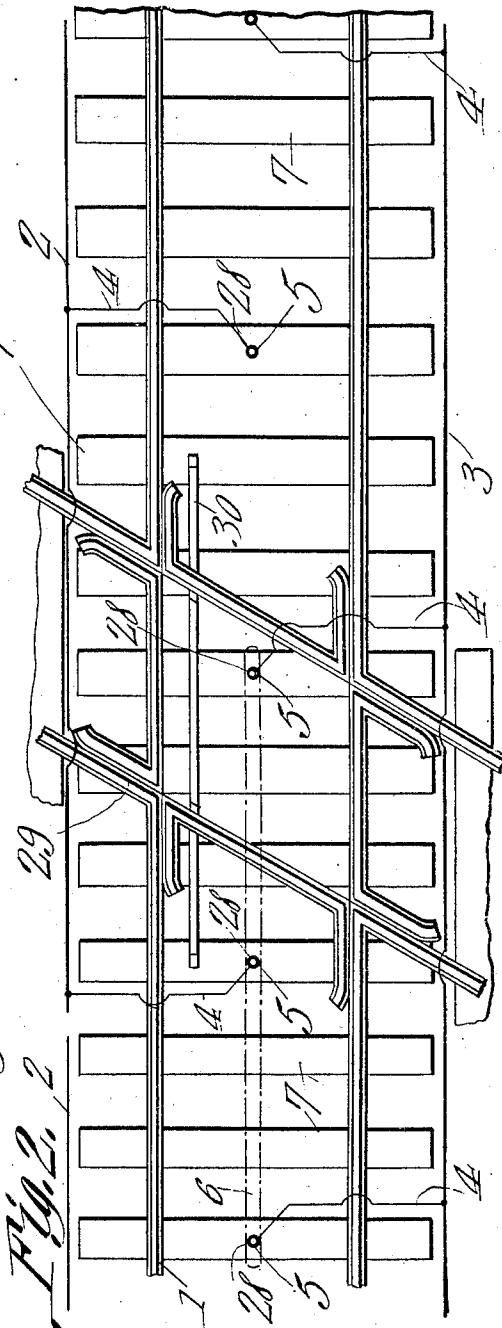
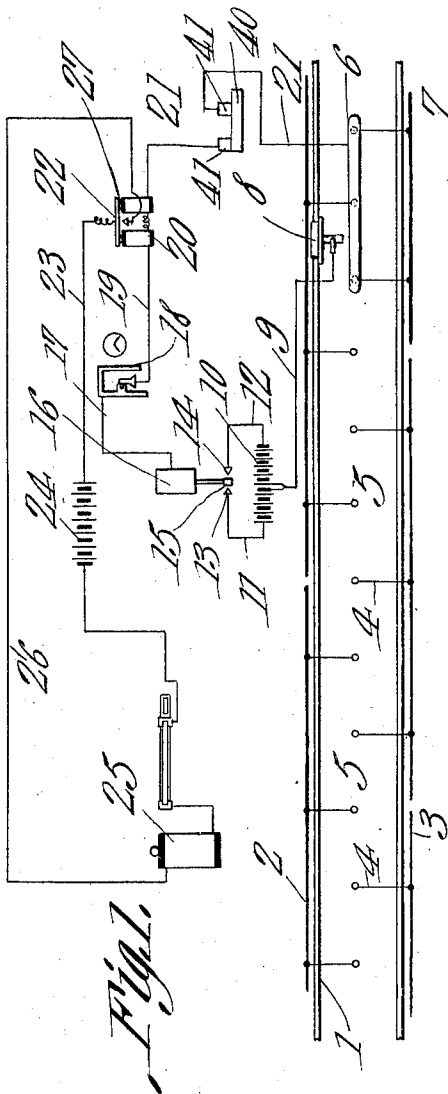


A. MINNICK.
SAFETY SYSTEM FOR RAILWAYS.
APPLICATION FILED NOV. 23, 1910.

1,016,227.

Patented Jan. 30, 1912.

2 SHEETS-SHEET 1.



Witnesses

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Fig. 3.

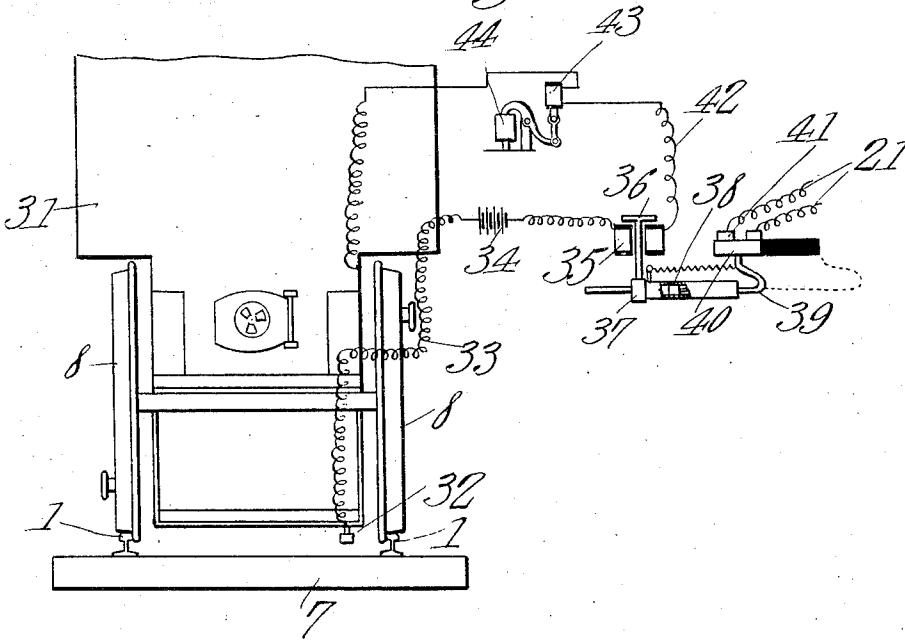


Fig. 4.

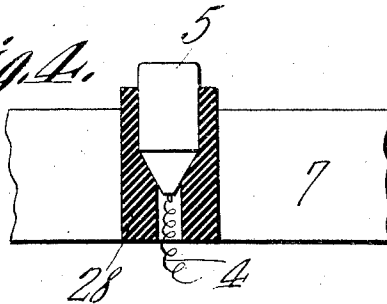
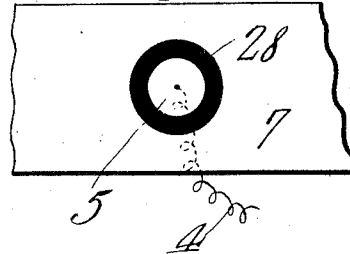


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SAFETY SYSTEM FOR RAILWAYS.

1,016,227.

Specification of Letters Patent.

Patented Jan. 30, 1912.

Application filed November 23, 1910. Serial No. 593,871.

To all whom it may concern:

Be it known that I, ALFRED MINNICK, a citizen of the United States, residing at Coeur d'Alene, in the county of Kootenai and State of Idaho, have invented a new and useful Safety System for Railways, of which the following is a specification.

This invention has reference to improvements in safety systems for railways and its object is to provide a means which under normal running conditions and in the absence of dangerous conditions is inactive but which becomes automatically active on the approach of a train or car equipped with brake applying and power disconnecting means, to a danger zone; such car or train will be brought to a standstill before entering such danger zone beyond a limited distance. Furthermore two approaching trains or cars whether going in the same direction or in opposite directions will be brought to a standstill when in dangerous proximity.

In accordance with the present invention there are provided two overlapping sectional conductors along the line of way either on the surface of the ground or overhead or underground and between the tracks or outside the same as may be desired. Branched off from these sectional conductors at appropriate points are other conductors leading to exposed terminal members which may all be located in one line with the terminal members of one sectional conductor alternating with those of the other sectional conductors in overlapping relation to the first named conductor and so on throughout the system. Each car or train is provided with a collecting shoe of sufficient extent to include both overlapping conductors where overlapping during the travel of the car or train there along. This collecting shoe is connected to electrically controlled train carried devices designed to shut off the steam or electric current as the case may be and to apply the brakes when danger conditions are established or exist within a certain predetermined distance of the train or car.

It has been proposed to use adjacent exposed conductors in overlapping relation and extending substantially throughout the length of the system. In the practical application of such a system certain difficulties are found to exist which it is the purpose

of the present invention to overcome. One of these difficulties is the danger of short circuiting the conductors by some conducting material bridging the same thus putting the system in condition to transmit danger impulses to the electrically controlled mechanisms on an approaching car or train, when no such danger conditions are present. Furthermore it has been found in practice that on a train traversing a crossing by another track, there is a likelihood of the actuation of the danger responsive devices when no such conditions are present as would demand the actuation of such devices.

The present invention includes means for eliminating such conditions as may occur at a railway crossing where one track crosses another.

The invention will be best understood from a consideration of the following description taken in connection with the accompanying drawings forming a part of this specification, in which drawings:—

Figure 1 is a diagrammatic representation of a portion of a railway track equipped with the present invention and also showing diagrammatically the electric controlling mechanism on a car or train. Fig. 2 is a plan view in part diagrammatic showing the arrangement at the crossing of two railway tracks. Fig. 3 is a diagrammatic representation of a cut-out mechanism for the train carried controlling devices operable at the crossing of two railway tracks. Fig. 4 is a vertical section through one of the terminal contact members for the sectional conductors. Fig. 5 is a plan view of the structure of Fig. 4.

Referring to the drawings there is shown a railway track 1 which may be taken as indicative of a track of any desired length and since the invention is designed for preventing collisions on single tracks or the running of the train into a portion of the track where danger conditions are present, the showing of the drawings may be taken as indicative of any railway track whether of single or multiple track type. The rails of the track 1 are assumed to be electrically continuous. Along the line of way are sectional conductors 2—3 in overlapping relation so that the end of one conductor, say the conductor 2 will be about midway of the length of a matching conductor, say the conductor 3. The meeting ends of the sectional

conductors may be separated from one another a sufficient distance to prevent electrical connection therebetween. The length of the conductors 2 and 3 will depend upon the length of the blocks established on particular railroads or particular portions of railroads, blocks varying in length under different conditions.

Branched off from each conductor 2 and 3 are other conductors 4 leading to contact terminals or blocks 5 in the path of a collecting member 6 carried by a car or train. The blocks 5 may be located at any desired point but preferably are mounted on the cross ties upon which the rails 1 are laid, these ties being indicated at 7 and furthermore it is usually desirable to mount these blocks 5 between the rails 1 of a track. Usually these blocks 5 are spaced apart a distance about equal to the separation of every third tie, but this distance is not at all fixed, and the blocks may be separated to a greater or less extent as desired. The blocks 5 are arranged in regular series in line one with the other and the series of blocks are generally parallel with the rails 1, but the alternate blocks are connected to the respective conductors 2 and 3 so that considering any particular block as No. 1, the third, fifth, seventh and like odd numbered blocks will be connected to one conductor while the even numbered blocks will be connected to the other conductor. Since the blocks 5 are comparatively close together and the sectional conductors 2 and 3 may each be a mile or more in length, although sometimes only a fraction of a mile in length, it will be seen that there are many blocks 5 for each conductor section 2 and 3. The collector member 6 need only be long enough to bridge the distance between two adjacent blocks of the same conductor thereby including an intervening block of the other conductor at all times. The member 6 is therefore at all times in bridging relation to the overlapping conductors 2 and 3.

In Fig. 1 the car or train is symbolized by a single wheel 8 which is assumed to be electrically connected by a conductor 9 to an intermediate point of a battery 10 or other source of electric energy upon the car or train. Opposite ends of the battery 10 are connected by conductors 11—12 to respective terminals 13—14 in spaced relation and adapted to be engaged by a vibratory terminal 15 under the control of actuating mechanism symbolized by the rectangle 16 which may be considered as indicative of any suitable mechanism for vibrating the contact 15 at regular intervals of say one or two seconds, but it will be understood that any suitable or desired time periods of operation may be chosen as conditions may warrant. There are numerous mechanical and electrical known devices capable of

causing the vibratory movement of the contact 15 and consequently it is not deemed necessary to show in detail any such structure. The arm 15 is connected through a conductor 17 to a time mechanism 18 permitting an engine man to cut out the train carried circuits for a short time interval but as this structure forms no part of the present invention any detail showing or description thereof has been omitted. From the cut-out 18 there leads a conductor 19 to relay magnets 20 and these magnets are connected by a conductor 21 to the collecting brush or shoe 6. The relay 20 has an armature 22 coupled by a conductor 23 to a battery 24 or other source of electric energy and this battery is in turn coupled to a controlling mechanism 25 for the brakes or power side of the locomotive or electric motor, or both, and from this controlling mechanism there leads a conductor 26 back to a contact terminal 27 forming part of the relay 20. The arrangement is such that whenever the relay magnets 20 are energized the circuit including the battery 24 is closed and the steam or electric current as the case may be is cut off, or the brakes are applied, or both operations take place in accordance with the equipment of the car or train, the particular arrangement of these parts not being material to the present invention.

By providing the overlapping conductors 2 and 3 with their terminal studs or blocks 5 trains can never approach closer than approximately half the length of the block section while with ordinary sectional conductors in lineal arrangement instead of in overlapping arrangement trains may under some circumstances approach so closely as to make it impossible to stop the trains without collision. By providing each train carried primary circuit with a pole changer operating at short intervals there is always the assurance of the current sources on two approaching trains being coupled to the completed circuit in the same sense before the train can enter the danger zone or when brought into dangerous proximity to a material extent. It is an easy matter to adjust the pole changing mechanism on the several trains to operate at different time periods so that the possibility of synchronism is avoided.

It will be found in practice that the terminal blocks 5 may be made of iron and to insure good insulation may be mounted each in a block 28 of insulating material. Each branch conductor may be connected to the respective block 5 through a suitable passage in the insulating block 28. The upper ends of the blocks 5 may extend sufficiently above the respective ties 7 and insulation 28 to be readily engaged by the brush or collecting member 6. The sliding of the contact member 6 over the blocks 5 will main-

tain their exposed surfaces in a bright conducting condition and because of the separation of these blocks and their arrangement one in line with the other, there is no danger of short circuiting the conductors 2 and 3 by fallen branches or brush or pieces of wire or track spikes or any such cause. And at the same time no special covering or guarding for the exposed terminals is necessary.

The track 1 is shown in Fig. 2 as being intersected by another track 29 and in Fig. 3 there is shown in diagram the mechanism designed to cut out the train controlling devices on the passage of a car or train over the intersecting track 29.

It has been found in practice difficult to prevent the short circuiting of the train carried controlling means on the crossing of the train over a track such as shown at 29 and so in accordance with the present invention there is provided a conducting strip 30 of sufficient length to extend along the track 7 to both sides of the track 29, this conducting strip 30 being to one side of the line of terminals 5.

In Fig. 3 is shown a locomotive 31 which may be taken as illustrative as well of an electric locomotive as a steam locomotive, the showing however being that of a steam locomotive. Carried by the locomotive and preferably by the firebox thereof is a brush 32 adapted to engage the strip 30 and this brush 32 is connected by a conductor 33 to one side of a battery 34 or other suitable source of electric energy the other side of which is connected to magnets 35 controlling an armature 36 which in turn controls a valve 37 designed to admit air to or cut off air from a cylinder 38 having therein a piston provided with a piston rod 39 acting as a cut out and carrying a contact member 40 acting as a bridging means designed to close the circuit between circuit terminals 41 which may be introduced into the conductor 21 of the engine carried power and brake controlling devices. Of course the terminals 41 may be introduced at any point in the circuit on the car or train. From the magnet 35 there leads a conductor 42 which may include another magnet 43 and ultimately is connected to the frame of the engine so that the circuit may be completed by way of the engine wheels and track 1 to the track 29 and thence to the bar 30 and by the brush 32 to the battery 34. The magnet 43 may be in the form of a solenoid and its armature may be connected to a whistle 44 so that by placing the conducting strips 30 at any appropriate point whether approaching crossings or other places where a whistle should be blown and by appropriately coupling the strip 30 to the track 1, the whistle 44 may always be sounded at the proper times without the necessity of attention on the

part of the engine man or motorman. When the engine approaches the crossing track 29 the brush 32 makes contact with the strip 30 and the circuit charged by the battery 34 is closed thus energizing the magnets 35 thereby causing an attraction of the armature 36 and the opening of the valve 37 admitting air to the cylinder 38 and so causing the actuation of the piston rod 39 in a direction to carry the bridging conductor 40 away from the contacts 41 thus rupturing the circuit of the conductor 21 or whichever conductor the terminals 41 may include. Now even though the contact members 6 engage the track 29 and so cause a short circuit through the engine carried devices this circuit is broken at the terminals 41 and so the short circuit at the track is immaterial.

What is claimed is:—

1. In a system of train control, two sectional conductors with the meeting ends of the sections of one of the sectional conductors intermediate of the meeting ends of the sections of the other sectional conductor and the sections having exposed contact terminals arranged in line with the contact terminals of one conductor alternating with those of the other.

2. In a system of train control, two sectional conductors with the meeting ends of the sections of one of the sectional conductors intermediate of the meeting ends of the sections of the other sectional conductor, and the sections having exposed contact terminals arranged in line with the contact terminals of one conductor alternating with those of the other, and a continuous conductor co-extensive with the combined sectional conductors.

3. In a system of train control, two sectional conductors with the meeting ends of the sections of one of the sectional conductors intermediate of the meeting ends of the sections of the other sectional conductor, and the sections having exposed contact terminals arranged in line with the contact terminals of one conductor alternating with those of the other, a continuous conductor coextensive with the combined sectional conductors, and electrically actuated train controlling means on each train and circuit connections between each train and the continuous and sectional conductor terminals respectively.

4. In a system of train control, two sectional conductors with the meeting ends of the sections of one of the sectional conductors intermediate of the meeting ends of the sections of the other sectional conductor and the sections having exposed contact terminals arranged in line with the contact terminals of one conductor alternating with those of the other, and a train carried contact of a length to bridge adjacent ter-

minals of the overlapping sections of the two sectional conductors.

5 5. In a system of train control, two sectional conductors along the line of way, a bridging contact for the conductors carried by a train, train controlling means on the train rendered active by the completion of the circuit through one or more of the sections of the sectional conductors, means 10 upon each train for rendering the train-controlling means inactive, and a circuit for actuating the said means, said circuit having terminals, one upon the train, and one along the line of way, said circuit including a train wheel and a traffic rail. 15

6. In a system of train control, a continuous conductor comprising the traffic rails, a conductor comprising two sectional conductors in overlapping relation, train 20 controlling means, a charged partial circuit on each train including a contact bridging adjacent sections of the conductors and controlling the train controlling means, and provided with adjacent circuit terminals, 25 and a charged circuit including means controlling the circuit terminals of the partial

circuit, and also including circuit terminals one on the train and another along the line of way respectively, and one wheel of the train and its corresponding rail. 30

7. In a system of train control, two sectional conductors with the meeting ends of the sections of one of the sectional conductors intermediate of the meeting ends of the sections of the other sectional conductor 35 and exposed insulated contact terminals connected with the sectional conductor and arranged in line with the contact terminals of one conductor alternating with those of the other conductor, the said contact terminals being spaced apart but arranged 40 close enough to have adjacent terminals of both conductors bridged by a train carried collector.

In testimony that I claim the foregoing 45 as my own, I have hereto affixed my signature in the presence of two witnesses.

ALFRED MINNICK.

Witnesses:

G. W. BUSH,

M. M. KELLIHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."