig. 5 is a detail view of one element of the construction.

In the drawings forming a part of this application, I have shown a portion a of a railway, which, at predetermined points is divided into a plurality of blocks a^2, a^3, a^4 and a^5, of which a^2 is the first and a^5 the last of a series of said blocks of any desired number.

In each of the blocks, I provide a casing b, b^2, b^3 and b^4, each of which is provided with electro-magnets c, c^2, c^3, c^4 and d, d^2, d^3 and d^4, respectively, the former of which are the setting magnets and the latter the releasing magnets, and adjacent each of said magnets is a pivoted armature c^5, c^6, c^7, c^8, and d^5, d^6, d^7 and d^8, respectively, adapted to be attracted by the corresponding magnets, each of the said armatures being normally forced away from the said magnets by springs c^9 and d^9.

Upon each side of the track a, I provide a plurality of contacts, of which those upon the right side, e, e^2, e^3 and e^4 are practically continuous, while upon the opposite side are the contacts f, f^2, f^3, and f^4, and h, h^2, h^3 and h^4, the former of which are connected with the magnets c, c^2, c^3 and c^4, respectively, whereas the contacts last named are connected with the magnets d, d^2, d^3 and d^4, and which are located in the block preceding that of each of the said last named contacts, and all of said contacts are in connection with the ground by means of wires i, the first mentioned connections between the contacts f, f^2, f^3 and f^4 and magnets c, c^2, c^3 and c^4 being designated by the reference character i^2 and those between the contacts h, h^2, h^3 and h^4, and magnets d, d^2, d^3 and d^4, by the reference character i^3.

Each of the magnets c, c^2, c^3 and c^4 are in a complete electrical circuit k, of sufficient power to attract the armature thereof, normally, and each of the said armatures are adapted to bridge a broken ground connection i^4 of the contacts e, e^2, e^3 and e^4, when attracted by the corresponding magnet, and said armatures, when withdrawn from the magnets, by the springs acting thereon, are held away from the magnets by the armatures d^5, d^6, d^7 and d^8, through the medium of a pin i^5 on the last named armatures, and, by reference to Fig. 2, it will be seen that the track contacts are arranged at a certain height from the ground.

In Fig. 2 is shown a car m, upon the said

railway, and provided with a plurality of spring actuated arms extending outwardly, transversely, therefrom, in such manner as to strike the contacts hereinbefore mentioned, each of said arms being adapted to bridge two spring plates k^2 and k^3 arranged in electrical circuits, upon a movement, in either direction, of the said arms upon their pivots, there being, preferably, two arms upon each side of the said car, but any number thereof may be employed.

The arms upon the right side of the car are designated by the reference characters m^2, in electrical connection with each other by means of conductors m^3 and with the ground by means of a conductor m^4 through a battery s, a switch m^5 and an electro-magnet m^6 having a pivoted armature m^7 adapted to bridge two contacts in an electrical circuit at m^8, and the plates k^3 and k^2 are also correspondingly connected by means of conductors k^5 and k^4, respectively, which are in connection with a circuit m^9 having a bell k^7 and switch k^8 therein, closed to actuate the bell, normally, when the plates k^2 and k^3 are bridged by the movement of the arms m^2 in either direction. This arrangement of the arms m^2 is duplicated for the arms n and n^2 opposite the arms m^2, and both sets of said arms are also adapted to be grounded through a conductor n^3, directly, by means of a switch n^4.

Supposing a car, equipped with my apparatus, should enter the block a^2 from left to right with the parts in the position shown; the arms m^2, engaging the contact e, grounds through i^4, and a circuit is completed through m^4, battery s, m^5, magnet m^6, m^3 and arm m^2 and the armature m^7 is attracted away from the contacts of the circuit m^8, thereby breaking the same, although the arm m^2 had bridged the plates k^2 and k^3 to complete this circuit, and the bell is not operated.

The arm n engages the contact f and a circuit is completed therethrough, through k to ground, to magnet m^6 through m^4, battery s, and back to arm n and the magnet c is short-circuited, permitting the armature c^5 to be drawn away by the spring c^6 and be engaged by the pin i^5, thereby setting my apparatus for a following car, and this operation is repeated, of short-circuiting the magnets c^2, c^3 and c^4 of all the blocks of the system, and thus setting the track apparatus to alarm following cars, it being understood that the magnets c and m^6 are relatively so arranged that the magnet m^6 will drop its armature on closing the shunt circuit.

When the arm n engages the contacts h, h^2, h^3 and h^4, in turn, a circuit is completed, for the block a^2, through the conductor i^3, magnet d, ground, magnet m^6 through m^4, and through m^3 and arm n, thus energizing the magnet d, attracting the armature thereof, d^5, and releasing the armature c^5, permitting it to be attracted by the magnet c which has been completely energized by the arm n having passed from the contact f, and the apparatus is in the primary or normal condition previous to the entrance of the car thereinto. If, however, a following car had entered the block a^2 while the preceding car was also therein, previous to the engagement of the arm n with the contact h to release the armature c^5, then the ground i^4 would have been broken because of the fact that the armature c^5 was down, and the movement of the arm m^2, inclined by contact with e, bridges k^2 and k^3 and, the ground i^4 being broken, no circuit through the magnet m^6 results, and the armature m^7 is thereby not moved and the circuit m^8 through the bell k^7 is complete and the said bell is energized and notifies the engineer that a car is in the same block in front of him and the ringing continues until the preceding car passes from the same block.

The operations thus far described are repeated in each of the blocks of the system, viz:—the setting of the track apparatus for a following car, the alarming of the engineer of the following car and the releasing of the track apparatus after a car has passed from a block, including the short-circuiting of the magnets c, c^2, etc., the energizing of the magnets d, d^2, etc., as well as of the magnets m^6, and the prevention of said alarm if the track is "clear".

In practice, I prefer to duplicate the car apparatus in order that I may throw either side of said apparatus into an operative and inoperative or inoperative and operative position, according to the direction of movement of the car and to the character of the railway, and I also prefer to use two arms on each side of the car in order to assure a more positive contact with the track apparatus, these features, as well as others which may suggest themselves, being merely details and not bearing upon the spirit of the invention nor the object thereof.

It will therefore be seen that I provide an alarm device which is absolute in operation, even in the event of the connections being broken or removed, providing that the setting portion thereof be intact and, indeed, if the track apparatus electrical connections be entirely broken or removed, an alarm will be given in a car as soon as the arm on the side thereof is inclined by contact with any exterior object, thus notifying an engineer that something is wrong, either that a car is in the same block or that the apparatus has been injured, this result following from the fact that it is an open circuit in the track apparatus which permits the actuation of the alarm and the closing of a circuit therethrough.

Having fully described my invention,

what I claim as new and desire to secure by Letters Patent, is:—

1. A safety apparatus for railways, comprising a track apparatus arranged in blocks, a car, an alarm thereon, arms pivoted on said car, contacts adapted to be engaged by said arms and in electrical connection with said track apparatus, an electrical circuit on said car through said alarm and closed upon the movement of one of said arms on its pivot and an electrical circuit closed through another of said arms and the track apparatus for maintaining said alarm circuit in an open position when the track apparatus is set at normal safe position.

2. A safety apparatus for railways, comprising a track apparatus arranged in blocks, a car, an alarm thereon, arms pivoted to said car, contacts for said arms in electrical connection with the track apparatus, a circuit through said alarm and adapted to be closed when one of said arms is moved on its pivot, a circuit through said arm, its contact and the track apparatus for setting the same at danger and a circuit through said car and track apparatus, when set at safety, for breaking said alarm circuit.

3. A safety apparatus for railways, comprising a track apparatus arranged in blocks, a car, an alarm thereon, a track contact in electrical connection with the track apparatus, an arm movable on said car adapted to engage with said contact and means connected with said arm for closing an electrical circuit through said alarm when said arm is moved out of normal position.

4. A safety apparatus for railways, comprising a track apparatus arranged in blocks, a car, an alarm thereon, an arm movable on said car, a contact for said arm in electrical connection with the track apparatus and contacts on said car, in electrical connection with said alarm, adapted to be bridged by said arm when moved out of normal position and thereby close said alarm circuit.

5. A safety apparatus for railways, comprising a track apparatus arranged in blocks, a car, an alarm thereon, an arm movable thereon, a circuit adapted to be closed through said alarm by the movement of said arm, a magnet in said track apparatus provided with a circuit breaker armature, a contact for said arm for shunting a normal circuit through said magnet, a supplemental arm on said car and a contact therefor grounded through said armature when the shunt circuit is open and arranged in a circuit maintaining said alarm circuit in an open position while the normal magnet circuit is operative, said shunt circuit serving to set said track apparatus at danger.

6. A safety device for railways, comprising a track apparatus arranged in blocks, a car, movable arms thereon, an alarm therein, a circuit through said alarm closed by the movement of one of said arms, a setting magnet in said track apparatus in temporary electrical connection with said arm, a circuit through another of said arms and through said track apparatus when said setting magnet is normally actuated and serving to open said alarm circuit and a contact in a block ahead for said first named arm and arranged in an electrical circuit including a releasing magnet for returning the setting magnet, when set, to normal position.

7. In a safety device for railways, comprising a track apparatus arranged in blocks and a car provided with an alarm; a movable arm on said car, a track contact therefor in electrical connection with the track apparatus for setting the same and devices connected with said arm for energizing said alarm when moved out of normal position by engagement with said contact.

8. In a safety device for railways, comprising a track apparatus arranged in blocks and a car provided with an alarm; a movable arm on said car for actuating said alarm when moved and a supplemental arm in temporary electrical connection with said track apparatus for holding said alarm circuit open.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 17th day of March 1908.

SAMUEL L. ADELSON.

Witnesses:
GEORGE F. BENTLEY,
W. THOS. BOOTH.