

(No Model.)

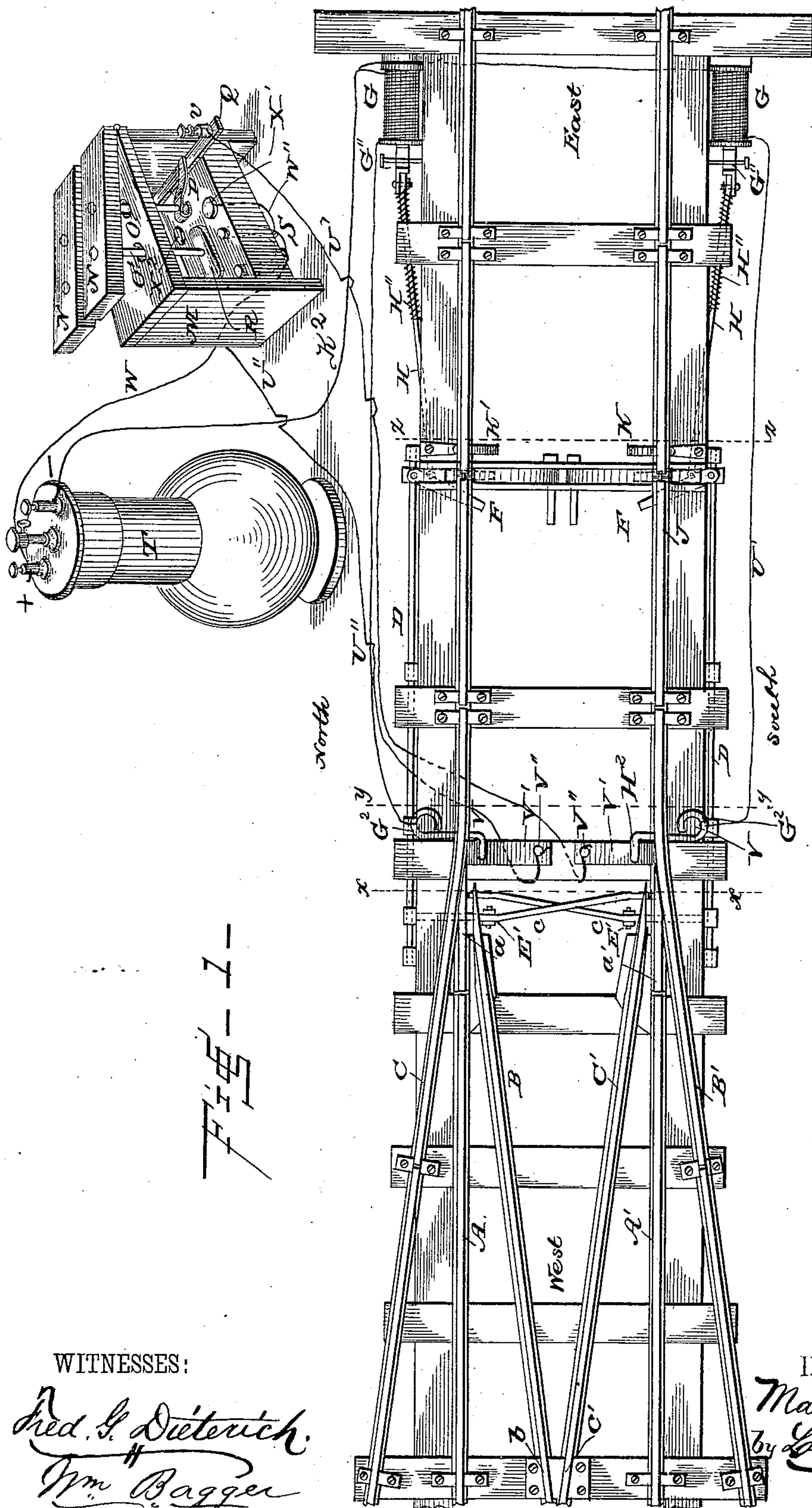
4 Sheets—Sheet 1.

M. MARSHALL.

DYNAMO ELECTRIC RAILROAD SWITCH.

No. 308,269.

Patented Nov. 18, 1884.



WITNESSES:

Fred. G. Dieterich.  
 Jm. Bagger

INVENTOR.

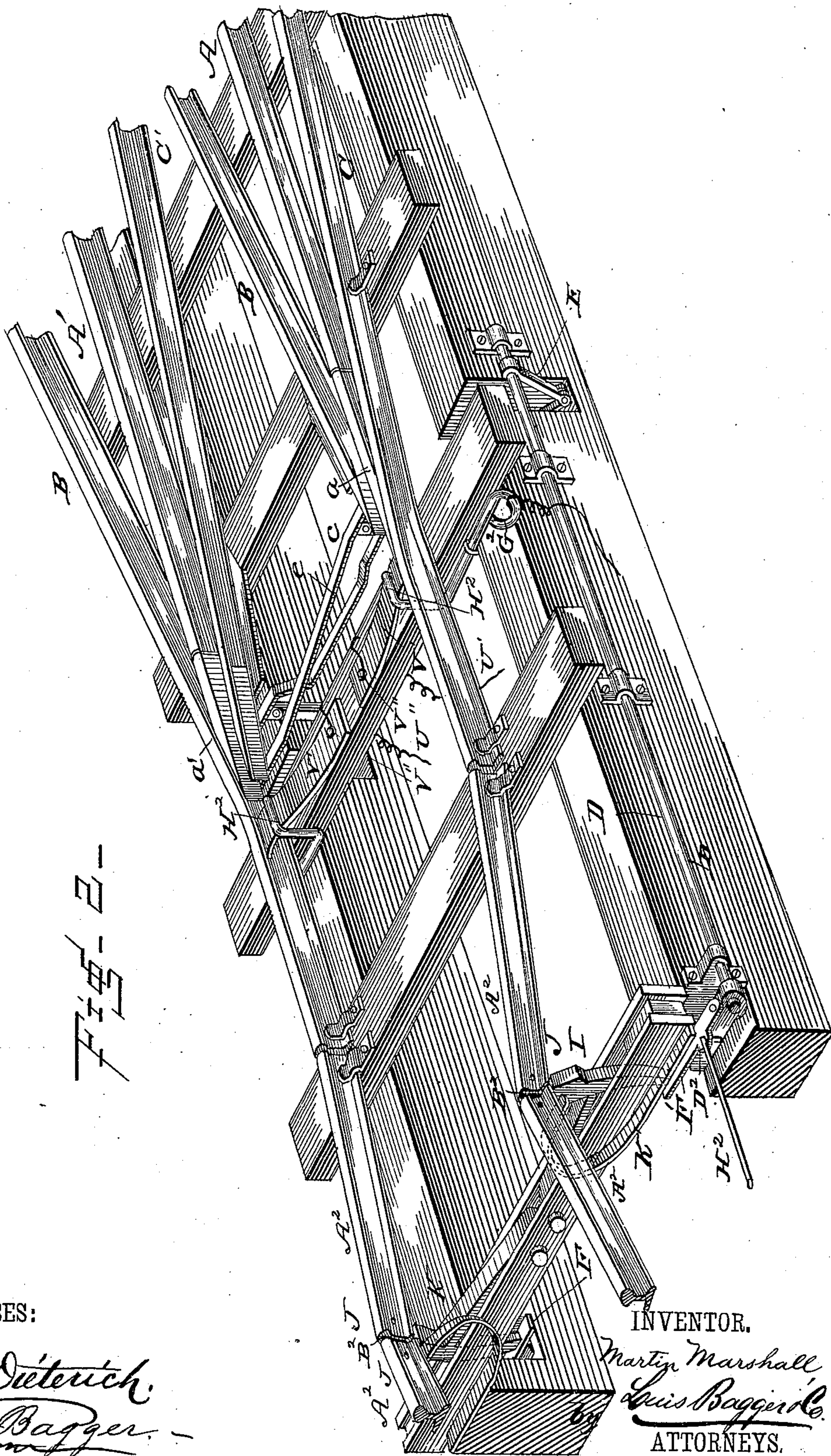
*Martin Marshall*  
by *Louis Boigard*  
ATTORNEYS.



(No Model.)

4 Sheets—Sheet 2.

M. MARSHALL.  
DYNAMO ELECTRIC RAILROAD SWITCH.  
No. 308,269.  
Patented Nov. 18, 1884.



WITNESSES:

*Fred. G. Dietrich.*  
*Wm. Bagger.*

INVENTOR.

*Martin Marshall*  
*Louis Bagger*  
ATTORNEYS.



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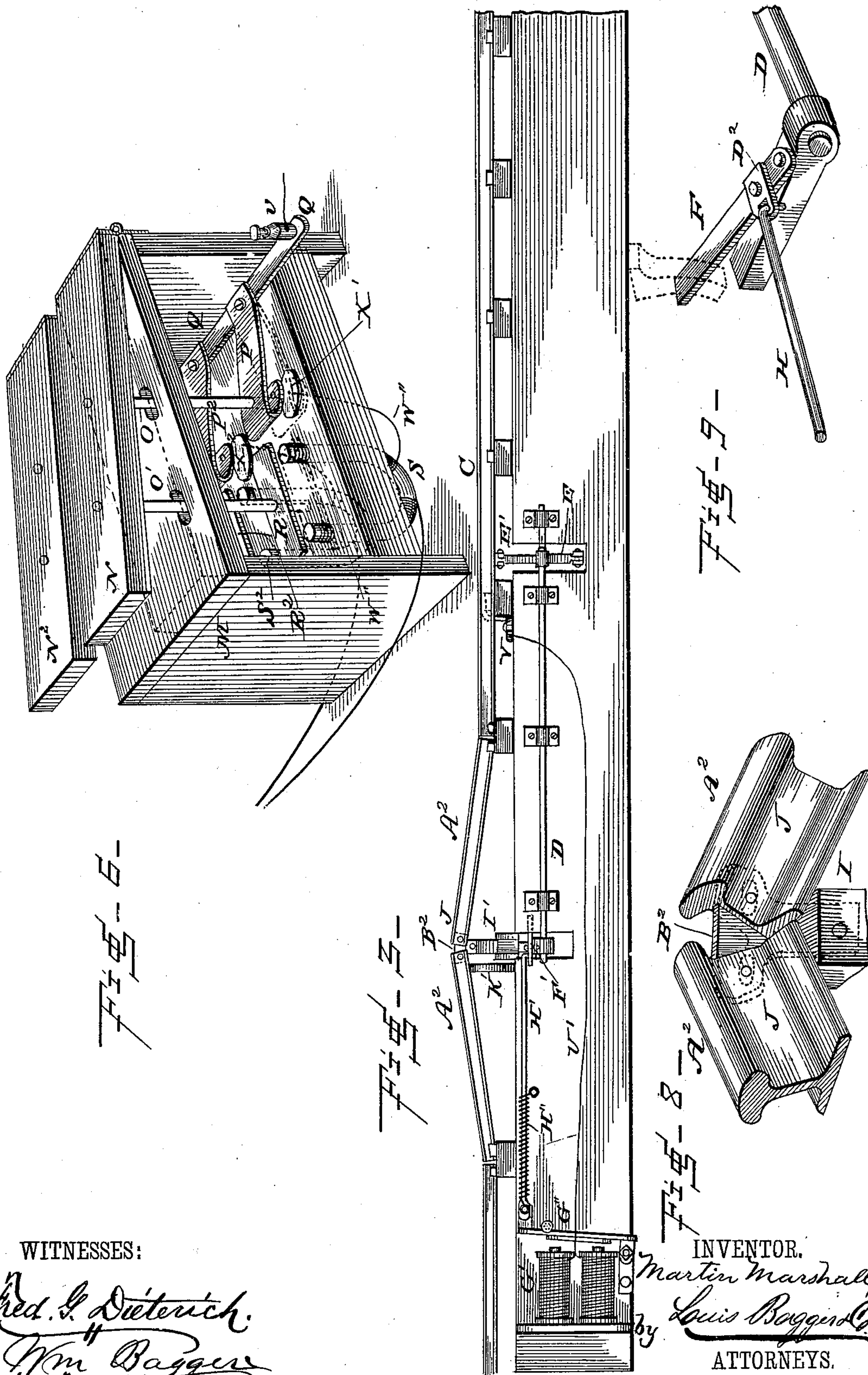
4 Sheets—Sheet 3.

M. MARSHALL.

DYNAMO ELECTRIC RAILROAD SWITCH.

No. 308,269.

Patented Nov. 18, 1884.



WITNESSES:

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(No Model.)

4 Sheets—Sheet 4.

M. MARSHALL.  
DYNAMO ELECTRIC RAILROAD SWITCH.  
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Fig- 4-

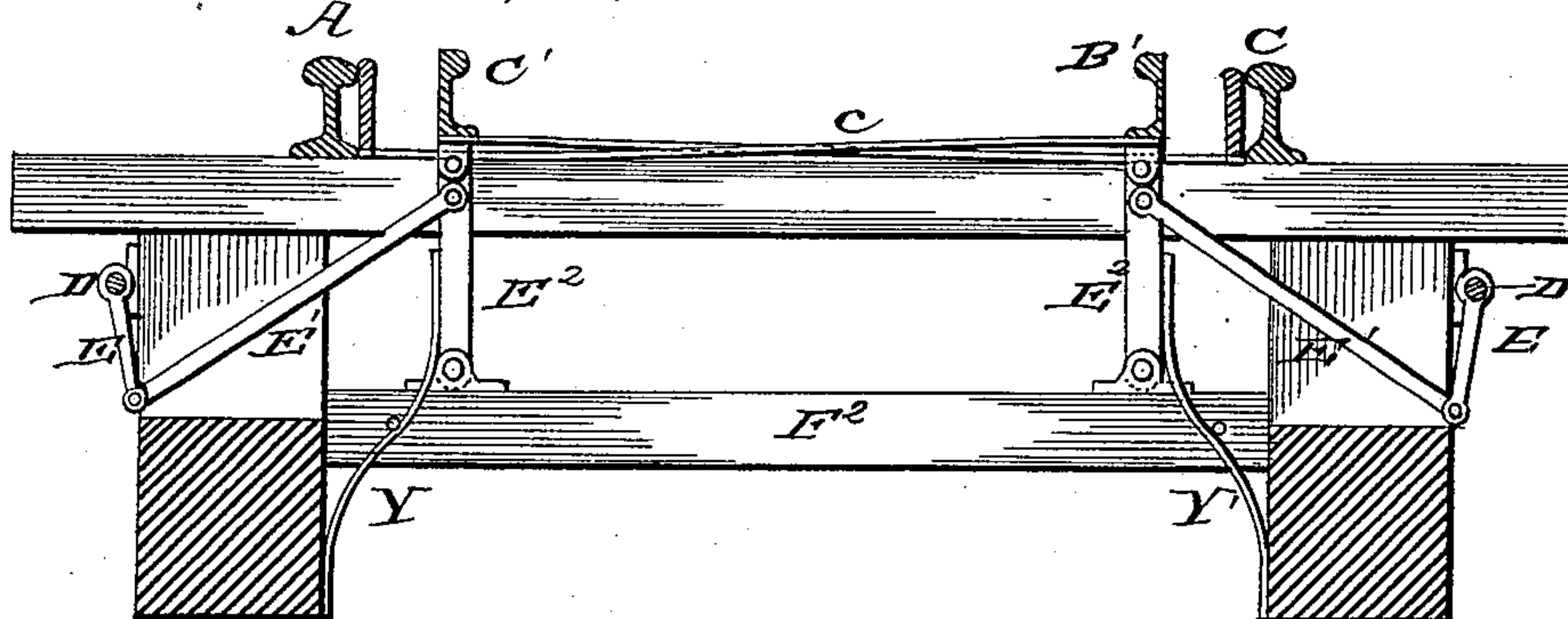


Fig- 5-

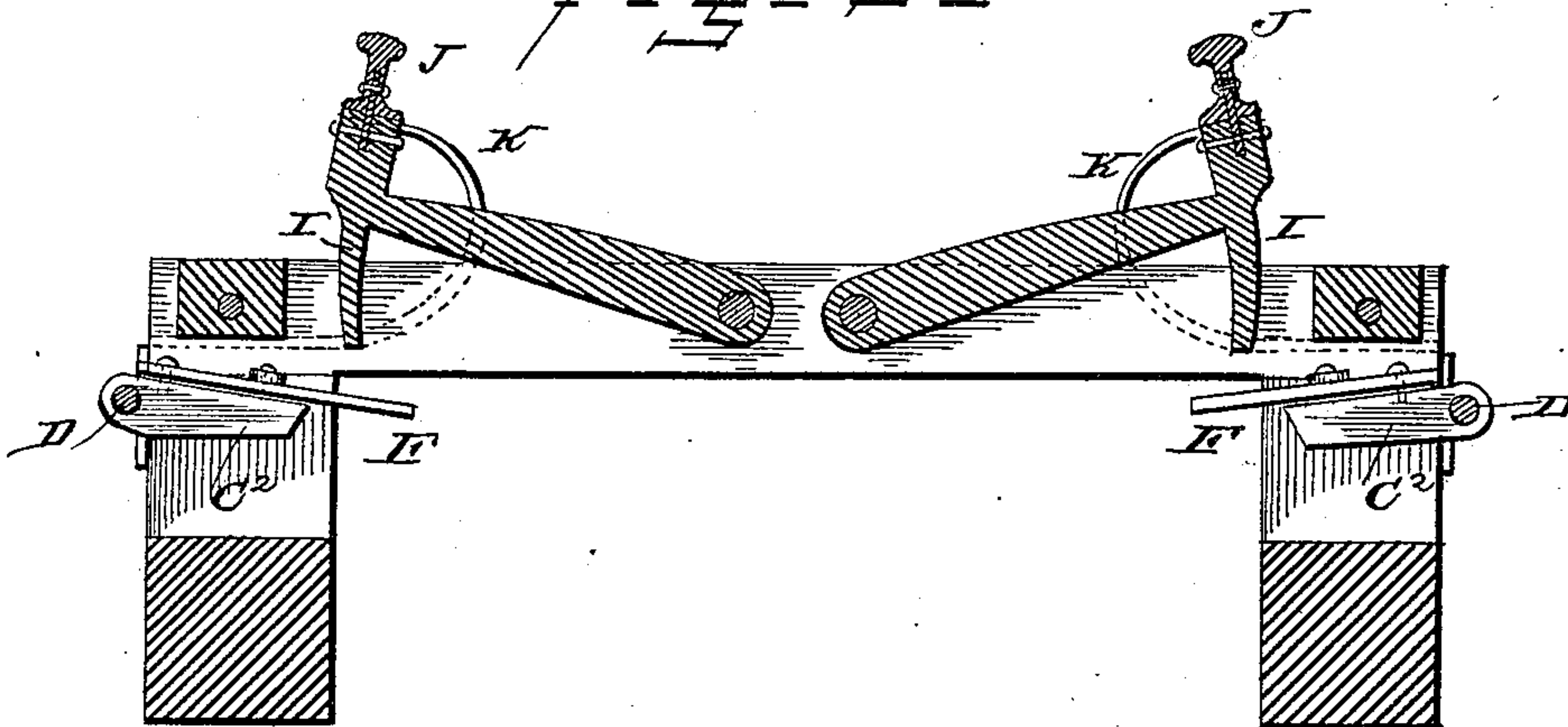
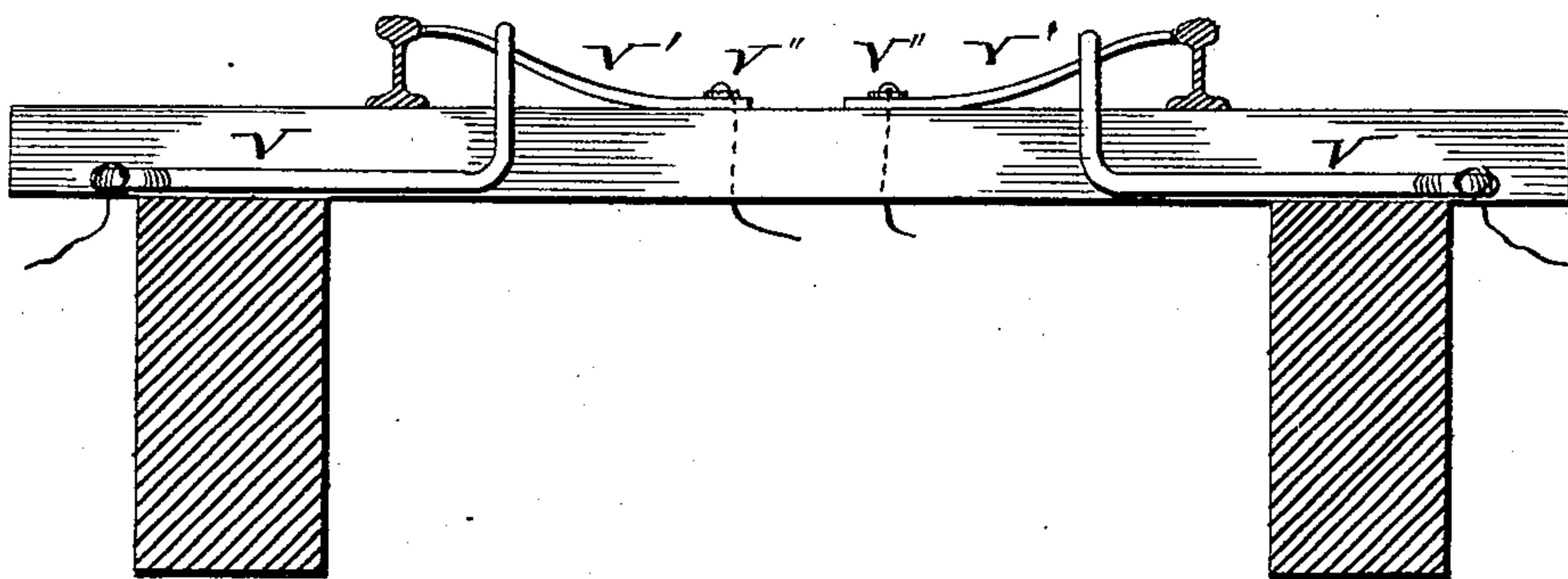


Fig- 7-



WITNESSES:

Wm. S. Dieterich.  
Wm. Bagger.

INVENTOR.

Martin Marshall  
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ATTORNEYS.



# UNITED STATES PATENT OFFICE.

MARTIN MARSHALL, OF JAMESTOWN, NEW YORK.

## DYNAMO-ELECTRIC RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 308,269, dated November 18, 1884.

Application filed May 7, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN MARSHALL, a citizen of the United States, and a resident of Jamestown, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Dynamo-Electric Railroad-Switches; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention has reference to that class of railroad-switches which are operated automatically by the passage of the cars over the track; and it consists, mainly, in an electrical controlling device whereby an operator may cause a train passing over the track to operate or actuate any one of several switches, thereby causing the train to take the desired direction.

The invention further consists in automatic devices for releasing the switches immediately after the passage of the train, thus opening the main line.

The invention further consists in the improved construction, arrangement, and combination of parts for effecting the above results, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a plan view of a track and switches embodying my improvements, showing also the electrical conductors, and showing in perspective a battery and the circuit-controlling device. Fig. 2 is a perspective view of a portion of the main track and the switches. Fig. 3 is a side view of the same. Fig. 4 is a transverse sectional view on the line  $x x$  in Fig. 1. Fig. 5 is a transverse sectional view on the line  $y y$  in Fig. 1. Fig. 6 is a perspective view, on an enlarged scale, of the circuit-controlling apparatus. Fig. 7 is a transverse sectional view on the line  $z z$  in Fig. 1. Fig. 8 is a detail view in perspective of the hinged adjoining ends of the raised portion of the railroad-track, and Fig. 9 is a detail view in perspective of one end of one of the crank-shafts.

The same letters refer to the same parts in all the figures.

I will state at the outset that in order to avoid unnecessary verbiage I shall describe the several rails and switches as being located, respectively, "north," "south," "east," and "west."

A A' designate, respectively, the north and south rails of the main track, at the termini of which are hinged short switch-rails  $a a'$ , which normally connect the said rails with the continuation of the main track, the rails of which, at the switch, diverge respectively in a northerly and southerly direction, as at C and B', so as to form the north and south rails of two switches, the other rails of which, which are pivoted at  $c' b$ , are designated by C' and B, respectively.

J indicates a jointed portion of the rails of the main track, at which two short rails, A<sup>2</sup> A<sup>2</sup>, are hinged in such a manner that their free adjoining ends are capable of moving vertically. The said adjoining ends are connected by means of a T-shaped plate, B<sup>2</sup>, the head of which is provided with slots to receive the pivoting-pins, while the shank of the said plate is pivotally connected with a T-shaped lever, I, pivoted to one of the sleepers near the center of the track. It will be seen that the construction is the same at the north and south rails. The free ends of the jointed rails are normally held in a raised position by means of suitably-arranged springs K.

D D are rock-shafts arranged alongside the track, adjoining the rails of the main track. The ends of these shafts, which terminate at the rail-joints J, are provided with arms or cranks C<sup>2</sup>, to which plates F are pivotally attached. These plates are provided with loops or staples D<sup>2</sup>, connected by pivoted rods H, with the spring-armatures G' of electro-magnets G, located at the sides of the track.

H'' are traction-springs coiled around the said connecting-rods, and attached to the upper ends of the armatures and to the sides of the track, for the double purpose of keeping the spring-armatures, normally off from the magnets and keeping the swinging plates F from under the T-levers I. The proportional arrangements of these parts, however, are such that when the armatures are attracted by the magnets the plates F shall swing under the T-levers I, so that when the rail-joints J are de-



pressed by a passing train the said T-levers shall descend upon the said plates, thus vibrating the rock-shafts. The ends of the rock-shafts, which terminate at the switch, are provided with arms E, connected by links E' with the switch-rails B and C', respectively, the free ends of the latter being mounted upon pivoted links or rods E<sup>2</sup>, mounted upon a cross-piece, F<sup>2</sup>, below the main track. The switch-rail B is connected by a rod or brace, c, with the switch a' of the south main-line rail A', and the switch-rail C' is likewise connected with the switch a of the north main-line rail A. It will thus be seen that when the northern rock-shaft is vibrated the effect will be to throw the switch-rails B a' in a northward direction, thus opening the southern switch or siding, while when the southern rock-shaft is operated the switch-rails C' a will be thrown southward, thus opening the northern siding for the passage of trains.

In the office of the operator whose duty it is to control the switches is arranged a battery, T, and a key-board or frame, M. The latter contains two electro-magnets, S S<sup>2</sup>, the armatures of which are connected by rods O' with the keys N' N<sup>2</sup>, that are hinged to the upper part of the frame. The said keys are also provided with rods O, arranged to bear upon spring conductors or cushions P P<sup>2</sup>, the double function of which is to keep or sustain the keys normally in a raised position and to touch the contact-points X' X<sup>2</sup> when the keys are depressed.

The windings of the electro-magnets are connected, respectively, as follows: One end of the winding of magnet S is connected with one of the poles of battery T, and its other end with the contact-point X'. One end of the winding of magnet S<sup>2</sup> is connected with the binding-screw V'' of a circuit-breaker, which will be presently more fully described, and its other end with the contact-point X<sup>2</sup>. The springs or cushions P P<sup>2</sup> are mounted upon a bar, Q, of copper or some other good conductor of electricity, one end of which is provided with a binding-post, v.

I shall now proceed to describe the circuit-breakers.

V V are well-insulated keepers secured at the sides of the track near the switch, and having loops G<sup>2</sup> and arms H<sup>2</sup>, which latter serve as contact-points for the springs V', which are secured to one of the sleepers by means of the binding-screws V''. The outer or free ends of the springs V' extend nearly to the rail-flanges, and occupy such a position that they shall be engaged by the wheel-flanges of passing trains and be thrown out of engagement with the keepers V.

It has been stated that the magnet S is connected directly with one pole of the battery T. The other pole of said battery has a double or twisted wire or conductor, K<sup>2</sup>, the branches of which are connected each with one end of the winding of one of the electro-magnets G, ar-

ranged at the sides of the track, as heretofore stated. The magnet G at the south side of the track is connected by a wire or conductor, U', with the loop of the keeper of the circuit-breaker at the south side of the track, the binding-screw of which is connected by a continuation of the said conductor U' with the binding-post v of the bar Q. The northern magnet G is connected with the keeper of the northern circuit-breaker, the binding-screw of which is, as has been already stated, connected with one end of the winding of the electro-magnet S<sup>2</sup>.

The switches are held in normal position for keeping the main track open by means of suitably-arranged springs Y Y'. (Shown clearly in Fig. 4 of the drawings.)

The operation of this invention is as follows: Under normal or ordinary circumstances the main line is always open, so that a train running in either direction would continue upon the main line if the electric keys were not disturbed. Now, suppose a train to be coming from east to west, and it shall be desired to switch it off upon the northern siding. The operator will then depress the key N of the electro-magnet S of his instrument, thus closing the circuit, which is as follows: from one end of the winding of magnet S to the pole of the battery T, which is marked +, from the other end of the winding of said electro-magnet to the contact-point X', thence through the contact-spring P, bar Q, binding-post v, and conductor U', to the circuit-breaker V' at the south side of the track, through the keeper of the same, and to the electro-magnet G at the south side of the track, through the windings of the same, and to the pole of the battery marked —, thus completing the circuit, the effect of this being to convert the electro-magnets S and G into active magnets. The former will retain its armature and the latter will attract and retain its armature G'', thus drawing the pivoted plate F under the T-lever I. When the train passes, it will depress the raised jointed portion J of the track, thus causing the T-lever I to strike the plate F and vibrate the rock-shaft D at the south side of the track, the result of which will be to open the northern siding, in the manner which has been already herein described.

If it shall be desired to switch a train off upon the southern siding, the operator will depress the key N<sup>2</sup> of electro-magnet S<sup>2</sup> with a precisely similar result, save that in this case the electro-magnet G at the north side of the track and its attachments will be influenced. The flanges of the wheels of the rolling-stock in their passage will depress the springs V', which form the circuit-breakers, thus automatically breaking the circuit and releasing the armatures from the electro-magnets, so that immediately upon the passage of the train the main line will be open, without the necessity of the care of attendants.

From the foregoing description, taken in connection with the drawings hereto annexed,



the operation and advantages of this invention will be readily understood.

The construction of the device is simple, and it may be applied to railroad-switches 5 without any considerable expense. Under all ordinary circumstances the main line of the track is open, and accidents which frequently result from the neglect or mistakes of switchmen are impossible. The switches may be 10 controlled by an operator located at any distance therefrom, whose duty it is simply to touch the proper key in order to set the desired switch for the passage of trains, the said switch being instantaneously and automatic- 15 ally released upon the passage of the train, so as to open the main line.

It is hardly necessary to state that the construction of many of the parts comprised in this invention is susceptible of numerous 20 modifications; likewise that the device may be equally successfully applied to single switches or to switches of a construction different from the one herein shown; and I desire to have it understood that I reserve to 25 myself the right to all such changes as may be made without departing from the spirit of my invention.

Having thus described my invention, I claim and desire to secure by Letters Patent of the 30 United States—

1. The combination of the switches, the operating devices for the same, the electro-magnets G, the spring-armatures and connecting-

rods, the traction-springs H", and the controlling device comprising electro-magnets, 35 contact springs and points, keys carrying the armatures for the said electro-magnets, and operating-rods for the contact-springs, electrical conductors, and automatic circuit-breakers, all arranged and operating substantially 40 as set forth.

2. The combination, with the switches, arranged and connected substantially as described, of the joints in the main line, the supporting-springs for the same, the T-shaped 45 connecting-plate, the T-levers, the rock-shafts having arms or cranks, the pivoted plates F, the electric controlling device, and connections between the ends of the rock-shafts and the free ends of the switches, sub- 50 stantially as set forth.

3. In an electric switch for railroads, the combination of the raised rail-joints, the rock-shafts having arms provided with pivoted plates, the T-levers, and mechanism for swing- 55 ing any one of the said pivoted plates under its proper T-lever on the closing of the circuit, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature 60 in presence of two witnesses.

MARTIN MARSHALL.

Witnesses:

O. W. COBB,

VICT. LINNANDER.