G. W. NISTLE, B. W. BRADY & E. INSKIP.

SWITCH LOCKING SYSTEM FOR RAILWAYS.

APPLICATION FILED JAN. 2, 1908.

928,272.

Patented July 20, 1909.

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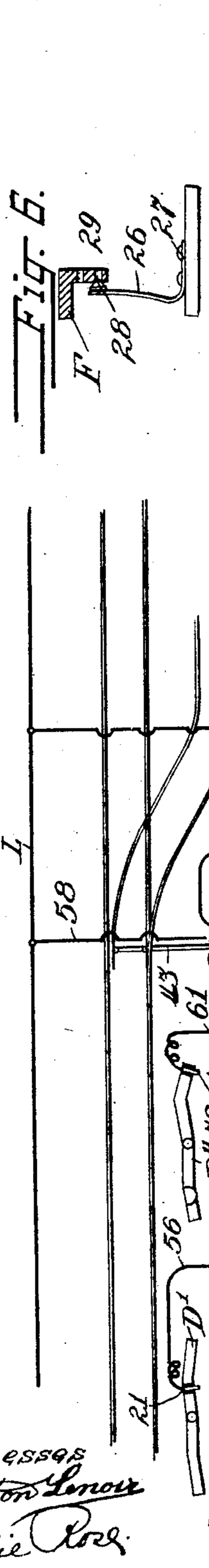

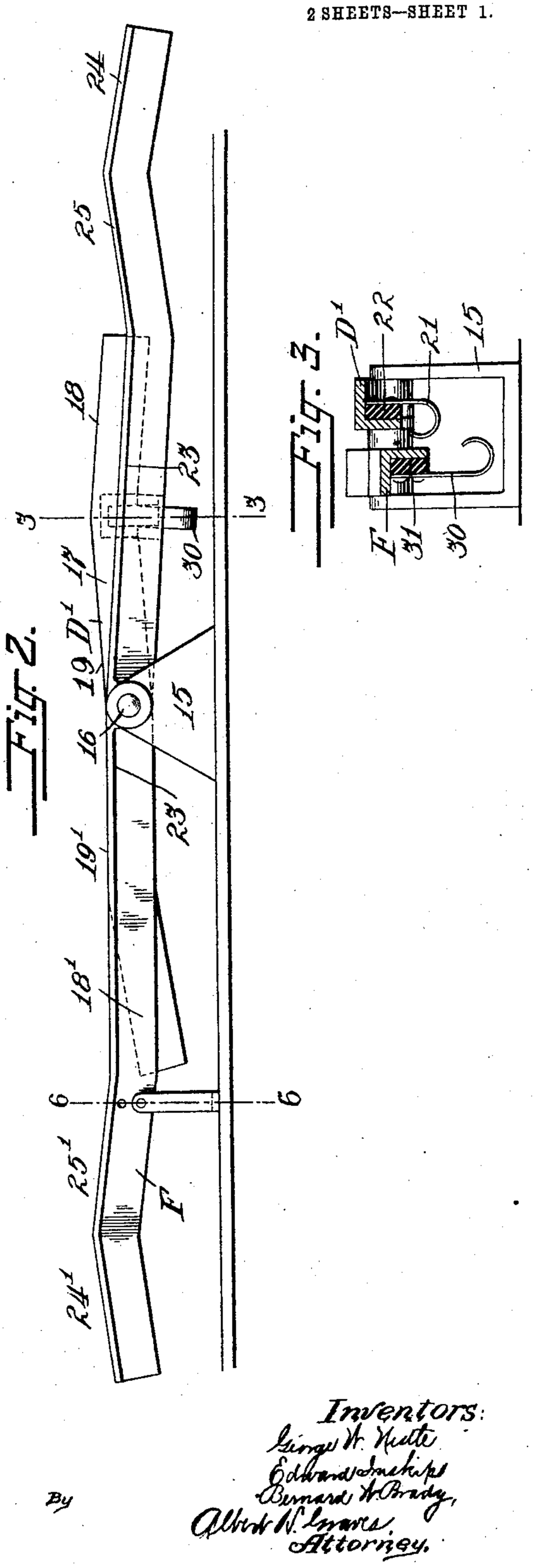

Witnesses
Milton Lenox
Emilie Rose.

By

Inventors:
George W. Nistle
Edward Inskip
Bernard W. Brady,
Albert G. Davis
Attorney.

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Fig. 4.

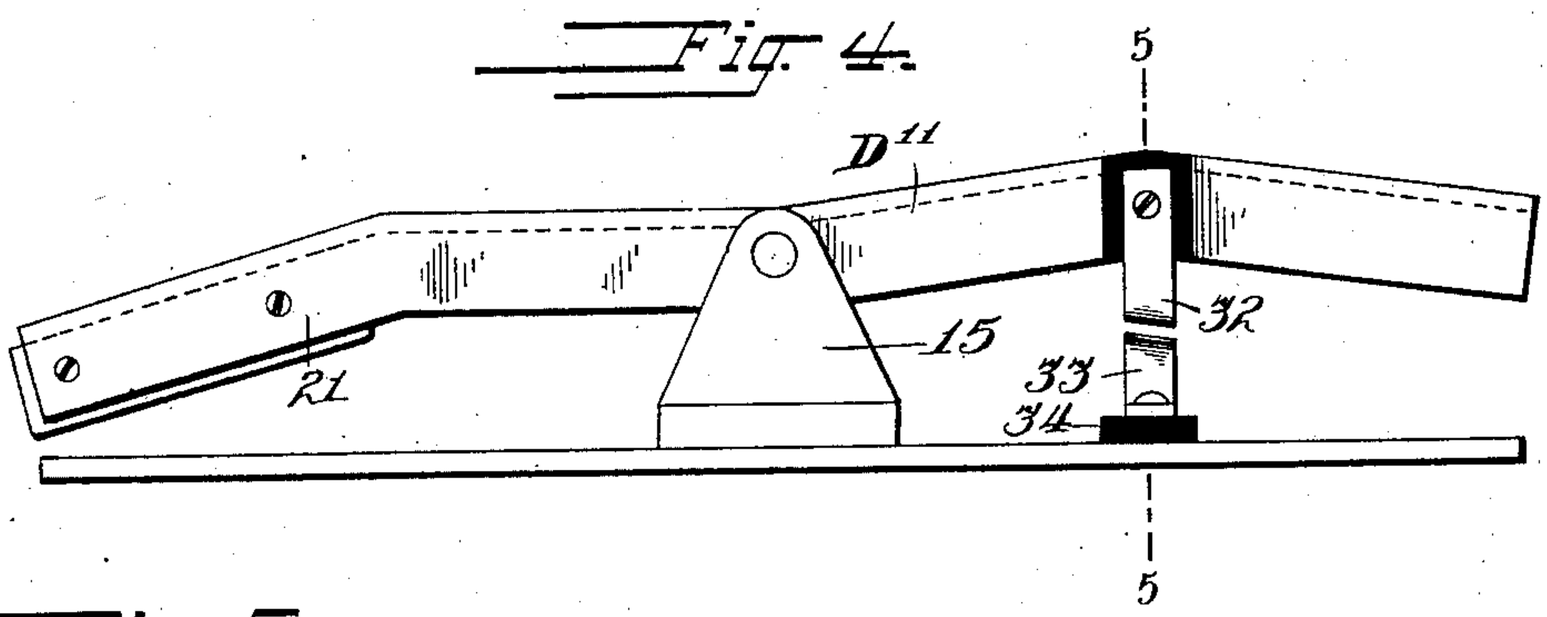


Fig. 5.

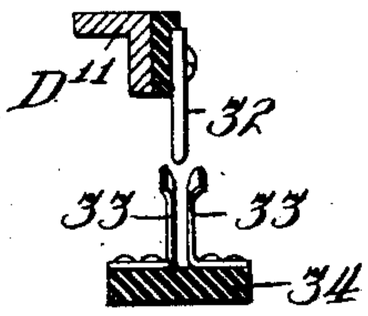


Fig. 7.

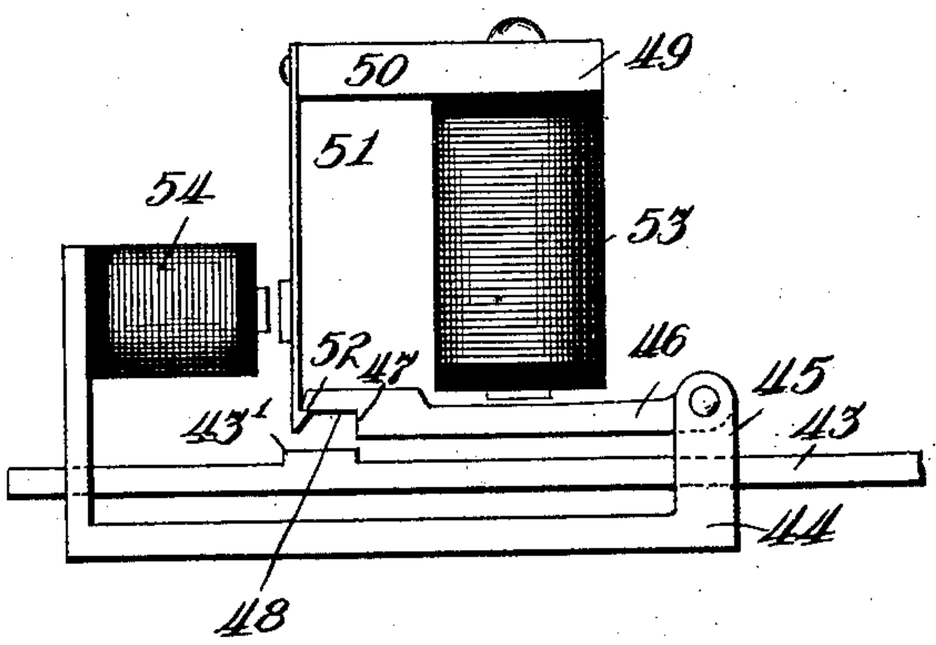
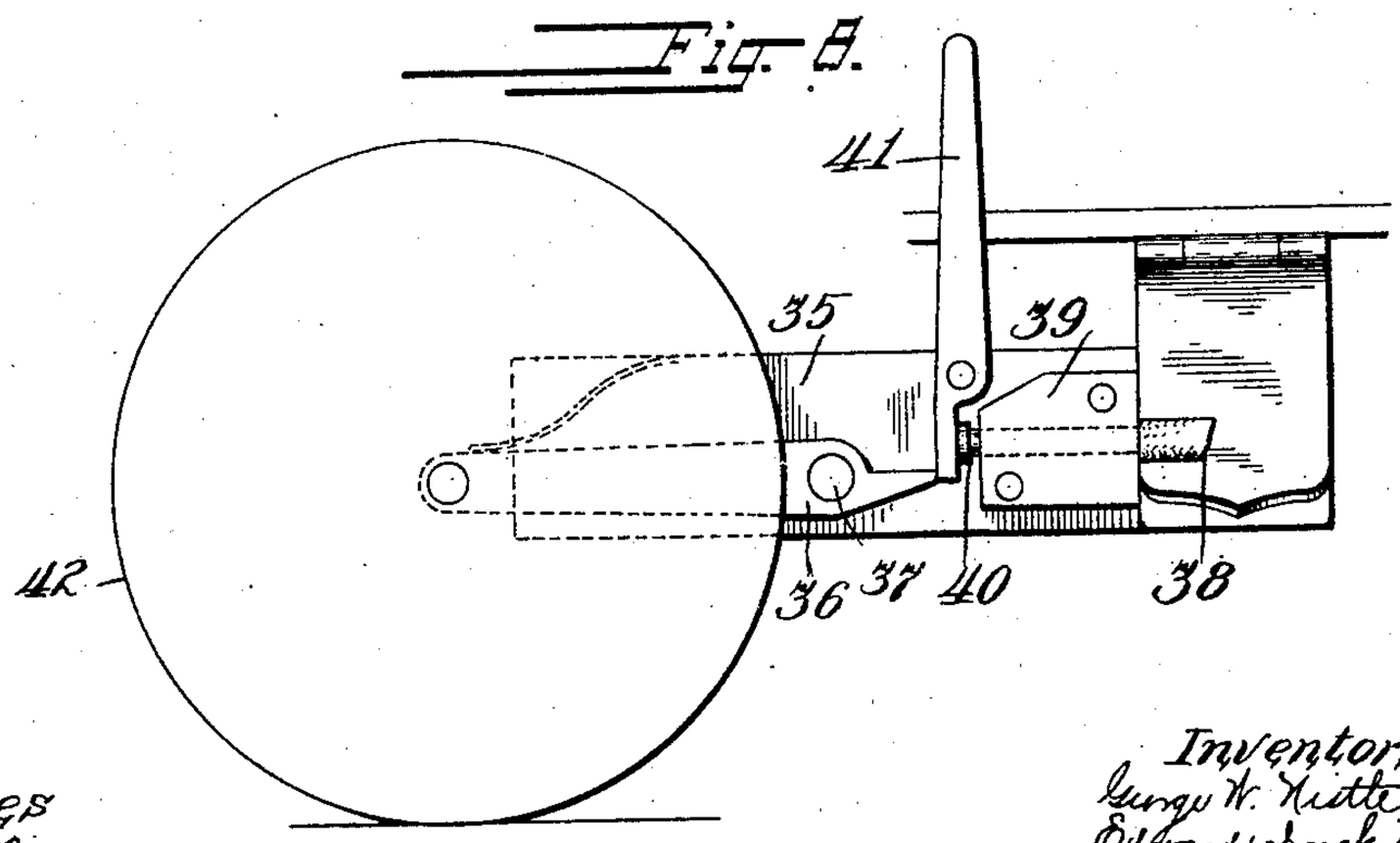


Fig. 8.



Witnesses
Milton Lenoir
Emilie Rose.

Inventors:
George W. Nistle.
Edward Inskip
Bernard W. Brady.
By Albert L. Graves,
Attorney.

UNITED STATES PATENT OFFICE.

GEORGE W. NISTLE, OF NORTH MUSKEGON, MICHIGAN, AND BERNARD W. BRADY AND EDWARD INSKIP, OF CHICAGO, ILLINOIS.

SWITCH-LOCKING SYSTEM FOR RAILWAYS.

No. 928,272. Specification of Letters Patent. Patented July 20, 1909.

Application filed January 2, 1908. Serial No. 408,944.

To all whom it may concern:

Be it known that we, GEORGE W. NISTLE, residing at North Muskegon, in the county of Muskegon and State of Michigan, and BERNARD W. BRADY and EDWARD INSKIP, residing at Chicago, in the county of Cook and State of Illinois, all citizens of the United States, have invented certain new and useful Improvements in Switch-Locking Systems for Railways, of which the following is a specification.

This invention relates to improvements in switch locking systems for railways and refers more particularly to improvements in a system of that general type in which mechanism along the track coöperates with mechanism upon the train to automatically lock and unlock switches at a siding.

The salient object of the present invention is to provide a system which is completely automatic in locking and unlocking switches at predetermined positions of a train, and of reliable construction and operation thereby eliminating "personal equation" to the greatest practicable extent and reducing the danger factor to a minimum.

Other objects of the invention are to provide simple and effective mechanism upon the train for coöperating with the track mechanism; to provide an improved combination of track levers which constitutes an important factor in simplifying such systems and specifically in carrying out the system herein described; to provide a system in which a train approaching a siding automatically locks the switch in order to prevent the switchman opening the latter while the train is going at a high rate of speed and which automatically unlocks the switch just before it reaches the siding to permit the switch to be opened in case the train slows down and desires to enter the siding; to provide a system which is so organized that a backing train will not lock or unlock the switch as it passes over the levers when the system is in normal position and in general to provide an improved system of the character referred to.

The invention resides in the matters hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 shows a diagrammatic embodiment of the system as applied to a siding open at one end and in use with double track railways; Fig. 2 is a side elevation of the combination locking levers shown in normal position, parts being shown in dotted lines; Fig. 3 is an enlarged sectional detail taken through lines 3—3 of Fig. 2 and showing the construction of the contact springs; Fig. 4 is side elevation of the unlocking lever shown in normal position; Fig. 5 is sectional detail taken through lines 5—5 of Fig. 4 and showing the construction of the electrical contacts; Fig. 6 is a sectional detail taken through lines 6—6 of Fig. 2 and showing the construction of the friction latch of one of the combination levers; Fig. 7 is a side elevation of the switch latch controlling mechanisms; Fig. 8 is a side elevation of the contact wheel upon train.

In carrying the present invention into effect we employ a novel type of circuit controlling track instruments, each of which instruments has as its important feature a lever carrying contact making device pivoted between its ends and provided with one or more tread surfaces inclined relatively to the horizontal so that as the lever is encountered by the wheel upon the train it will be oscillated. In the present system a combination set of levers is shown for locking the switches which in the present instance consist of two levers pivoted adjacent to each other and each provided with electrical contacts adapted for closing a circuit when the levers are oscillated, in the proper directions relatively to each other. For controlling the unlocking circuit where only one switch has to be locked or unlocked we provide a single lever which is adapted when depressed at its forward end to momentarily close circuit controlling mechanism which unlocks the switch.

It might be here stated that the unlocking lever is placed close enough to the switch so that a train approaching at a high rate of speed will have ridden by the entrance to the siding before the switchman can open the switch even though the latter is unlocked. On the contrary if the train desires to enter the siding it will slow down after it has unlocked the switch in order to permit the switchman to open the latter, thus eliminating, of course, any danger of derailing the train while going at a high speed.

Inasmuch as the locking and unlocking levers are differently constructed and these differences involve different operations and

constructions, these levers will first be described.

Referring to Fig. 2 the levers there shown are designated D′ and F respectively. Each lever is pivotally mounted at 16 to a common base plate 15 adapted to be secured to a cross tie or other suitable support upon the road bed. Describing lever D′, it is desirably made of angle iron so as to be both light and strong and comprises a central portion 17, oppositely downwardly inclined top tread surfaces 18, and 18′ and downwardly inclined converging intermediate tread portions 19 and 19′. This lever is weighted at its rear end 18′ so as to have its forward end normally elevated and is so supported relatively to the line of travel of the controller wheel which actuates the lever that it will be oscillated by the traverse of the wheel there over. Upon the forward end of this lever is a hook shaped spring contact 21 which is insulated from the main body of the lever by an insulating block 22 and is adapted to be connected to the electrical conductor as will hereinafter appear. From the foregoing it will be seen that when an advancing train passes over this lever it will depress the forward end thereof, thus forcing the contact 21 downwardly. After the train has passed over the lever the latter will return to its normal position by gravity. Describing now the coöperating instrument F, this lever comprises the central portion 23, downwardly inclined end tread portions 24 and 24′ and downwardly inclined converging intermediate tread portion 25 and 25′. The position of this lever is controlled by a friction latch mechanism adapted to hold the lever yieldingly in either of its two positions in which it happens to be left. This friction latch mechanism comprises a spring plate latch 26 secured at 27 to a base plate and having a conical inclined engaging end 28 which coöperates with corresponding recesses 29 formed in the side face of the lever F and at suitable points corresponding to the two positions of the lever. Upon the forward end of lever F is fixed a spring contact 30 similar to the contact 21 and insulated from lever by block 31 in exactly the same manner as the spring contact 21 upon the lever D′. The contacts 21 and 30 are arranged to engage each other when the forward end of the lever F is elevated and the forward end of the lever D′ is depressed. It is to be further noted that these levers are so constructed that when the forward end of the lever F is forced downwardly by a backing train, the circuit contacts 30 and 21 will not engage each other even when the forward end of the lever D′ is depressed.

In Fig. 4 is shown an instrument designated D″ in the diagram. The general construction and shape of this lever is, or may be, precisely the same as that of instrument D′, with the exception of the contact at its forward end hereinafter described. This lever is similarly mounted on a base 15 and is weighted at its rear end so as to tend to return it to normal position by gravity. This instrument is employed for momentarily closing the circuit when the controller wheel is passing over its forward end. To this end the forward end of lever carries a contact plate 32, insulated from the body of the lever and adapted to coöperate with a pair of contact plates 33 mounted upon a suitable fixed support 34 below the lever. The arrangements of these parts are shown clearly in Figs. 4 and 5.

Next describing the controller wheel and its associated mechanism and referring to Fig. 8, upon a suitable part of train, as for example, upon the journal box of one of the axles of the tender is mounted a frame designated as a whole 35, which in turn carries a lever 36 pivotally mounted between its ends, as indicated at 37. The pipe 38 connects and leads from the train pipe and extends through a suitable block 39 upon the frame 35 and terminates in a cap 40 controlled by an upright lever 41 pivoted upon the frame 35. Upon the longer end of the lever 36 is mounted a controller wheel 42 which coöperates with the several levers of the track instruments hereinbefore described. This controller wheel is provided with a relatively wide tread of sufficient width to simultaneously engage two of the levers of the track instruments when the latter are arranged in overlapping relation to each other as in case of levers D′ and F. While the pipe controlling mechanism has nothing to do with the system herein described, yet it is thought advisable to show this type of controller wheel inasmuch as such a construction may also be used in a blocking system covered by a companion application.

Describing now the switch controlling latches and their respective magnets and referring to Fig. 7, 43 designates a switch bar having an upstanding lug 43′ the switch power being adapted to reciprocate with the opening and closing of the switch as shown clearly in Fig. 1. Upon an upstanding arm 45 of a suitable support 44 is pivotally mounted a relatively large latch 46. This latch is provided at its forward end with a shoulder 47 and is adapted to drop down by gravity and engage the lug 43′ thus preventing the bar 43 from being moved in the direction to open the switch as seen more clearly in Fig. 1. Upon an arm extension 50 of a suitable support 49 is mounted a spring latch 51 which is provided at its lower end with a shoulder 52 which is beveled downwardly at its outer face. This latch is adapted to normally spring inwardly and engage an extension 48 of the lever 46, thus holding the latter in its horizontal position and out of

engagement with the lug 43′. The lever 46 is also controlled by a magnet 53 which when energized will draw the latch 46 upwardly. The smaller latch 51 is controlled by a magnet 54 which when energized will draw this latch outwardly, thus disengaging shoulder 52 from lever 46 and permitting the latter to drop into engagement with the switch bar. It will be seen that when the magnet 53 draws up the lever 46, the latter will wipe by the shoulder 52 of the spring 51 by reason of the bevel on the outer surface of the shoulder 52 before referred to.

Referring to diagrammatic Fig. 1, the system is therein shown as organized for controlling a single way track, that is a track over which the trains normally pass in one direction only, as is usual where double tracks are employed. This view also shows a siding open at one end and provided with a single switch. It is to be observed that the several contact levers are shown in the position they would take after a train has passed over the same and the levers have returned to their normal positions.

Describing the circuits which control the locking devices a train approaching a switch will first ride over the rear end of the lever F thus forcing downwardly the rear end of the lever and raising the contact 30. While the lever F is held in this position by its spring latch at its rear, the forward end of the lever D′ will be depressed thus bringing the contacts 21 and 30 into engagement with each other. This closes a circuit over ground at 55 through contacts 21 and 30 to a conductor 56, secured to contact 21, thence by way of conductor 57 through the magnet 54 and conductor 58, to the feed line L. This circuit will energize the small magnet 54 thus retracting the spring latch 51 out of engagement with the latch 46 and permitting the latter to fall into engagement with the lug 43′. Inasmuch as the magnet controlling the large latch is normally deënergized the latch 46 will remain in its downward position and the switch is thus effectually locked against opening. As soon as the contact wheel 42 of the train has passed over the forward end of the levers D′ and F the circuit which energizes the magnet 54 will be broken between the contacts 21 and 30. This is due to the fact that as hereinbefore described, the lever D′ will return by gravity to its normal position thus elevating the forward end of that lever. The locking latch 46 will, however, remain in its downward locking position until its controlling magnet 53 has been energized. Just before the train reaches the switch, the contact wheel will ride over the single lever D″ and close the circuit through the contacts 32 and 33 at the forward end of this lever. This circuit may be traced as follows: from ground at 59 by way of conductor 60 to the stationary contact 33, thence by way of contact 32 to conductor 61, through magnet 53 to conductor 62 to the feed line L. This circuit energizes the larger magnet 53 which will thereupon automatically draw up the locking latch 46 out of engagement with the lug 43′. Inasmuch as the magnet 54 will not at this time be energized, the latch 51 will have sprung back to normal position. It will thus be seen that upon the deënergizing of the magnet 53, the latch 46 will be held out of engagement with the switch bar by means of the shoulder 52 as shown clearly in Fig. 7. After the train has passed over the forward lever D″, the latter will return to its normal position by gravity thus breaking the circuit which energizes the magnet 53. However, as just described the latch 46 will not be permitted to return to locking position.

The system is so arranged that a train backing by the switch will neither lock or unlock the latter. The backing train will first encounter the lever D″ thus momentarily energizing the magnet 53 which, however, will not disarrange the system inasmuch as on the deënergizing of this magnet the latch 46 will drop back into normal engagement with the shoulder 52. When the train reaches the combined levers D′ F, it will first force down the forward end of the lever F, if it is not already in that position, and next depress the forward end of lever D′. But as hereinbefore described this will not close the circuit through the contacts 30 and 21.

It is obvious that the circuits may be so arranged through the contacts of the locking levers D′ F as to control any desired number of switches. In this case, of course, a single lever D′ would be arranged adjacent to each switch. The circuits already described would not thereby necessarily be changed.

We claim as our invention:

1. In a railway track system, the combination with a suitable support, of a pair of contact levers pivotally mounted between their ends, and one or both of said levers provided with oppositely inclined tread surfaces, whereby one or both of said levers are oscillated twice by the traverse thereover of a traversing member carried by a train, and coöperating contact devices controlled by said levers.

2. In a railway system, the combination with a pair of contact levers pivotally mounted between their ends, one of said levers being provided with oppositely inclined tread surfaces whereby it is oscillated twice by the traverse thereover of a traversing member carried by a train, and means for holding said lever yieldably in one or more positions.

3. In a railway system, the combination with a lever pivotally mounted between its ends and provided with two oppositely inclined track surfaces whereby the lever is oscillated and its position changed twice by the

traverse thereover of the traversing member carried by a train, of a second lever pivotally mounted adjacent to said first lever and provided with one or more inclined track surfaces adapted to be oscillated by the traverse thereover of a traversing member carried by a train.

4. In a railway system, the combination with a lever pivotally mounted between its ends and provided with two oppositely inclined track surfaces whereby the lever is oscillated and its position changed twice with the traverse thereover of a traversing member carried by a train, a friction latch mechanism for yieldably holding said lever in one or more positions, and a second lever pivotally mounted adjacent to said first lever and provided with one or more inclined track surfaces and adapted to be oscillated by the traverse thereover of a traversing member carried by a train.

5. In a railway track system, the combination with a lever pivotally mounted between its ends and provided with two oppositely inclined track surfaces whereby the lever is oscillated and its position changed twice by the traverse thereover of a traversing member carried by the train, of a second lever pivotally mounted adjacent to said first lever and adapted to be oscillated by the traversing member carried by a train, and coöperating contact devices connected with the respective levers, said levers being so arranged that the contacts will be closed only by a train passing in one direction.

6. In a railway track system, the combination with a contact lever pivotally mounted between its ends and provided with an inclined track surface, a second lever pivotally mounted between its ends adjacent to said first lever and provided with an inclined track surface beyond either end of the inclined track surface of the first lever, and coöperating contact devices carried by the respective levers, said levers being so mounted as to close said contact devices only when a train passes in one direction over said levers.

7. In a switch locking system, the combination with a length of track, a switch, a switch locking mechanism associated therewith, a pair of levers pivotally mounted between their ends adjacent to each other, and adapted to be oscillated by the traverse thereover of a traversing member carried by a train, normally open coöperating contact devices carried by the respective levers and adapted to be closed only when the levers are oscillated by a train passing in one direction, and circuit connections including said contact devices and controlling said locking mechanism.

8. In a switch locking system, the combination with a length of track, of a switch, electrically controlled switch locking mechanism associated therewith, a pair of levers pivotally mounted between their ends and each provided with one or more inclined tread surfaces whereby said levers are oscillated by the traverse thereover of a traversing member carried by a train, coöperating contact devices controlled by said levers, and circuit connections including said contact devices and electrically controlling said switch locking mechanism.

9. In a switch locking system, the combination with a switch, electrically operated switch locking mechanism associated therewith, a set of normally open train actuated contact devices, circuit connections including said contact devices and controlling the locking of said locking mechanism, a second set of train actuated contact devices also normally open, and circuit connections including said second set of contact devices and controlling the unlocking of said switch locking mechanism.

10. In a switch locking system, the combination with a switch, of electrically operated locking mechanism controlling said switch, a set of normally open train actuated contact devices, means for yieldably holding said contact devices in open position and circuit connections including said contact devices and controlling said locking mechanism.

11. In a railway system, the combination with a length of track, of electrically controlled mechanism associated with said length of track, a set of contact devices adapted to be actuated by a passing train, a friction latch for yieldably holding said contact devices in the position in which they are left after the passage of said train, and circuit connections including said contact devices and controlling said mechanism.

12. In a switch locking system, the combination with a switch, of switch locking mechanism associated therewith, a pair of contact controlling levers pivotally mounted between their ends and adapted to be automatically restored to normal, said levers being provided with one or more contact surfaces whereby they are oscillated by a passing train, coöperating contact devices associated with said levers and adapted to be closed when said levers are oscillated, and circuit connections including said contact devices and controlling said locking mechanism.

13. In a railway system, the combination with a length of track, of train actuated contact controlling levers mounted adjacent to said track, said levers adapted to be oscillated twice by the passage thereover of a traversing member carried by a train, normally open coöperating contact devices controlled by the respective levers, said contacts being so arranged that the passage of a train in one direction only will close said contacts.

14. In a railway system, the combination with a length of track, of a train actuated lever pivotally mounted adjacent to said

track and adapted to be oscillated twice by a traversing member carried by a train, normally open contact devices controlled by said lever and adapted to be closed by the passage of said traversing member over said lever in one direction only, and means for yieldably holding said lever in the position in which it is left after the passage of said traversing member.

15. In a railway system, the combination with a length of track, of a train actuated lever pivotally mounted between its ends and adapted to be oscillated twice by the traverse thereover of a traversing member carried by a train, and electrical contact devices controlled by said lever.

16. In a railway track system, the combination with a length of track, of a train actuated lever pivotally mounted between its ends and adapted to be oscillated twice by the traverse thereover of a traversing member carried by a train, means for yieldably holding said lever in the position in which it is left after the passage of said traversing member, and contact devices controlled by said lever.

17. In a railway track system, the combination with a contact lever pivotally mounted between its ends and provided with a track surface, a second lever pivotally mounted between its ends adjacent to said first lever and provided with a track surface beyond either end of the track surface of the first lever, and coöperating contact devices carried by the respective levers, said levers being so mounted as to close said contact devices only when a train passes in one direction over said levers.

GEORGE W. NISTLE.
BERNARD W. BRADY.
EDWARD INSKIP.

Witnesses for George W. Nistle:
W. C. Nistle,
Chas. I. Giles.

Witnesses for Bernard W. Brady and Edward Inskip:
Emilie Rose,
F. L. Belknap.