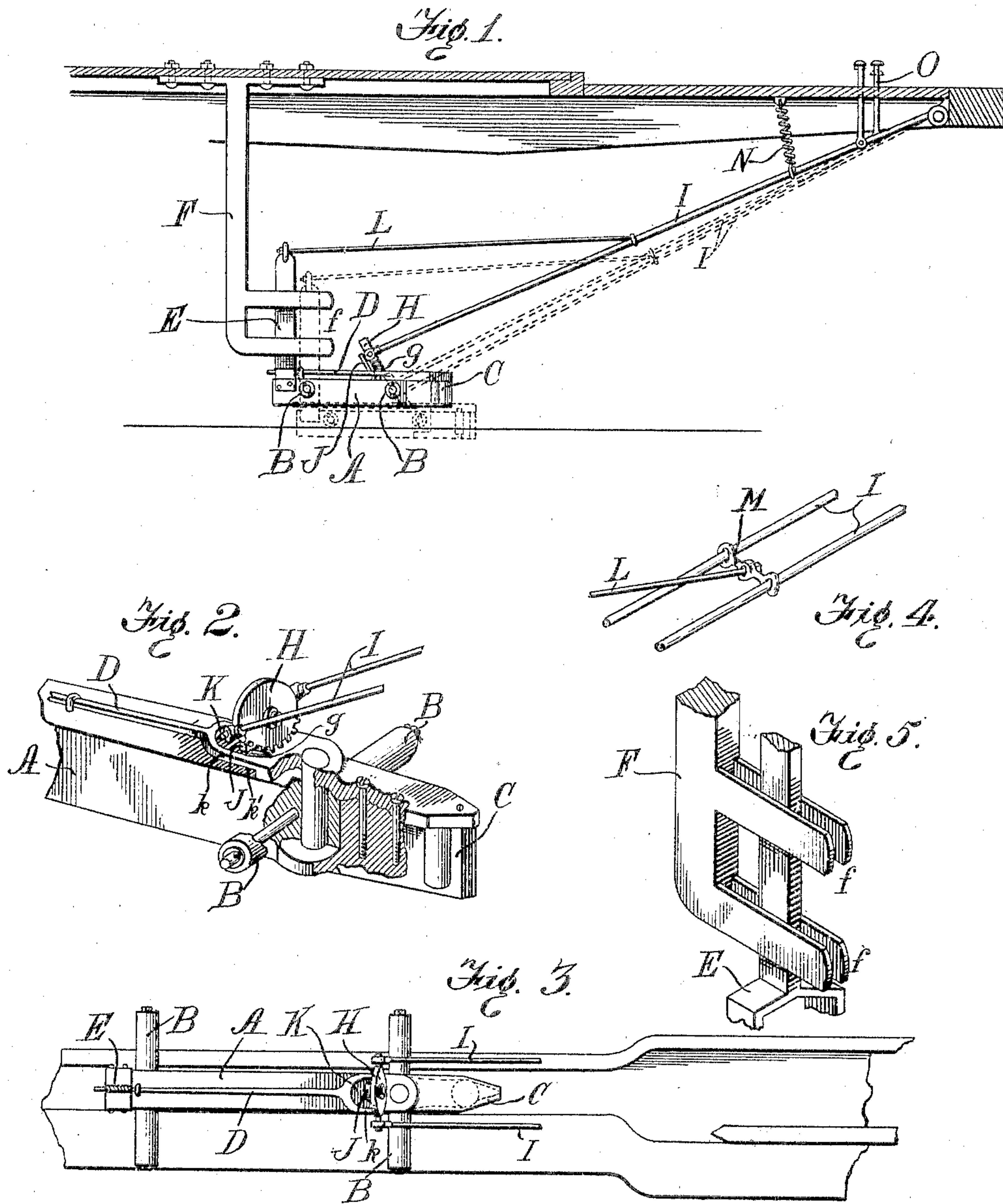


W. D. SIMPSON.  
AUTOMATIC SWITCH.  
APPLICATION FILED APR. 10, 1905.

2 SHEETS—SHEET 1.



Witnesses:

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J. H. Tunney

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By his Attorneys  
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2 SHEETS—SHEET 2.

Fig. 6.

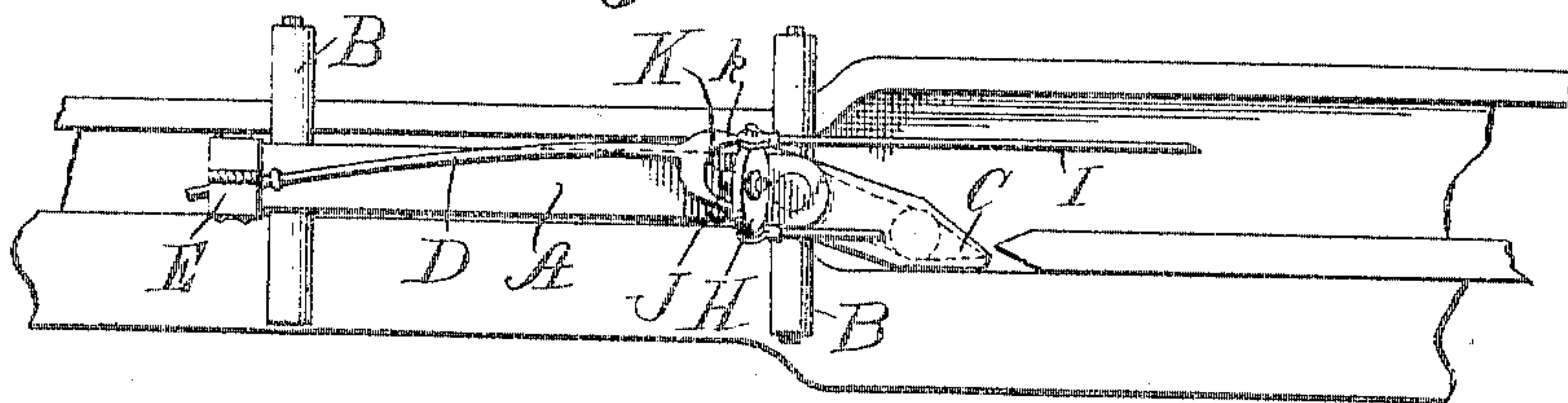


Fig. 7.

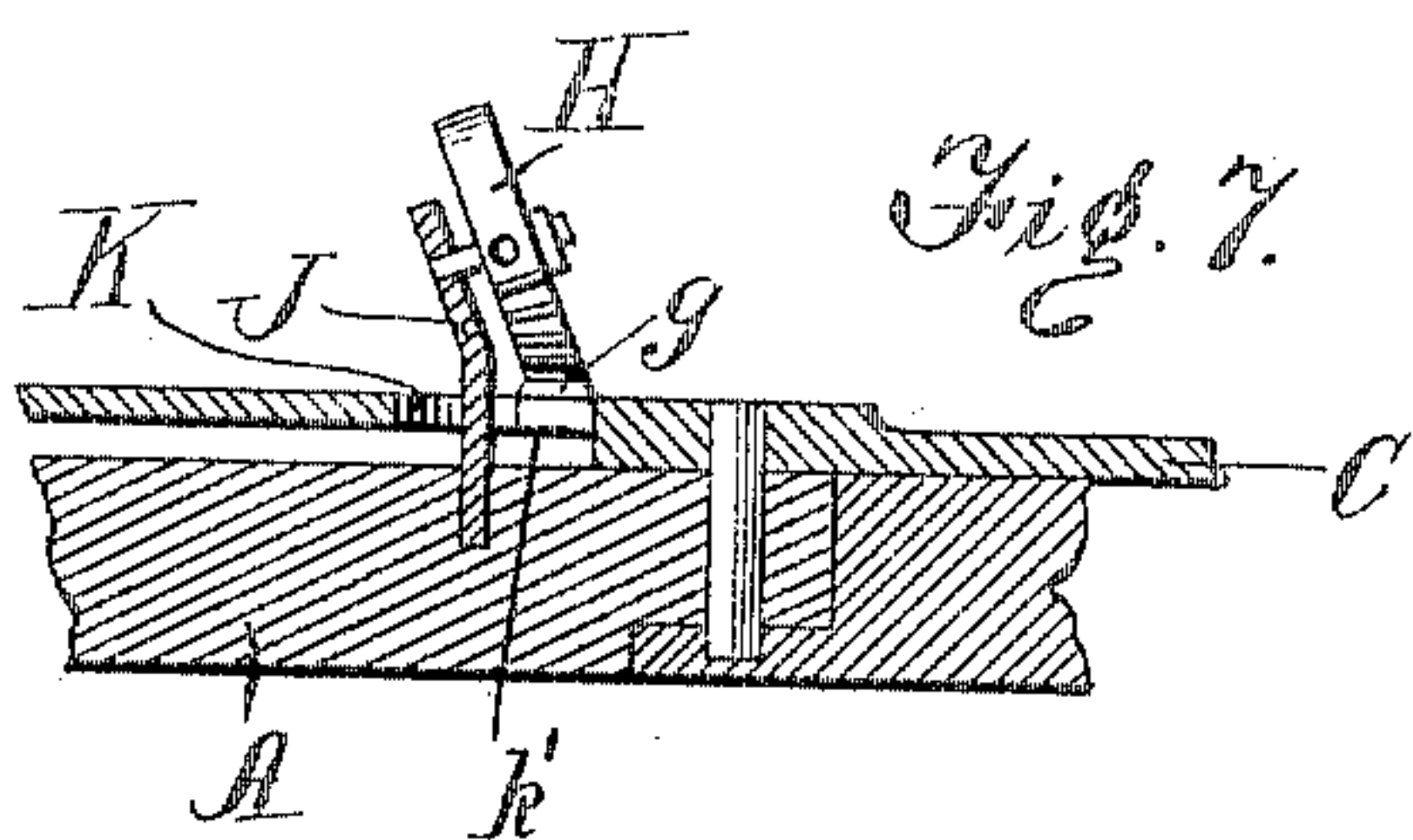


Fig. 8.

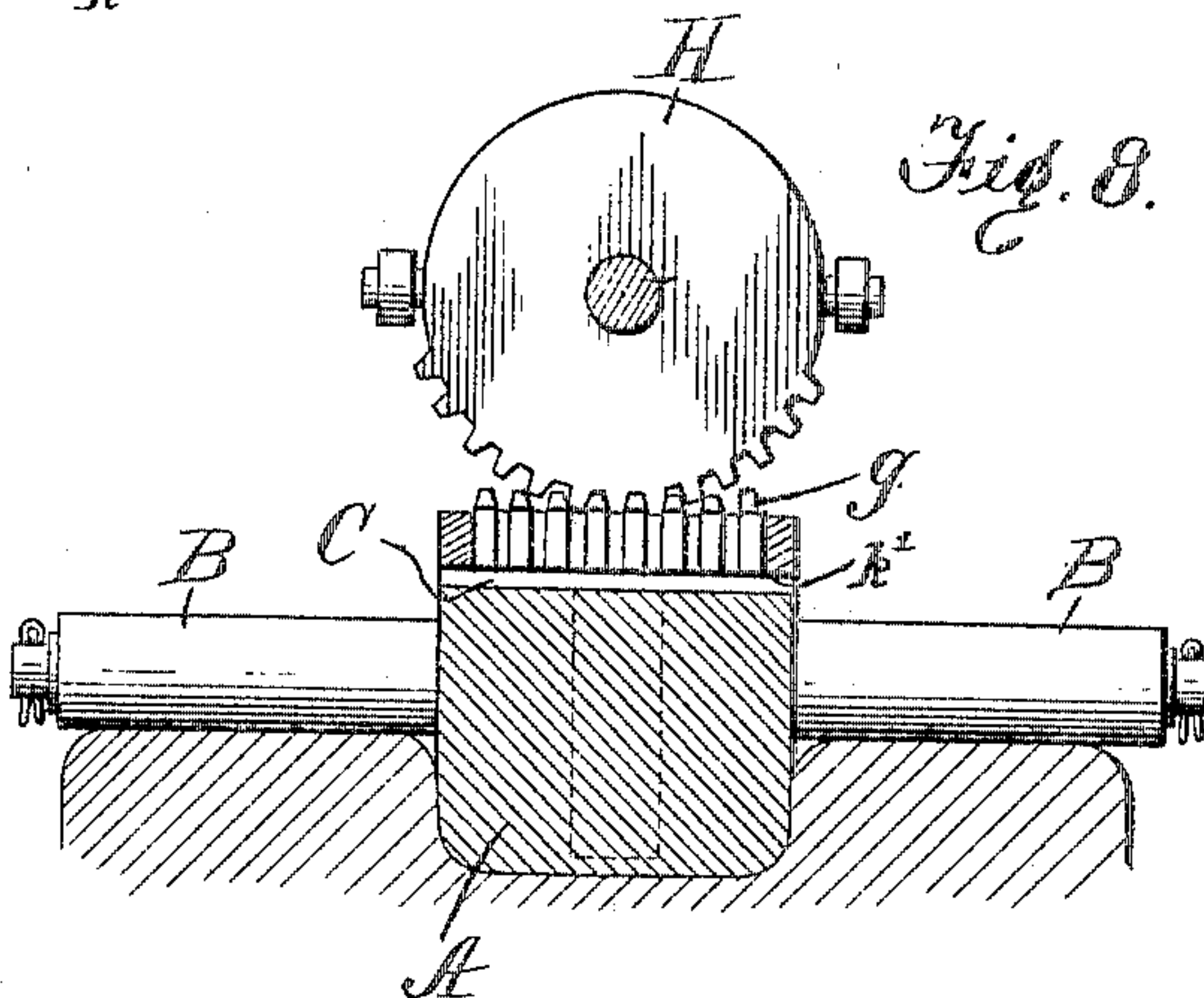
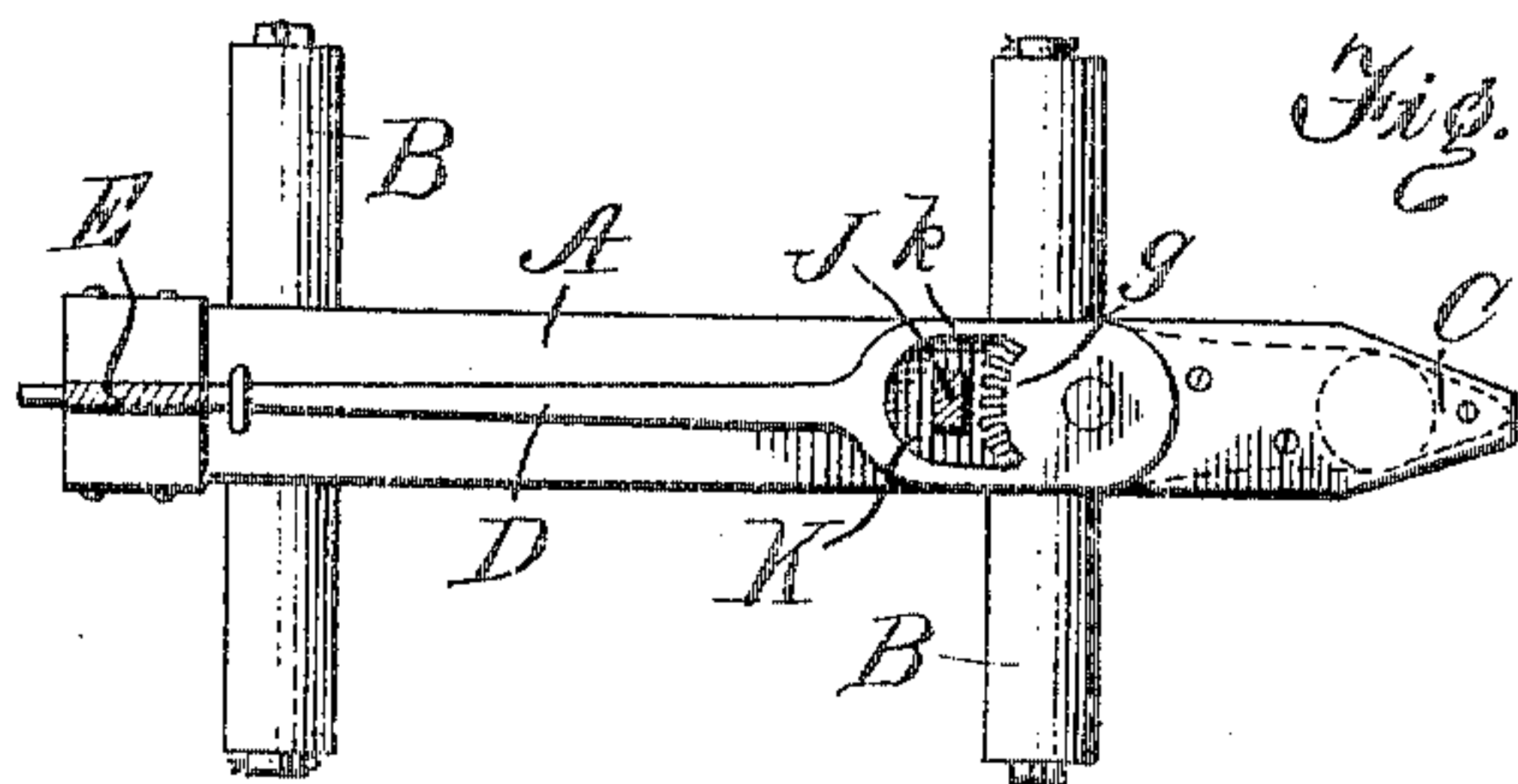


Fig. 9.



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# UNITED STATES PATENT OFFICE.

WILLIAM DUNLAP SIMPSON, OF COLUMBIA, SOUTH CAROLINA.

## AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 794,051, dated July 4, 1905.

Application filed April 10, 1905. Serial No. 254,785.

*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 Letters Patent of the United States granted to me on August 9, 1904, No. 767,176, I have shown an automatic switch-operating mechanism in which is provided 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 shoe being provided at its rear end with a roller adapted at all times to run on the track. 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 several ways. One way shown and described 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 and which are normally held elevated by springs. 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 object of my present invention is to simplify the construction of the mechanism shown in my before-mentioned patent. Instead of causing the shoe to rest at its rear end at all times on the track I now provide means for raising it entirely clear of the track when not in use for turning a switch-point, and I dispense with the swinging frame heretofore employed for suspending the shoe at its rear end.

According to my present invention the shoe is provided at its rear end with an upwardly-projecting tailpiece which extends vertically through arms projecting laterally from a bracket secured to the bottom of the car. The upper end of the tailpiece is connected by a rod with the diagonal rods heretofore referred to, the organization being such that when the diagonal rods are raised by their springs the shoe is raised bodily from the track so as to entirely clear it, being guided in such vertical movement by the tailpiece and the bracket-arms before mentioned. I find this construction an important improvement on the former construction, where the rear end of the shoe rested at all times on the track. I found that sometimes the teeth of the toe-piece became clogged with dirt, and I now so construct the toe-piece that any dirt tending to pack in the teeth has a chance to escape.

In the accompanying drawings, Figure 1 shows a side elevation of my improved switch-operating devices applied to a car-body, the latter being shown in section. 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 is a detail view in perspective, showing the connections between the diagonal rods and the tailpiece of the shoe. Fig. 5 is a detail view in perspective, showing the construction and relation of



the tailpiece and the guide-bracket. Fig. 6 is a detail view similar to Fig. 3, but showing the switch-operating devices in position to engage a switch-point. Fig. 7 is a detail view in section of the shoe for the purpose of showing particularly the manner of supporting the toothed wheel on the shoe-body. Fig. 8 shows a transverse section through the shoe and part of a grooved rail. Fig. 9 is a plan view, on an enlarged scale, of the shoe and some of the parts carried thereby.

The shoe-body A is of substantially the same construction as that illustrated in my patent before mentioned, and therefore needs no detailed description. It will be observed, however, that the shoe does not carry a supporting-roller at its rear end adapted to at all times run on the track; but instead I provide the shoe with four supporting-rollers B, which are adapted to rest on the track when the shoe is depressed to the position shown by dotted lines in Fig. 1. The toe-piece C is similar to that of my prior patent, and it is provided with a spring D, operating as before. To the rear end or heel of the shoe is secured a tailpiece E, preferably of the construction shown and which extends vertically upward from the shoe between the arms *f* of a guide-bracket F, secured to the bottom of the car-body. The toe-piece is provided with a segmental series of teeth with which engages a segment of teeth on a wheel H, to which the diagonal rods I are connected. The wheel H is mounted to turn on a pivot attached to the standard J, secured to the shoe-body and extending up through a hole K in the toe-piece. This hole is bounded by relatively narrow walls *k*, the under sides of which are cut away, as shown at *k'*, so that should any dirt tend to clog in the teeth *g* it will first pass into the hole K and then out under the walls *k*. The upper end of the tailpiece E is connected by a rod L with the diagonal rods I. Preferably the rod L is connected to a cross-head M, (shown in Fig. 4,) which is adapted to slide on the rods I to a limited extent. As thus constructed the shoe and parts directly connected therewith will be normally held directly over the groove of a rail in the elevated position shown by full lines in Fig. 1 by the springs N. If now either one of the push-rods O is depressed, the shoe will first be depressed onto the track or until it occupies the position shown by dotted lines in Fig. 1, and then the further movement of the push-rod when the shoe arrives at a switch, as shown in Fig. 6, will cause the toe-piece to be turned in

the proper direction. As soon as pressure is released from the push-rod the toe-piece will straighten out into alinement with the shoe, and then the shoe will be elevated by the springs N to the normal position above the track, as shown in Fig. 1.

The details of construction of all of the parts shown have not been described, as much of this mechanism is similar to that shown in my patent above mentioned. The novel features of the present invention are, however, clearly illustrated in the drawings and have been sufficiently described.

It will be observed that the guide-bracket F with its arms *f* not only serve to guide the shoe as it is being raised and lowered, but also prevent any sidewise movement thereof at any time. Therefore the shoe is always held directly over the groove of a rail and when depressed will immediately enter the same.

I claim—

1. A switch-operating device comprising a shoe having a pivoted toe-piece, means under the control of the motorman for shifting the toe-piece laterally, means for suspending the toe-piece at its front end from the car-body, a guide-bracket for the rear end of the shoe, and means for suspending the shoe at its rear end.

2. A switch-operating device comprising a shoe having a pivoted toe-piece and a vertical tailpiece, a guide-bracket secured to the car-body for the tailpiece, means for suspending the shoe, and means for moving the toe-piece laterally.

3. A switch-operating device comprising a shoe having a pivoted toe-piece and formed with a segment of teeth and a hole into which the teeth project, a standard projecting through said hole, a toothed wheel pivoted to said standard, and means for operating said wheel.

4. A switch-operating device comprising a shoe having a pivoted toe-piece and an upwardly-projecting tailpiece, a guide-bracket for the tailpiece secured to the car-body, a toothed wheel carried by the shoe engaging the toe-piece, diagonal rods for operating said wheel and a rod connecting the tailpiece with said diagonal rods.

In testimony whereof I have hereunto subscribed my name.

WILLIAM DUNLAP SIMPSON.

Witnesses:

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D. GORDON BAKER.