

(No Model.)

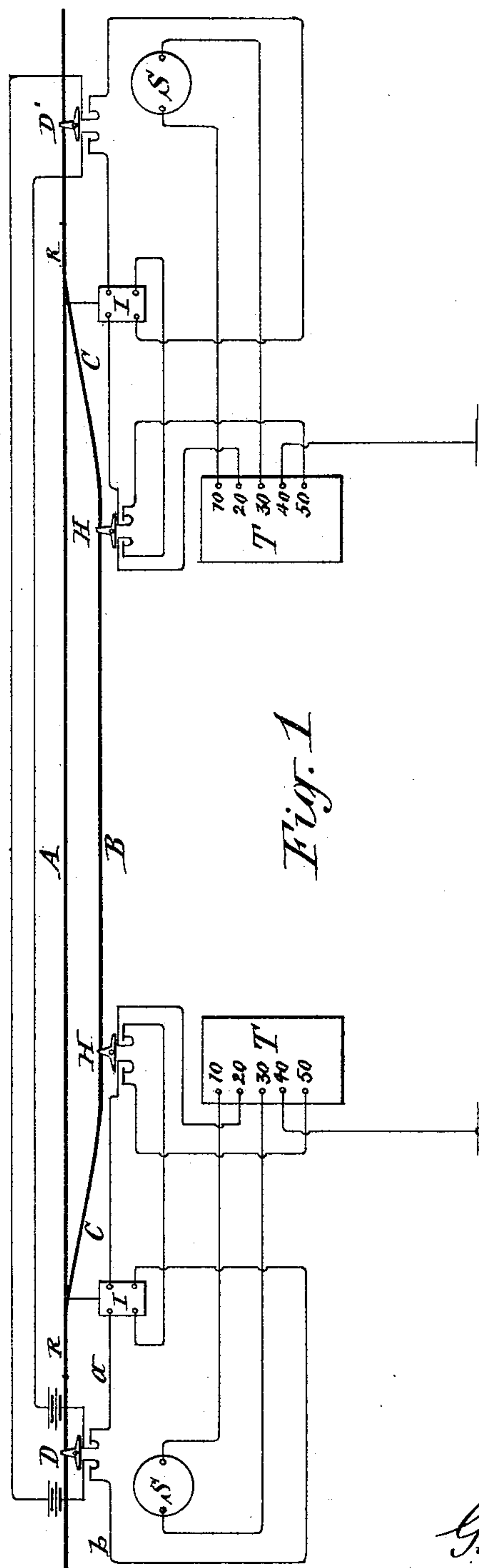
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2 Sheets—Sheet 1.

SWITCH INSTRUMENT FOR RAILROAD SIGNALS.

No. 403,619.

Patented May 21, 1889.



WITNESSES:

*J. J. Laess*

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INVENTOR.

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BY

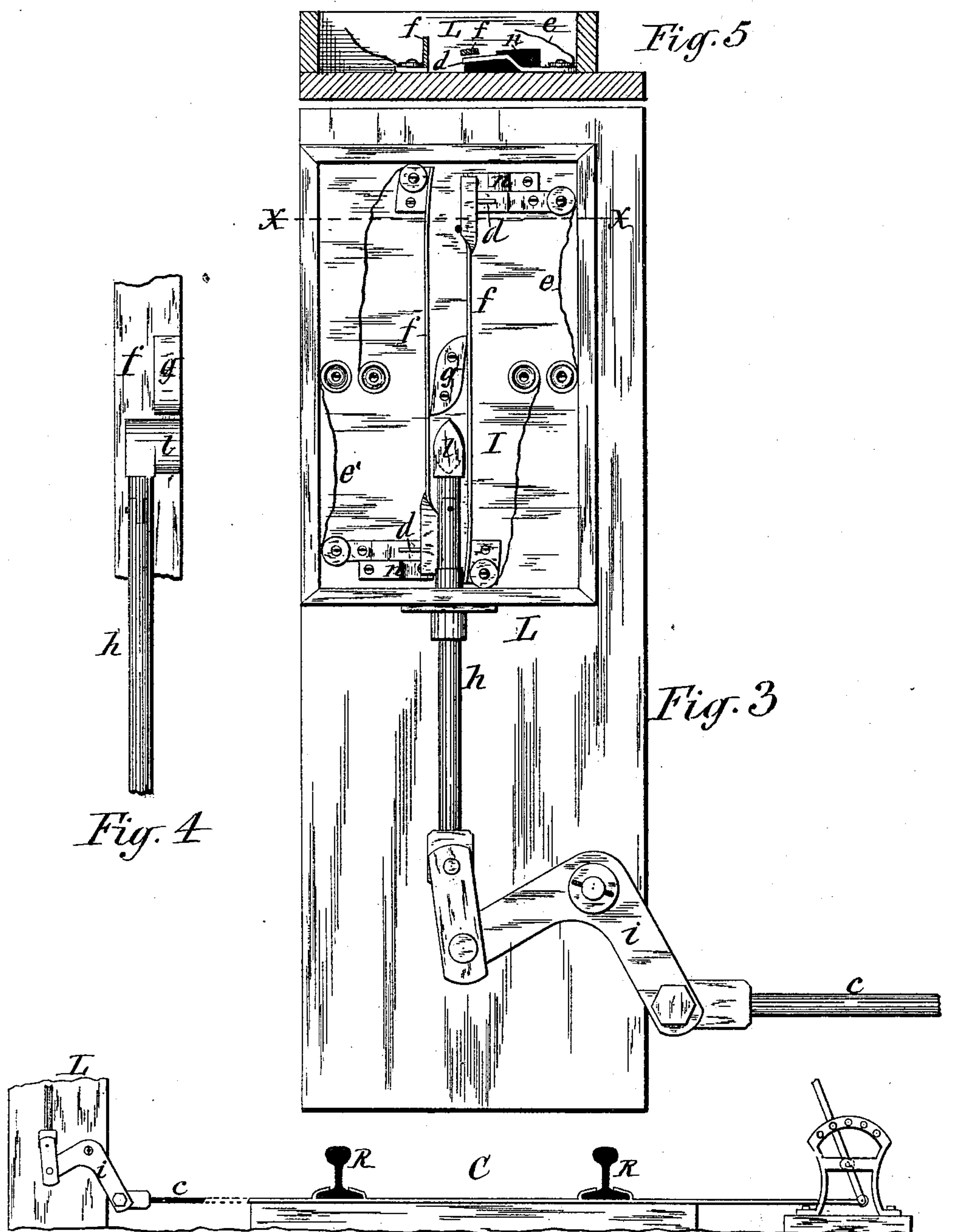
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Fig. 2

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# UNITED STATES PATENT OFFICE.

GEORGE C. STEENBERGH, OF SYRACUSE, NEW YORK.

## SWITCH-INSTRUMENT FOR RAILROAD-SIGNALS.

SPECIFICATION forming part of Letters Patent No. 403,619, dated May 21, 1889.

Application filed July 14, 1888. Serial No. 279,943. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE C. STEENBERGH, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and  
5 useful Improvements in Switch-Instruments for Railroad-Signals, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

10 This invention relates to an electric-circuit making and breaking apparatus designed to be operated automatically with the shifting of the switch-rails of railways, and specially adapted to be used in connection with the  
15 railway signaling apparatus for which J. Harper Gibson has obtained Letters Patent of the United States No. 375,063, dated December 20, 1887, the apparatus shown in said patent employing two circuits with circuit-breakers arranged to be operated, respectively, by the  
20 wheels of cars traveling in opposite directions, a registering mechanism being connected with the two circuits and arranged to receive reverse movements from the same, and the circuit-breakers being arranged a proper distance apart on the road, so that in the passage of a train of cars over one circuit-breaker it will register the number of wheels on one side of the train passed, and in the passage of said  
30 train with the same number of cars over the other circuit-breaker will restore the registering mechanism to its original condition. A visual signal, being operated by the registering mechanism, causes the signal to indicate  
35 "danger" by the first action of the registering mechanism and to return to a position indicating "safety" by the complete reversed action of said registering mechanism.

40 It is obvious that in case one or more cars of the train are switched onto a siding between the points on the road at which the circuit-breakers are located the circuit-breakers passed over by the train after leaving the switch will fail to actuate the registering  
45 mechanism often enough to restore the visual signal to the position indicating "safety."

50 The object of my invention is to obviate the aforesaid defect, and at the same time employ the aforesaid visual signals for protecting trains running on the main track from running onto a siding which by negligence has

been left open to the main track; and to that end my invention consists in the combination, with a block of railway main track and siding connected with the intermediate portion of  
55 said block, two electric circuits, circuit-breakers at each end of the block actuated separately by the cars passing over the block of road, registering mechanism in the circuits and actuated in opposite directions, respectively, by the circuit-breakers at opposite ends  
60 of the block, and signals actuated by the registering mechanism, of two circuit-breakers connected, respectively, with the two circuits and actuated separately and respectively by  
65 the movement of the switch-rod in opening and closing the switch of the siding, and circuit-breakers connected with the same circuits and arranged to be actuated by the cars entering and leaving the siding, all as herein-  
70 after more fully described, and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a diagram of a block of railway with a siding provided with my improved signaling apparatus. 75 Fig. 2 is a view illustrating the connection of the switch-instrument with the switch-rail. Fig. 3 is an enlarged elevation of my improved switch-instrument. Fig. 4 is a detached side view of the plunger-head which operates the  
80 circuit-breakers of the switch-instrument; and Fig. 5 is a transverse section on line *xx*, Fig. 3.

A represents a block of main track of a railway, and B a siding connected with the intermediate portion of said block by a  
85 switch, C.

D and D' denote track-instruments or two sets of circuit-breakers similar to those shown in the patent to J. Harper Gibson, No. 375,063. They are located at opposite ends of the block  
90 of railway to be guarded, and the circuit-breakers of each set are disposed reversed to each other, so as to be actuated separately and respectively by the cars passing in opposite directions. Two separate electric circuits, *a*  
95 *b*, connect, respectively, the circuit-breakers of one set with those of the other set, which are disposed conversely in relation to the first set, so that a car passing the first set of circuit-breakers breaks one circuit, and in passing  
100 over the second set of circuit-breakers breaks the other circuit. The interrupted



currents through the two circuits are utilized to operate, respectively, in opposite directions a suitable registering-instrument, T, an example of which may be seen in the patent to J. Harper Gibson, hereinbefore referred to, but to the specific construction of which I do not limit myself. The movement of said registering-instrument in one direction received by the breaking of one circuit through the instrumentality of the first circuit-breaker registers the number of cars or car-wheels entering the block of road, and the reverse movement imparted to said registering-instrument by the breaking of the other circuit at the second set of circuit-breakers counts off from the register the number of cars or car-wheels leaving the block of road. A suitable visual signal, S, similar to that shown in the patent to J. Harper Gibson, hereinbefore mentioned, is electrically connected with and actuated by the registering-instrument, so that the first movement of the latter sets the signal for "danger" and remains in this position until the registering mechanism is turned back to its original position, when the visual signal is restored to its position to indicate "safety." Consequently, if one or more cars of the train are left in the block of road, the train in leaving said block will fail to restore the visual signal to its position of "safety," and by indicating "danger" it guards against the accident of a following train running into the cars left on the block.

In order to maintain the described signaling apparatus in its proper operative condition in places where a siding or switch is connected with the block of main track and cars are switched thereat from the main track onto the siding, I provide a suitable switch-instrument, I, consisting, chiefly, of two circuit-breakers connected, respectively, with the two circuits *a* and *b*, a reciprocating rod actuated by the switch-rod in opening and closing the switch, and a head on the reciprocating rod adapted to operate the two circuit-breakers alternately during the reciprocating motion of said rod. I prefer to construct said switch-instrument in the form illustrated in Fig. 3 of the drawings, in which *c* represents a rod connected to and extending laterally from the shifting-rail R of the railway-switch C. At the outer end of the said switch-rod *c* is erected a standard or frame, L, from opposite sides of which project toward the center of the frame two metallic rods, *d d*, one of which is electrically connected with the circuit *a* by wire *e*, and the other is connected with circuit *b* by wire *e'*. From opposite ends of the frame project flexible metallic bars *f f*, each of which lies with its free end normally upon one of the rods *d*. The rods *f f* are connected with the circuits *a* and *b* and constitute the circuit-breakers, and between the same is arranged a stationary insulated double guide-cam, *g*, which is elongated in the direction of the

length of the rods *f f* and has its ends beveled toward opposite sides.

*h* is a rod, which is at one end connected with the switch-rod *c* by a bell-crank, *i*, and has its opposite end guided vertically on the frame L, and provided with an insulated head, *l*, of the form of a double wedge, arranged between the two circuit-breaking rods *f f*. The vertical rod *h* receives a reciprocating motion by means of the switch-rod *c* and bell-crank *i* during the operation of shifting the switch-rail to open and close the switch, and said reciprocating motion carries the head *l* first between one side of the guide-cam *g* and adjacent circuit-breaking rod *f*, and then back between the opposite side of the guide-cam and adjacent circuit-breaking rod. Each of the rods *f* is thus momentarily crowded laterally and allowed to spring back to its normal position. Under the free ends of the rods *f f* are inclined insulated blocks *n n*, which project with their deeper portions above the rods *d d*, so that in the lateral movement of the rods *f f* the latter are crowded away from the rods *d d* by the blocks *n n*, and thus the circuits are broken. Besides the said switch-instrument I employ a track-instrument or a set of circuit-breakers, H, similar to one of the track-instruments D, and connected with the same circuits, *a* and *b*. The track-instrument H is arranged at the side of one of the rails of the siding B, near the switch C, so as to cause said track-instrument to be actuated by all the cars or car-wheels entering the siding, and since the said track-instrument is in the two circuits aforesaid the registering-instrument T is actuated likewise by the latter track-instrument.

The operation of my invention is as follows: Assuming a train of cars having entered the block of road, the track-instrument or circuit-breaker D or D' at the end of the block from whence the train has entered has caused the registering-instrument T to register the number of wheels in the train and the visual signal S to be thrown into position indicating "danger." If, then, the train is switched off onto the siding B, the switch-instrument I in opening the switch is caused to add one more impulse to the registering-instrument T, and the track-instrument or circuit-breakers H cause the registering-instrument to receive a number of reversing impulses corresponding to the number of wheels switched onto the siding. If the switching of the cars has been effected by a so-called "running switch"—i. e., by momentum and without running the entire train onto the switch—then the registering-instrument has been retraced to a registry corresponding to the number of wheels left on the main track plus one, which is the registry of the switch-instrument. Then by closing the switch the registering-instrument receives another reverse impulse and the regis-



try corresponds with the number of wheels on the main track. Then in running the train out of the block the second track-instrument on the main track causes the registering-instrument to return to its original position and the visual signal to assume its position to indicate "safety." In case the entire train is run onto the siding the track-instrument H causes the registering-instrument to return within one registry to its original position and the visual signal remains in position to indicate "danger" until the switch is closed and turned to the main track. In running a part of the train out of the siding onto the main track the registering-instrument is caused to register the number of wheels in said part of the train. Then by closing the switch and running the said part of the train out of the block of main track the second track-instrument or set of circuit-breakers on the main track causes the registering-instrument to move back to its original position and allow the visual signal to resume its position to indicate "safety."

25 Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a block of railway main track and siding connected with said block, two electric circuits, circuit-breakers at each end of the block connected with said circuits and actuated separately by the cars passing over the block of road, registering mechanism in the circuits actuated in opposite directions, respectively, by the circuit-breakers at opposite ends of the block, and signals actuated by the registering mechanism, of two circuit-breakers separate and independent of the circuit-breakers at the ends of the block and connected, respectively, with the two circuits and actuated separately, one by the movement of the switch-rod in opening the switch of the siding and the other by the movement of the switch-rod in closing said switch, substantially as described and shown.

2. The combination, with a block of railway main track and siding connected with

said block, two electric circuits, circuit-breakers at each end of the block connected with said circuits and actuated separately by the cars passing over the block of road, registering mechanism in the circuits actuated in opposite directions, respectively, by the circuit-breakers at opposite ends of the block, and signals actuated by the registering mechanism, of two circuit-breakers separate and independent of the circuit-breakers at the ends of the block and connected, respectively, with the two circuits and actuated separately, one by the movement of the switch-rod in opening the switch of the siding and the other by the movement of the switch-rod in closing said switch, and circuit-breakers connected with the same circuits and arranged at the side of the track-rail of the aforesaid siding to be actuated by the cars entering and leaving said siding, substantially as described and shown.

3. In combination with the shifting-rail of a railroad-switch and a rod connected to said rail, two electric circuits, two circuit-breaking bars, each in one of the aforesaid circuits and arranged side by side, a double guide-cam secured stationarily between the said circuit-breaking bars and having its ends beveled in opposite directions from each other, a reciprocating rod, a bell-crank connecting said rod at one end with the switch-rod, and an insulated double wedge secured to the opposite end of the reciprocating rod and adapted to pass between the circuit-breaking bars alternately at opposite sides of the stationary guide-cam during the motion of the aforesaid reciprocating rod in opposite directions, substantially as described and shown.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 26th day of March, 1888.

GEO. C. STEENBERGH. [L. S.]

Witnesses:

C. H. DUELL,  
MARK W. DEWEY.