

(No Model.)

3 Sheets—Sheet 1.

H. C. O. GRUHLKE.  
AUTOMATIC SAFETY RAILROAD SWITCH.

No. 507,495.

Patented Oct. 24, 1893.

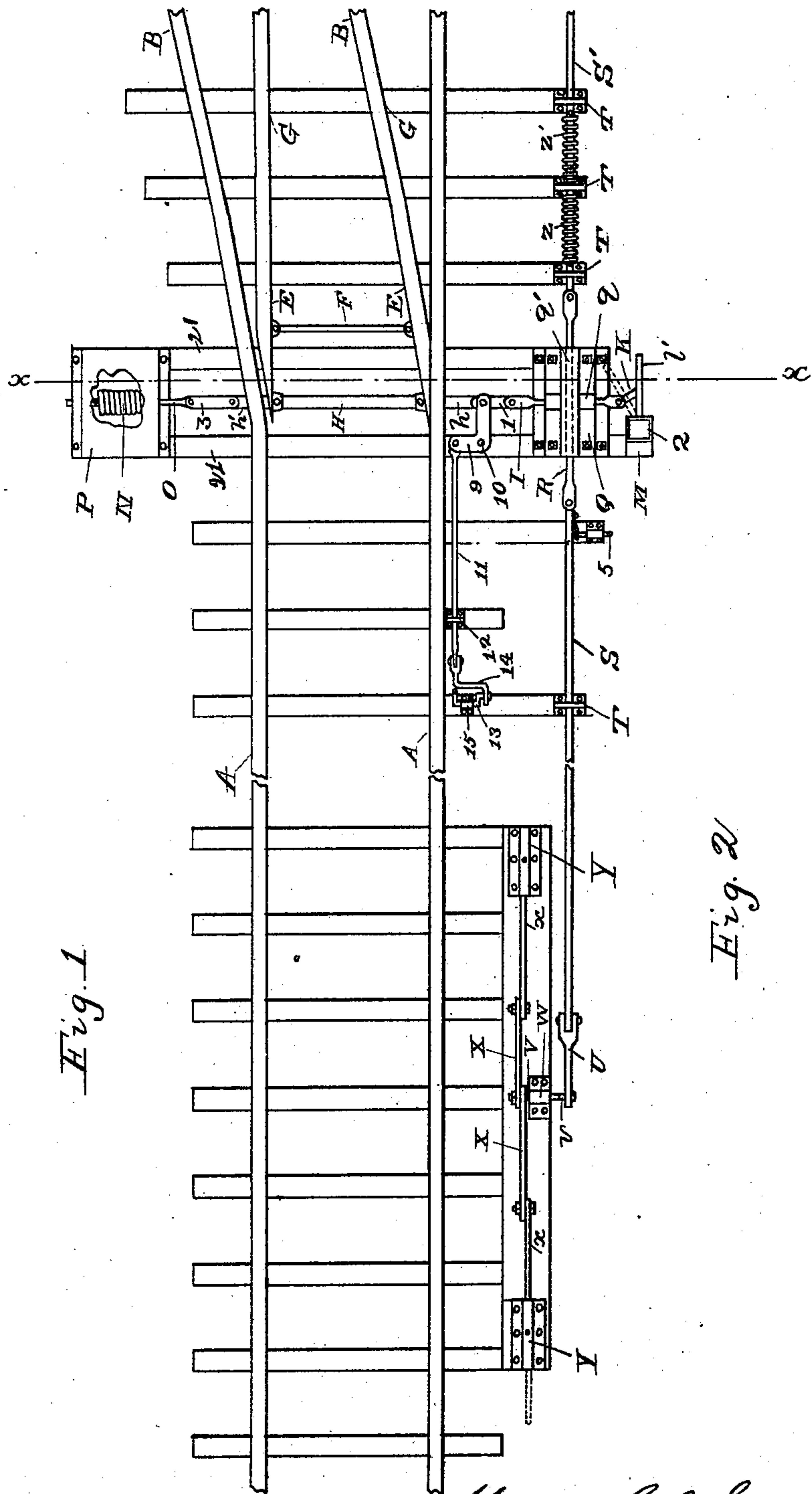


Fig. 1

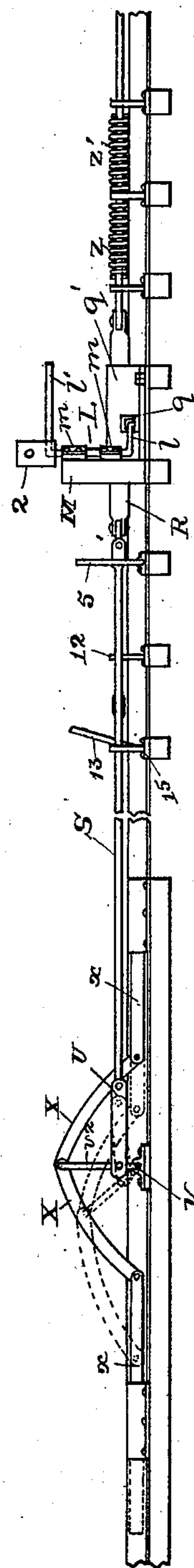


Fig. 2

Witnesses  
Thos. H. Minked  
M. C. MASSIE.

Henry C. O. Gruhlke  
By J. W. Tallmadge  
Inventor  
Attorney

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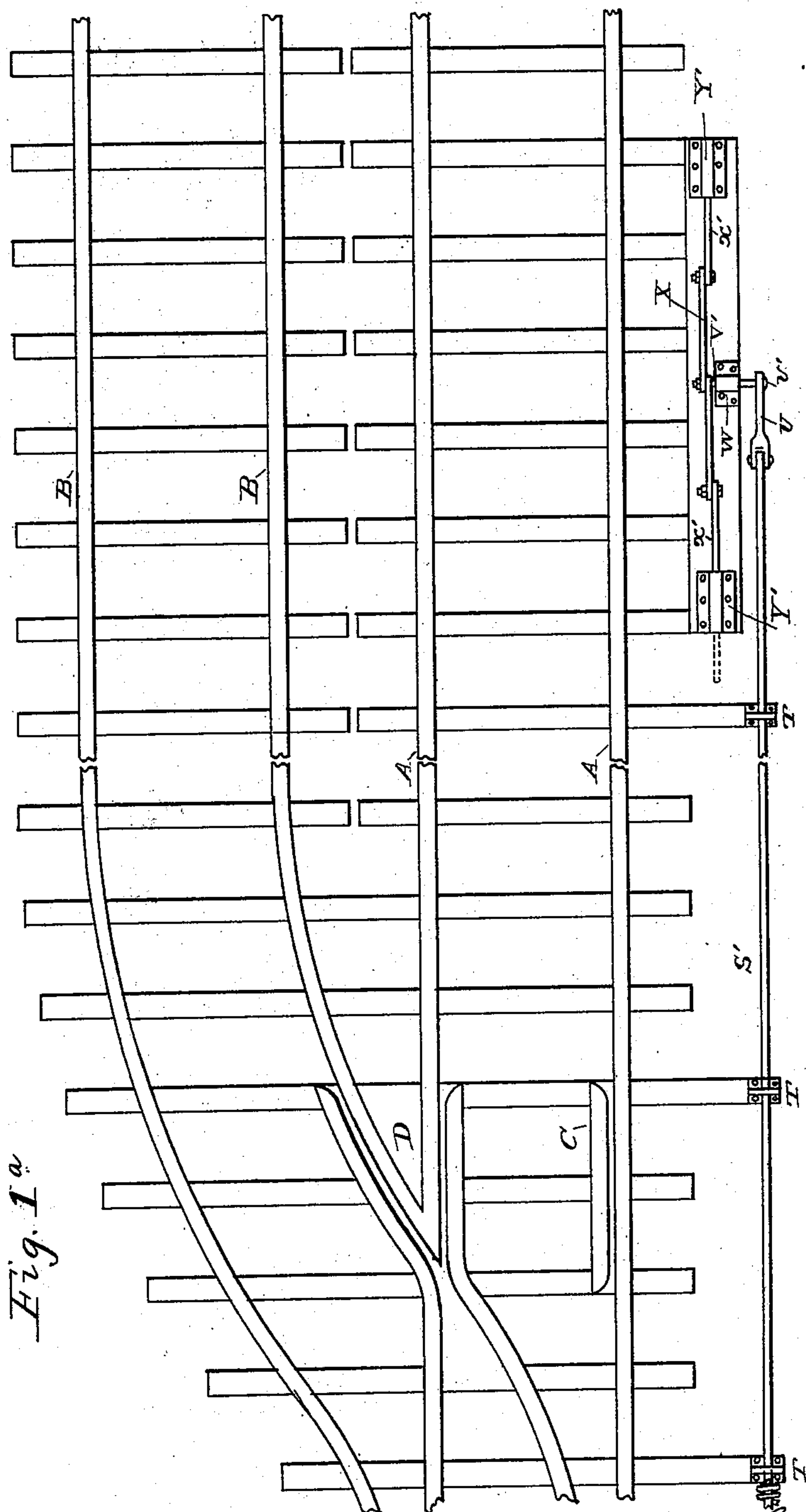


Fig. 1<sup>a</sup>

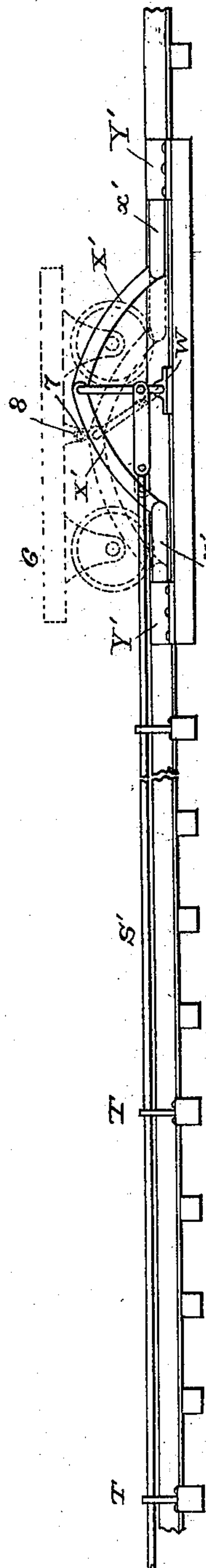


Fig. 2a

Witnesses  
Thos. H. Miltad.

*M. C. MASSIE.*

Henry C. O. Gruhlke

Inventor

By *J. W. Tallmadge* Jno

Attorney.

(No Model.)

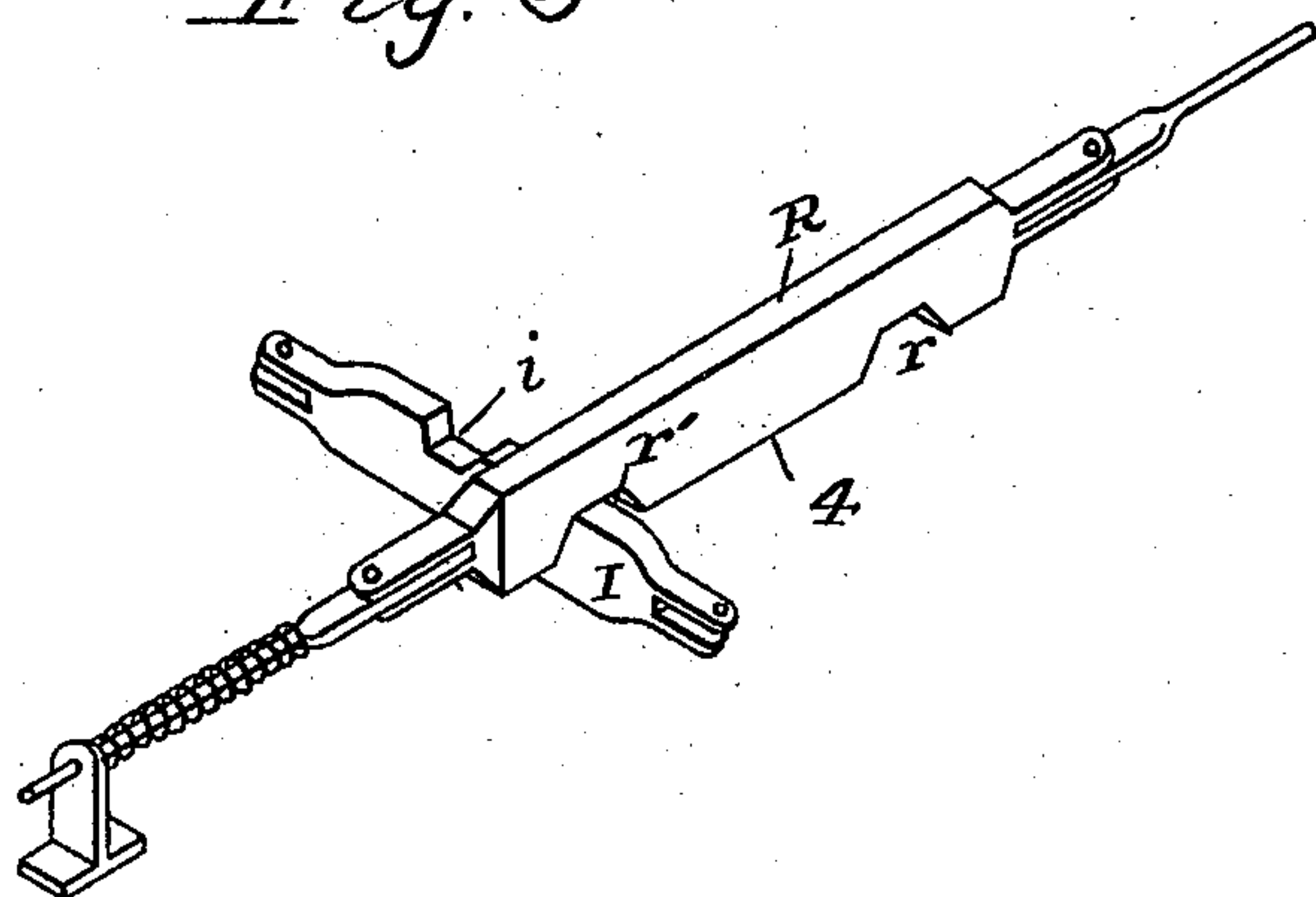
3 Sheets—Sheet 3.

H. C. O. GRUHLKE.  
AUTOMATIC SAFETY RAILROAD SWITCH.

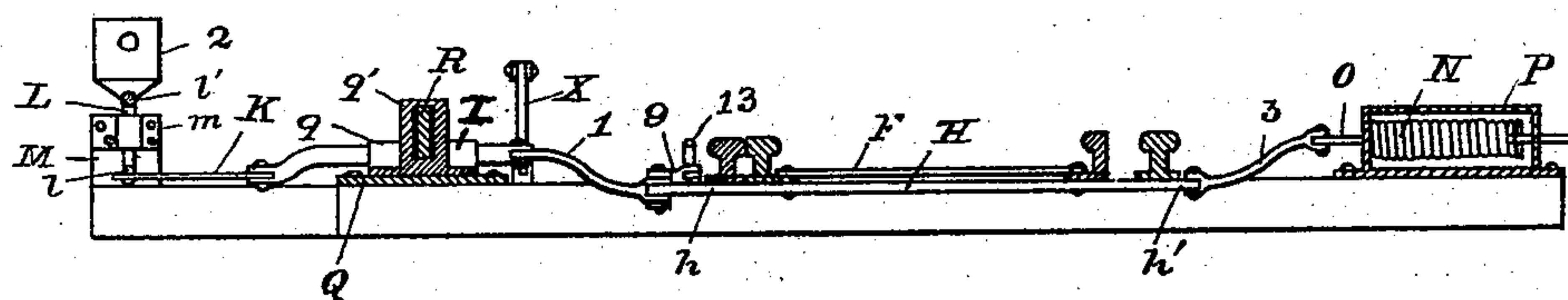
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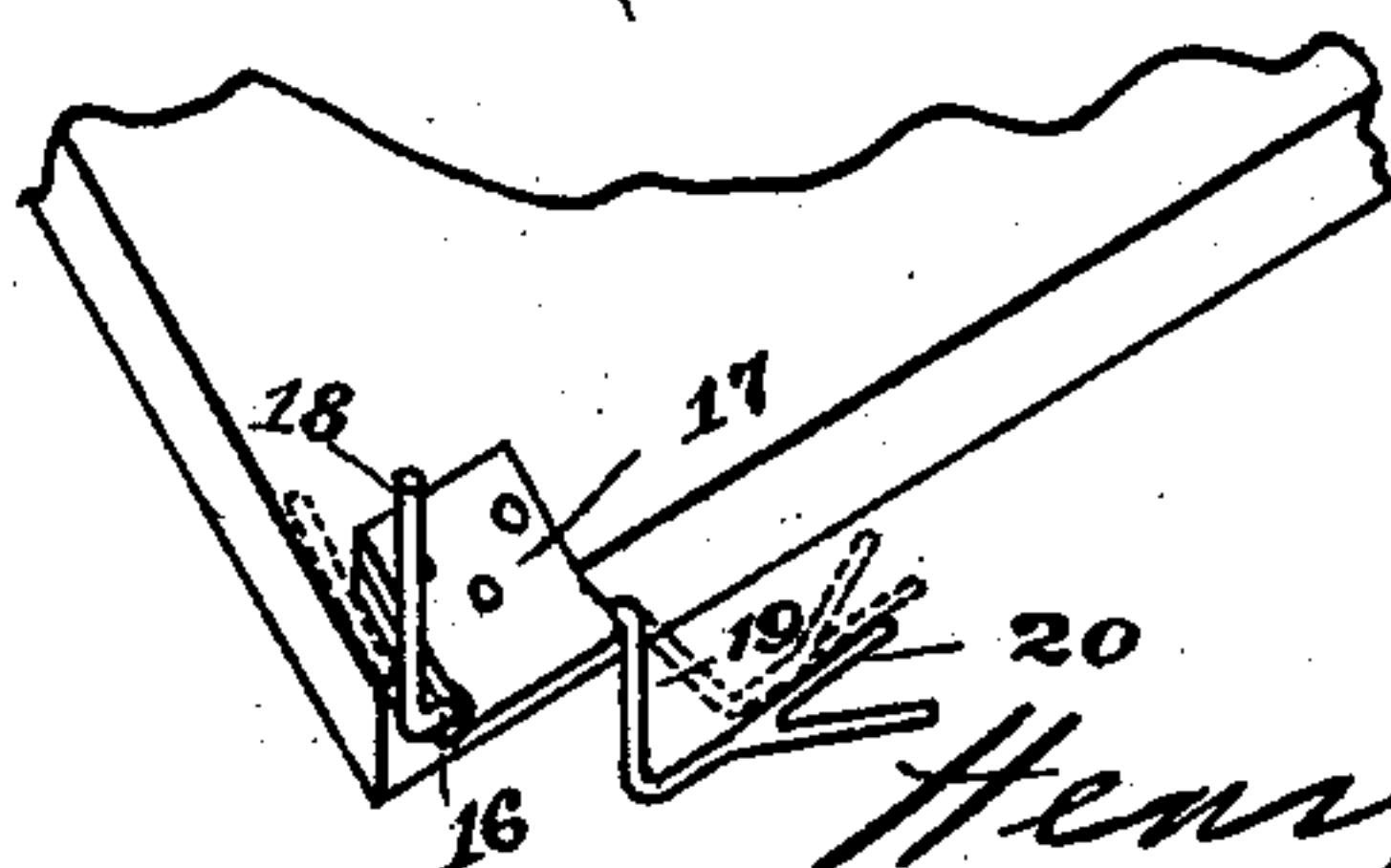
*Fig. 3*



*Fig. 4*



*Fig. 5*



Witnesses  
Thos. H. Miltstead  
M. C. MASSIE.

Inventor

Henry C. O. Gruhlke  
By A. W. Tatum, Attorney



# UNITED STATES PATENT OFFICE.

HENRY C. O. GRUHLKE, OF MORRIS, ILLINOIS.

## AUTOMATIC SAFETY RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 507,495, dated October 24, 1893.

Application filed February 21, 1893. Serial No. 463,160. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY C. O. GRUHLKE, a citizen of the United States, residing at Morris, in the county of Grundy and State of Illinois, have invented a new and useful Automatic Safety Railroad-Switch, of which the following is a specification.

My invention relates to an improvement in automatic safety railroad switches.

The object of my invention is the production of a switch which, if accidentally left open, will be automatically closed by the approach of a train from either direction on the main line before the train arrives at the switch, and which, if closed, may if desired be automatically opened by the train to permit the train to enter the turnout.

My invention will first be described in connection with the accompanying drawings, and then pointed out in the claim.

Figures 1 and 1<sup>a</sup> taken together form a plan view of my improved switch. Figs. 2 and 2<sup>a</sup> taken together form a side elevation of the same. Fig. 3 is a perspective detail view of the locking mechanism. Fig. 4 is a detail view of the switch-spring, case, links, and throw-bar, being a cross-section on the line *xx*, Fig. 1. Fig. 5 is a detail view of the throwing-device on the train. Figs. 1 and 1<sup>a</sup> will be referred to hereinafter as Fig. 1, and Figs. 2 and 2<sup>a</sup> will be referred to as Fig. 2.

Referring to the drawings, A are rails of a main line.

B are rails of a turnout.

C are guard rails, and D is a frog.

E are switch-points connected by the rod F and spiked down at G in the ordinary manner.

H is a throw-bar attached to the under side of the switch-points E at their toes, and having its ends extended beneath and beyond the rails A, at *h* and *h'*. To the end *h* is pivoted an upward curved link 1, to the outer end of which is pivoted a slide-bar I, notched in its upper surface at *i*, as clearly shown in Fig. 3; and to this slide-bar is pivoted one end of a link K, the other end of which is pivoted to a crank *l* formed on the lower end of a shaft L, which is bent outward to form a hand-lever *l'*, as clearly shown in Fig. 2, the

hand-lever being provided with the ordinary signal-lamp holder 2. Shaft L is journaled at *m* to an ordinary switch-stand M.

The switch is held normally closed by a spring N on the side of the track opposite to that where the switch-stand M is located, this spring actuating a rod O passing through holes in a casing P, which is broken away in Fig. 1 to show the spring N and rod O, the latter being attached to the end *h'* of the throw-bar H by means of an upward-curved link 3, pivoted to the throw-bar and to the rod O. Slide-bar I passes through a transverse slideway *q* in a casing Q, which has above it a longitudinal slideway *q'*, as shown in dotted lines in Fig. 1. Through this slideway *q'* passes a locking-bar R, in the under side of which are two notches *r*, *r'*, between which is a plain central portion 4, as shown in Fig. 3. To the ends of locking-bar R are attached rods S, S', which extend parallel with the main track and some distance each side of the point of switch, being supported by keepers T. The outer extremities of these rods S, S' are connected by links U to cranks *v*, *v'* formed on the ends of rock-shafts V, V', journaled at W. The other ends of these rock-shafts are bent upward to form levers *v*<sup>2</sup>, which are pivotally connected to the ends of curved contact-bars X, X', whose other ends are pivoted to guide-bars *x*, *x'*, sliding in guides Y, Y'. Rods S S' are actuated by springs Z, Z', which tend to keep the locking-bar I in such a position that its plain central portion 4 will be in the middle of the longitudinal slideway *q'* and will engage notch *i* in slide-bar I when the switch is opened, thereby preventing the closing of the latter by the pressure of the spring N. It is apparent from Fig. 3 that when the locking-bar is drawn in either direction the plain central portion 4 will be drawn out of the notch *i* in slide-bar I and one or the other of slots *r*, *r'* will come in line with slide-bar I, releasing the latter and permitting the spring N to close the switch. When the rods S, S' are drawn in either direction for the purpose of so actuating the locking-bar, one or the other of springs Z, Z' will be compressed and retained in that position by the slide-bar I engaging one or the



other of the notches  $r$  or  $r'$  in the locking-bar.

5 is a hand crank-lever for moving the locking-bar R by hand.

5 In Fig. 2, 6 is a representation in dotted lines of a car or engine truck on the main line, having a stud 7 fastened at right angles to the track and projecting some distance out. On this stud is a roller 8 adapted to engage contact-bars X, X' when the switch is open. The normal position of the contact-bars when the switch is closed is shown by the dotted lines. In this position they are out of the way of the roller 8 and therefore not actuated by a passing train.

15 To the end  $h$  of the throw-bar H is attached one arm of a bell-crank 9, pivoted at 10, and having its other end connected to an opening-rod 11, which slides freely through a keeper 20 12. To the rod 11 is attached a crank-lever 13 by means of a link 14, the crank-lever being journaled in the bearing-plate 15, as shown, and normally projecting upward when the switch is closed.

25 To the engine or car truck is attached a cranked rock-shaft 16 by means of a bearing 17, the rock-shaft having a hand-lever 18 and a downward-projecting arm 19, forked at 20, for engagement with the crank-lever 13, the arm 19 being normally swung up, as shown in dotted lines, in order that it may clear the crank-lever 13.

The operation of my improved apparatus is as follows: The switch is opened by hand 35 by means of switch-lever  $l'$ , which draws over the switch-points E through the medium of the throw-bar H and slide-bar I, at the same time compressing the spring N. In this position the switch is held by the locking-bar 40 R engaging its plain central portion 4 with the notch  $i$  in the slide-bar I. The switch is opened automatically from the train desiring to enter the turnout by swinging the arm 19 so that its forked end 20 will strike 45 the crank-lever 13, forcing it forward, and, through the medium of the rod 11 and bell-crank 9, drawing the throw-bar H over until it is secured by the locking devices in the same manner as when opened by hand, 50 it being understood that the switch can only be opened automatically by a train coming in the direction which permits it to enter the switch when it has opened it. The switch may be closed manually by drawing the locking-bar longitudinally in either direction by 55 means of the hand crank-lever 5.

60 If at any time the switch is accidentally left open it will be automatically closed by a train coming toward the switch from either direction on the main line by means of roller 8 on the engine or car truck striking the curved contact-bars and thereby actuating the rock-shafts V, V', which operate the lock-

ing-bar R through the medium of rods S, S', forcing the said bar in the same direction as 65 the train is moving, disengaging the slide-bar I and permitting the springs N to close the switch and thus give a clear main line for the moving train, preventing it from being switched onto the turnout. It will be plain 70 that the switch will also be closed automatically by a train coming from the turnout onto the main line, if the train is run far enough on the main line for the roller 8 on the engine to engage the curved contact-bars. 75

The above description relates largely to the mechanism described and claimed by me in the Letters Patent No. 489,583, issued to me January 10, 1893, with the exception of the mechanism for automatically opening the 80 switch from the engine, the arrangement of the spring for holding the switch normally closed, and the upward-curved links at each end of the throw-bar. By substituting one spring N for the two shown in my patent 85 above referred to, and attaching the said spring directly to the end  $h'$  of the throw-bar H, I not only reduce the number of wearing parts and simplify the apparatus, but I also give the spring a greater leverage on the switch- 90 points and avoid punching the rails at the point of switch. Moreover, by this arrangement, together with the use of the upward-curved links 1 and 3, I am enabled to place the switch-spring N and casing P, the casing 95 Q with its inclosed mechanism, and the switch-stand M, all on the pair of switch-ties 21, the throw-bar passing under the rails and between the ties. Thus when any settling takes place, all this mechanism will be held in its proper 100 relation, thereby not affecting the working of the switch, there being enough lost motion or play in the other portions of the mechanism to allow for the difference in settling of the various foundations to which of necessity 105 they are attached.

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

The combination, with a switch, a hand- 110 operated switch-opening mechanism, a switch-closing device, and contact-mechanism on the engine for actuating the closing device, of an automatic switch-opening mechanism, and a tripping device on the engine adapted to en- 115 gage with the automatic switch-opening mechanism, whereby the switch may be opened by the movement of the train, substantially as described and for the purpose set forth.

In testimony that I claim the foregoing as 120 my own I have hereto affixed my signature in presence of two witnesses.

HENRY C. O. GRUHLKE.

Witnesses:

W. E. VINER,

J. W. MCKINDLEY.