

No. 767,176.

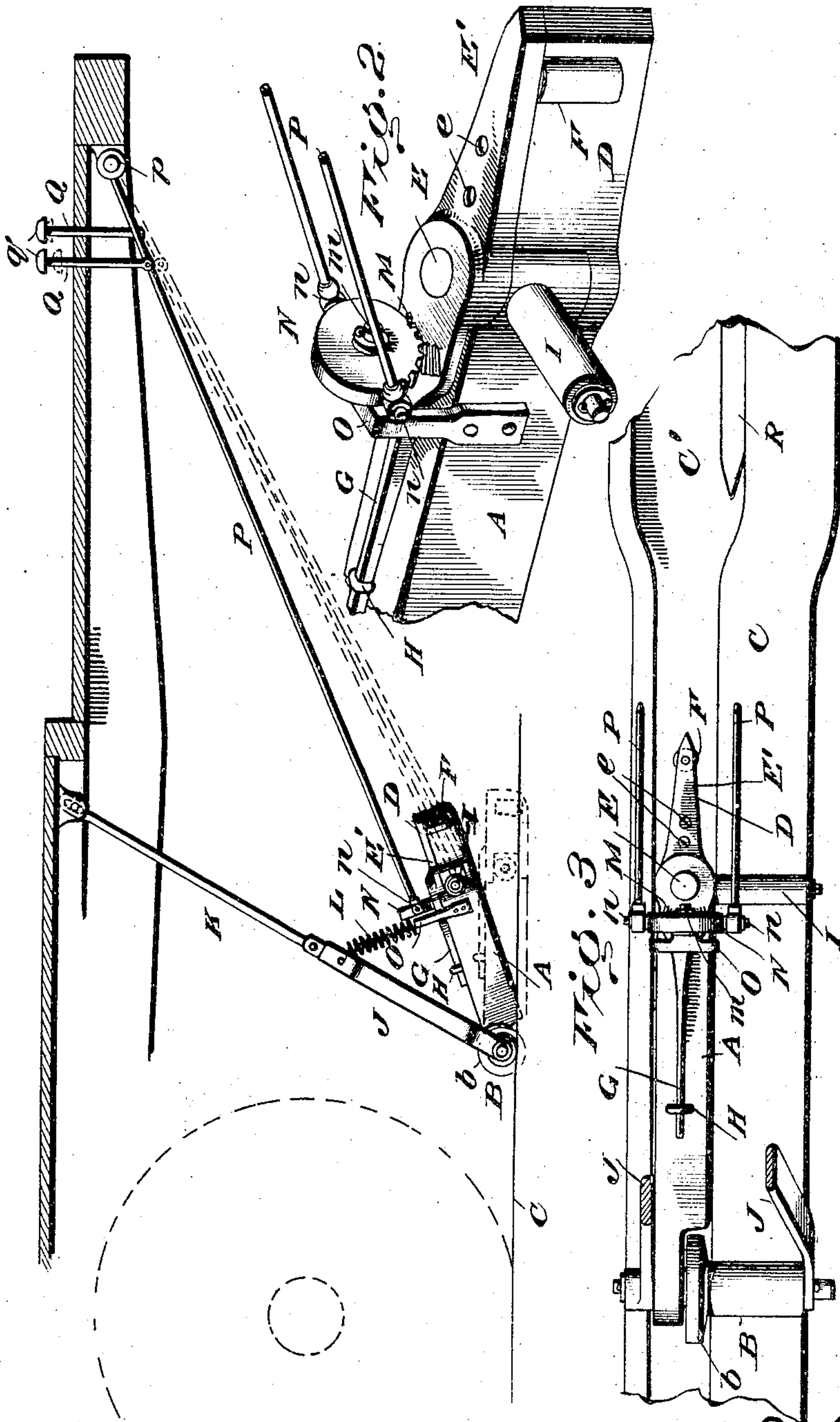
PATENTED AUG. 9, 1904.

W. D. SIMPSON.
AUTOMATIC SWITCH.
APPLICATION FILED MAY 5, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

FIG. 1.



Witnesses

E. B. Brewer

By

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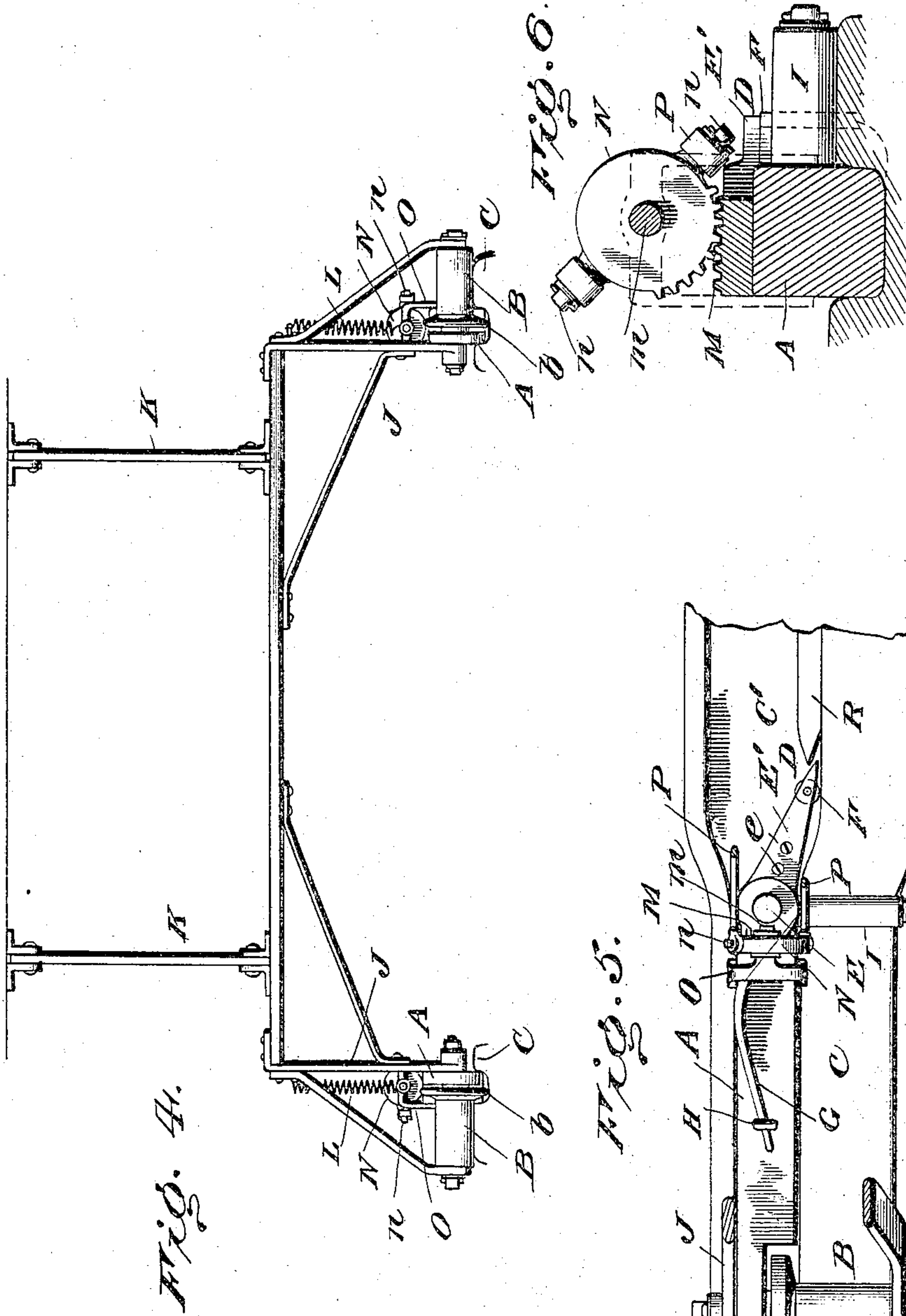
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3 SHEETS—SHEET 2.



Witnesses

For witness
E. B. Brewer.

W. D. Simpson
By *Baldwin & Wight*
his Attorney

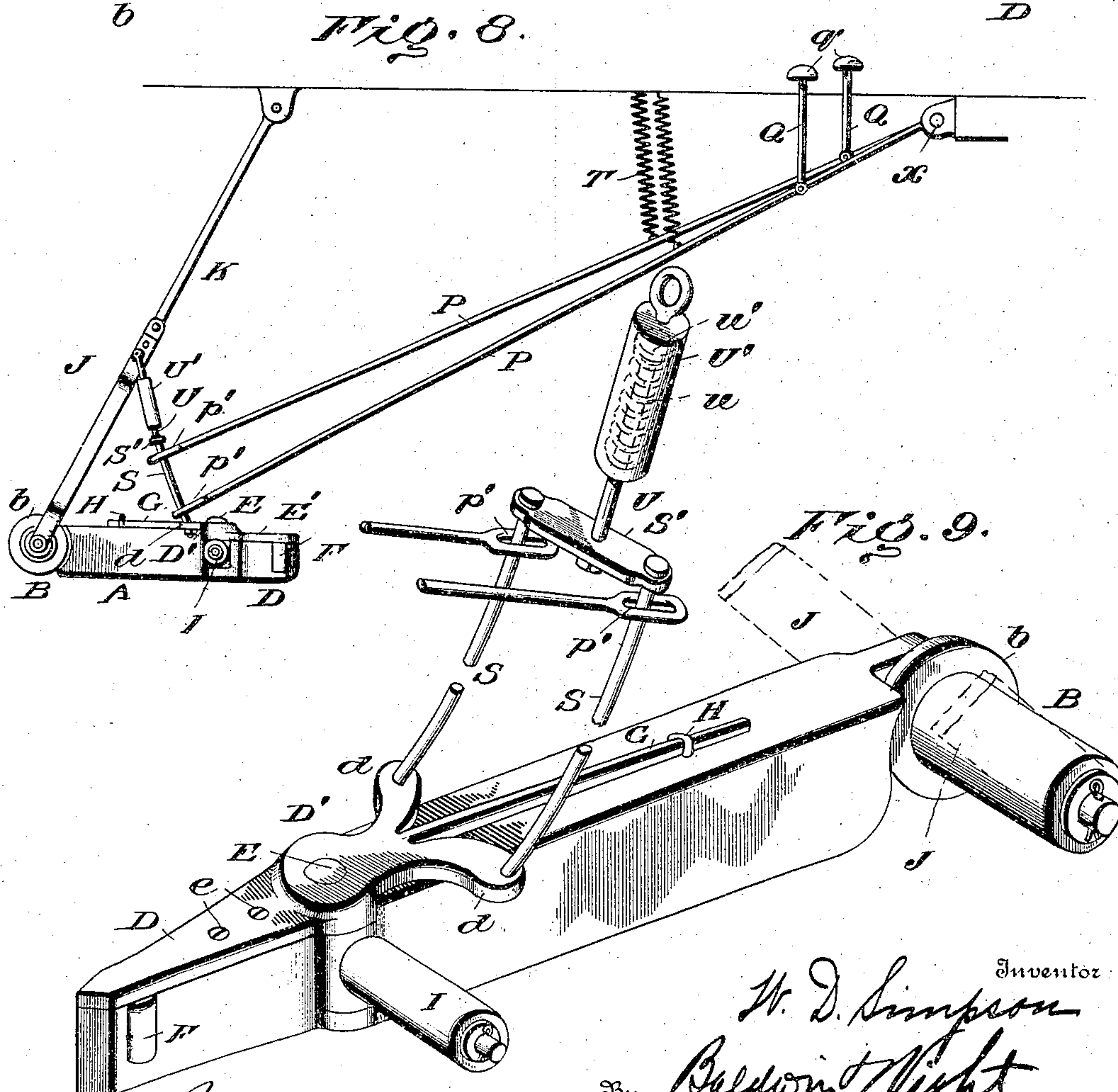
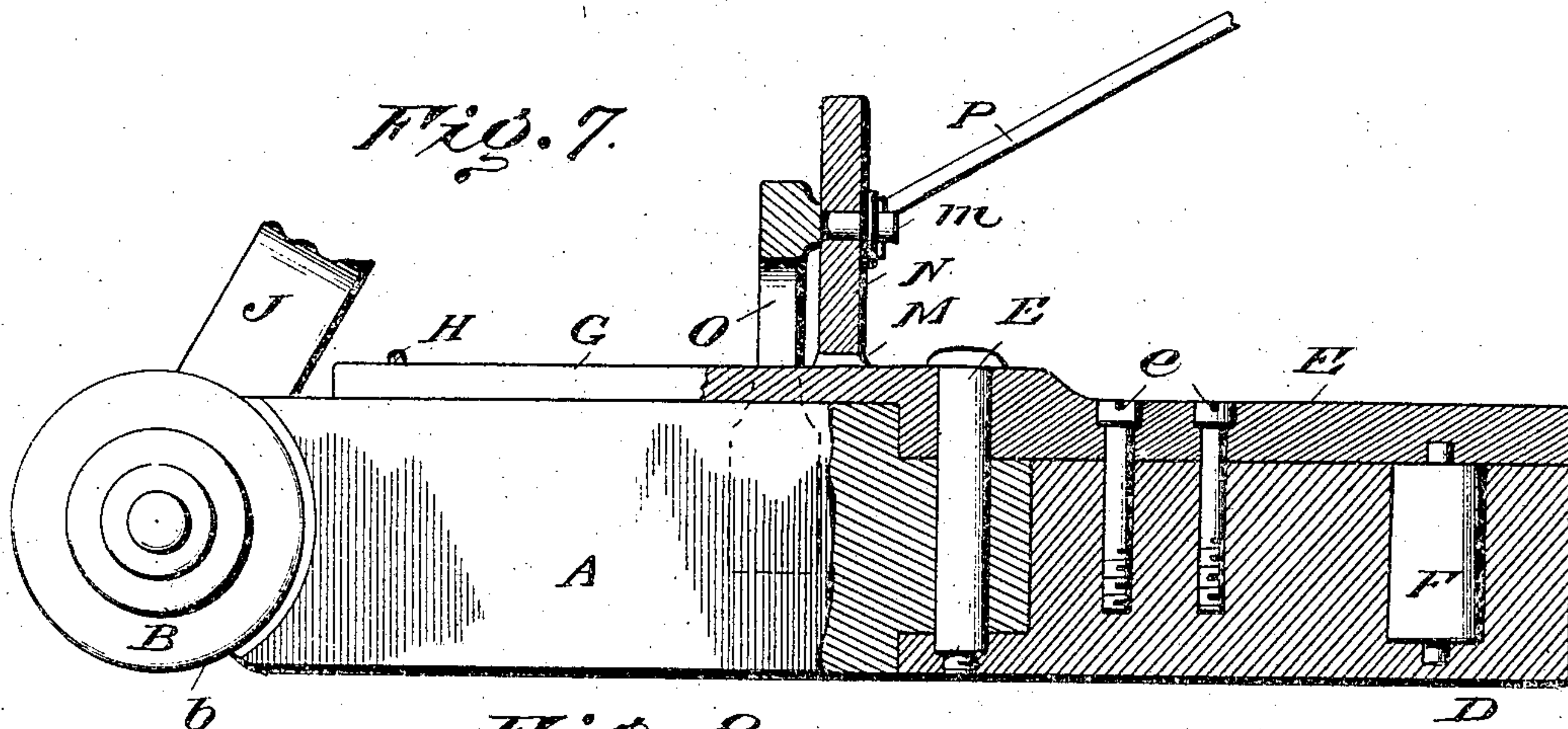
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3 SHEETS—SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM DUNLAP SIMPSON, OF COLUMBIA, SOUTH CAROLINA.

AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 767,176, dated August 9, 1904.

Application filed May 5, 1904. Serial No. 206,582. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DUNLAP SIMPSON, a citizen of the United States, residing at Columbia, in the county of Richland and State of South Carolina, have invented certain new and useful Improvements in Automatic Switches, of which the following is a specification.

My invention relates particularly to devices for operating the switches of street-railways; and the object of my invention is to provide improved means whereby the ordinary pivoted switch-points now generally used in street-railways may be automatically operated by devices carried by a moving car.

In my Patent No. 754,169, of March 8, 1904, I have shown mechanism of this class. In the mechanism shown in that patent, however, it was necessary to employ two switch-operating devices on each side of the car for turning the switch-points in opposite directions. By my present improvements I am enabled to employ a single switch-operating device on each side of the car for the same purpose.

My invention contemplates the use of devices which may be readily applied to any street-car and which are adapted to operate ordinary switch-points without material modification thereof.

In carrying out my invention I provide on each side of the car a shoe having a pivoted toe tapered or wedge-shaped in outline and which is normally held parallel with the body of the shoe by a spring on the toe engaging a loop or suitable fastening on the shoe-body. Each shoe is provided with wheels or rollers adapted to rest on the track, and it is pivotally connected at its rear end with a frame jointed to the car-body. The front portion of the shoe is held elevated by yielding or spring connections between the forward part of the shoe and the swinging frame. The shoes may be lowered and have their toe ends turned to the right or to the left, so as to engage the switch-points in two ways. One way is to provide the toe-piece with a segment of teeth, with which engages a toothed wheel mounted to turn about a horizontal axis or stud-shaft attached to a bracket secured to the body of the shoe. This wheel is provided with arms on opposite

sides jointed to rods which extend diagonally from the wheel to the end of the platform of the car, with which they are pivotally connected. Push-rods jointed to the upper front portions of these diagonal rods extend through the platform and are provided with foot-pieces. By the depression of one or the other of these foot-pieces the diagonal rods may be depressed, which will first cause the shoe to be depressed until it enters the groove of the track. Continued pressure on the foot-piece causes the toothed wheel to be turned, and therefore shifts the toe-piece to one side, bringing it into position to engage the switch-point. The other way in which the shoe may be operated is to provide the toe-piece with an extension in rear of its pivot, having diverging arms to which are secured curved rods that are connected by yielding devices with the swinging frame before referred to. Diagonal rods similar to those before mentioned are provided which are pivotally connected with the car-platform near its front end and are operated by push-rods like those before referred to. These diagonal rods are normally held elevated by springs, and at their lower ends they are formed with loops, through which guide-rods projecting from the toe-piece extend. The organization is such that when one of the diagonal rods is depressed its lower looped end moves downward on its guide-rod and abuts against the top of the shoe. Further pressure on the foot-piece causes the shoe to be lowered into the groove of the rail, and then additional pressure on the foot-piece, combined with the forward movement of the car, causes the toe-piece to be shifted to one side or the other in position to engage the switch-point. The details of construction and mode of operation will be hereinafter more fully explained.

In the accompanying drawings, Figure 1 shows a side elevation of my improved switch-operating devices applied to a car-body. Fig. 2 is a detail view in perspective of the shoe and the preferred devices for operating the toe-piece. Fig. 3 is a detail plan view illustrating the manner in which the shoe moves in the grooved rail near a switch-point. Fig. 4 shows a rear elevation of the switch-oper-

ating devices constructed in accordance with my invention. Fig. 5 is a detail view similar to Fig. 3, but showing the switch-operating devices in position to engage a switch-point.

5 Fig. 6 shows a transverse section of the shoe and the devices for operating the toe-piece. Fig. 7 is an enlarged detail view, partly in section, of the shoe and the toe-operating mechanism. Fig. 8 is a side elevation of a modified form of my invention, and Fig. 9 is a perspective view thereof.

10 The shoe-body A is made of metal, preferably cast-iron, and carries at its rear end a wheel B, which is adapted to ride on the top of the rail C. It is preferably flanged at *b*, so as to keep the shoe in line over the groove when it is elevated in the manner shown in Fig. 1. The front end or toe D of the shoe is tapered or wedge-shaped and is pivotally connected at E with the shoe-body. The toe preferably carries an antifriction-roller F, and in order that the roller may be easily placed in position or withdrawn the toe-piece is preferably made in two parts, the cap E' being secured in place by screws *e*. From the rear end of the toe-piece projects rearwardly a thin metal tongue or spring G, which extends through a loop or fastening device H on the top of the shoe-body. The arrangement is such that the toe-piece is normally held in line with the groove and with the body of the shoe by this spring; but the spring yields sufficiently to allow the toe-piece to be turned on its pivot to the right or to the left.

35 Near its front end the shoe carries a roller I, which rests on the top of the track C in the manner shown in Fig. 3 when the shoe is depressed into the groove of the track.

40 Preferably two shoes are used, one for each side of the track, and they are pivotally connected or hinged at their rear ends to a frame J, similar to that shown in my patent before mentioned and which is flexibly connected with the car-body by links K. The rollers B are pivotally connected with this frame, and the shoes are normally held in an elevated position, such as shown by full lines in Fig. 1, by springs L, attached to the shoes and to the frame J. Normally the shoes are held in this position, with the wheels B on the track; but they may be depressed into the grooves of the track, and their toe ends may be shifted to operate the switches in the manner next to be described.

55 The preferred way of depressing the shoes and turning the toes is illustrated in Figs. 1 to 7. As there shown, each toe-piece is formed with a segment of teeth M, with which engages a toothed wheel N, mounted to turn on a stud-shaft *m*, projecting forwardly from a bracket O on the shoe-body. Each wheel is provided with laterally-projecting arms *n*, to which are jointed diagonal rods P, which are pivotally connected at their upper or front ends with the car-body at *p*. To each of these

rods is jointed a vertical push-rod Q, each having a foot-piece *q*. When the motorman places his foot on one of the foot-pieces *q*, the diagonal rod connected therewith is depressed in the manner indicated by dotted lines in Fig. 1. This causes the shoe A to be lowered to the position shown by dotted lines in Fig. 1 without at first turning the toe-piece. As soon, however, as the shoe has entered the groove in the rail further pressure on the foot-piece *q* will cause the wheel M to turn about its axis and by the gearing described will cause the toe-piece to be turned about its pivot as soon as it arrives at the widened part C' of the rail, when it is made to assume the position shown in Fig. 5 and will engage the switch-point R. The further forward movement of the car causes the switch-point to be shifted properly. Of course the direction in which the toe-piece is shifted depends on which of the push-rods Q is depressed. The shoe and toe-piece on the opposite side of the car are operated in a similar way. When the motorman releases the push-rod Q, the shoe is elevated by means of the spring L. By these devices it will be seen that it is only necessary to use two shoes on each end of the car, and yet the switch-points may be turned in either direction. Of course where the track has switches on only one side only one shoe need be attached to the car. In the modified construction shown in Figs. 8 and 9 the frame J is similar to that before described, and the shoe-body A and supporting wheels or rollers B and I are precisely the same. The toe-piece D, however, is slightly modified, an extension D', formed with laterally-projecting arms *d'*, being employed, to which are rigidly connected guide-rods S, which are curved, as shown, in arcs struck from the axis *x*, about which the rods P turn. In this case the rods are held normally elevated by springs T, attached to the car-body. The lower ends of the rods P are looped at *p'*, so as not to bind on the guide-rods S and permit freedom of movement. The guide-rods are connected by a cross-piece S'; but this connection is a loose one. To the cross-piece S' is attached a rod U, which extends into a cylinder U', containing a spring *u*. The upper end of the rod is provided with a head *u'*, resting on the spring, and the cylinder is pivotally connected with the frame J. The spring *u* normally holds the shoe out of the groove of the rail, and the rods P are normally held at the upper ends of the guide-rods S in the manner shown in Fig. 9 by the springs T. If one of the rods P is depressed, its lower end will descend along its guide-rod S and will come against the top of the shoe, causing the shoe to be depressed into the groove of the rail without turning the toe-piece. The shoe will then move forward slightly, and the continued forward movement of the car will cause the rod T to pull

on the rod S and cause the shoe to be shifted on its pivot in the proper direction to engage the switch-point. In this way the toe may be turned in either direction by operating the proper diagonal rod.

In each case the spring G tends to hold the toe-piece in line with the main groove of the track, and it returns the toe-piece to this position when pressure on the rod P is removed.

The roller F is not essential, but is preferably used. It serves to cause the switch-point to ride more smoothly along the toe-piece when it is being shifted.

I claim as my invention—

1. A switch-operating device comprising a shoe having a pivoted toe-piece, a spring for normally holding the toe-piece in line with the body of the shoe, and means under the control of the motorman for shifting the toe-piece laterally against the force of the spring.

2. A device for operating switch-points comprising a shoe, a toe-piece pivotally connected therewith, means for suspending the shoe from a car-body, a spring for normally holding the front end of the shoe elevated, a spring for normally holding the toe-piece in line with the major axis of the shoe, and means under the control of the motorman for lowering the shoe and for shifting the toe-piece.

3. A device for operating switch-points comprising a shoe, a frame for suspending the shoe from a car-body, a spring connecting the frame with the front portion of the shoe for holding it normally elevated, a toe-piece pivotally connected with the shoe, a spring for normally holding the toe-piece in line with the shoe, and means under the control of the motorman for lowering the shoe and shifting the toe-piece.

4. A device for operating switch-points comprising a shoe, a toe-piece pivotally connected therewith, a spring connecting the toe-piece and shoe and which normally holds the toe-piece in line with the shoe, a frame to which the rear end of the shoe is pivotally connected and which is hung from the car-body, diagonally-arranged rods extending to the platform of the car, means for depressing these rods, and connections between the lower ends of the rods and the toe-piece by which the latter is shifted.

5. A device for operating switch-points comprising a shoe, a toe-piece pivotally connected therewith, a spring for normally holding the toe-piece in line with the shoe, means for connecting the shoe with the car-body, a toothed wheel engaging the toe-piece, rods extending from the toothed wheel to the platform, and means for depressing these rods to cause said toothed wheel to shift the toe-piece.

6. A device for operating switch-points comprising a shoe, a toe-piece pivotally connected therewith and provided with a segment of teeth, a toothed wheel engaging said teeth on the toe-piece, rods extending from the wheel to the car-body, and means for operating these rods.

7. The combination of the shoe-body, a toe-piece pivotally connected therewith, an anti-friction-roller carried by the toe-piece, and means under the control of the motorman for lowering the shoe and shifting the toe-piece.

In testimony whereof I have hereunto subscribed my hand.

WILLIAM DUNLAP SIMPSON.

Witnesses:

HARRY N. EDMUNDS,
GEORGE P. LOGAN.