

992,261.

J. SAURUG.
SWITCH OPERATING APPARATUS.
APPLICATION FILED JULY 16, 1910.

Patented May 16, 1911.

4 SHEETS-SHEET 1.

Fig. 2

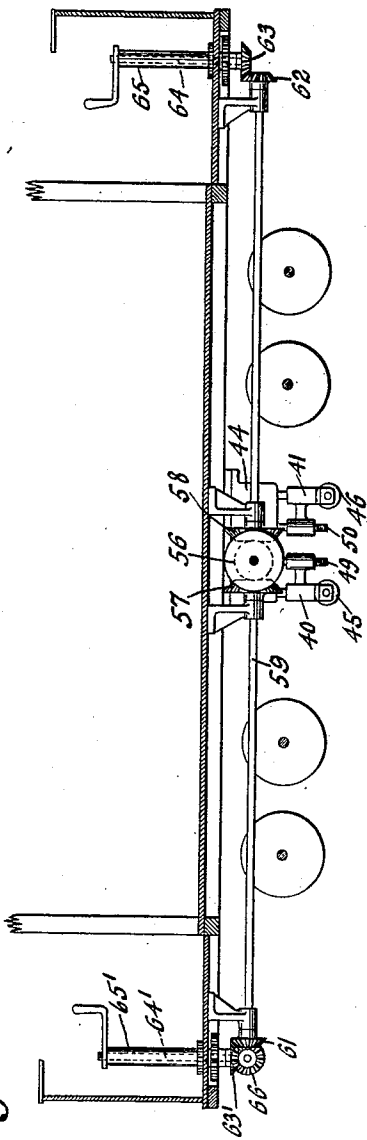
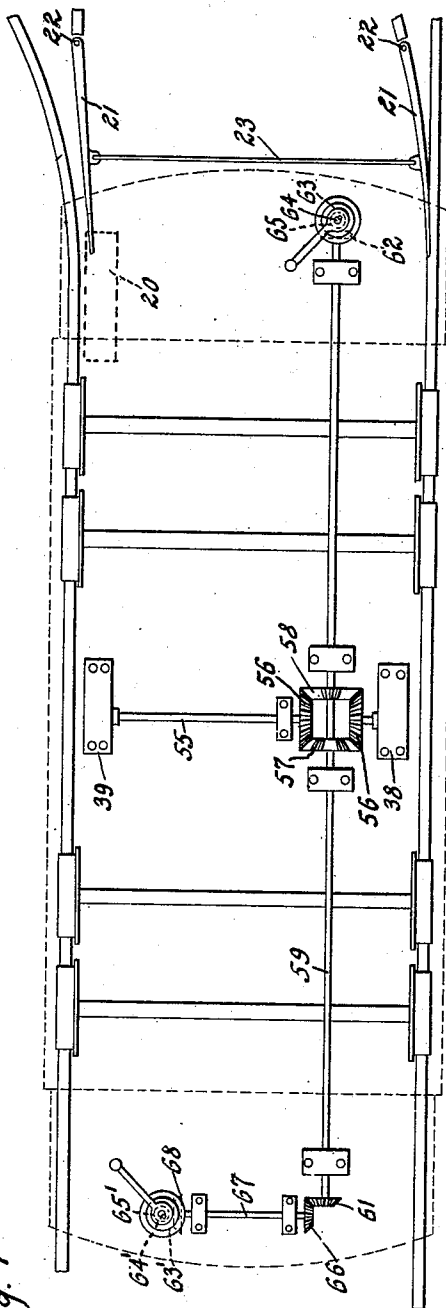


Fig. 1



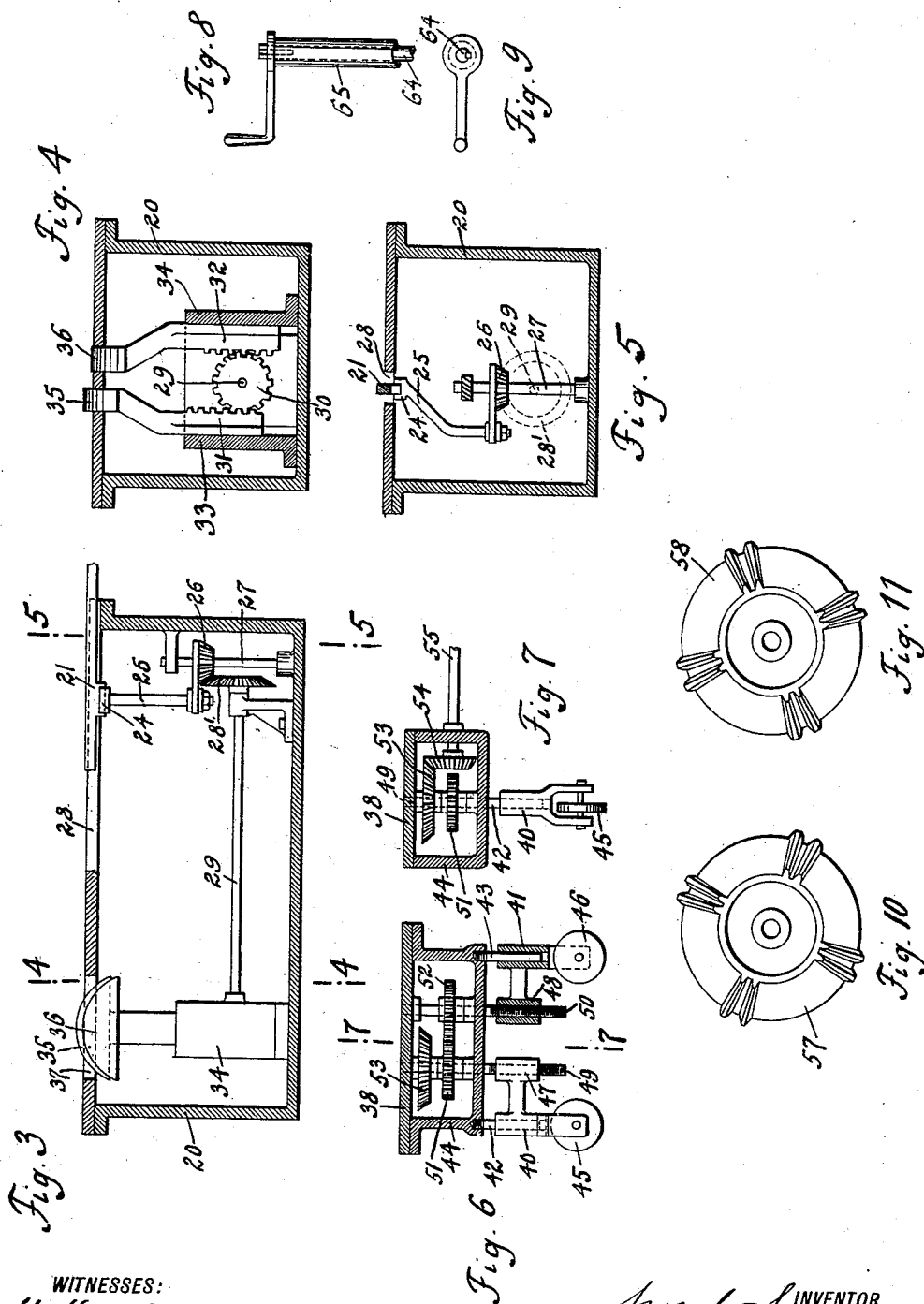
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APPLICATION FILED JULY 18, 1910.

Patented May 16, 1911.
4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

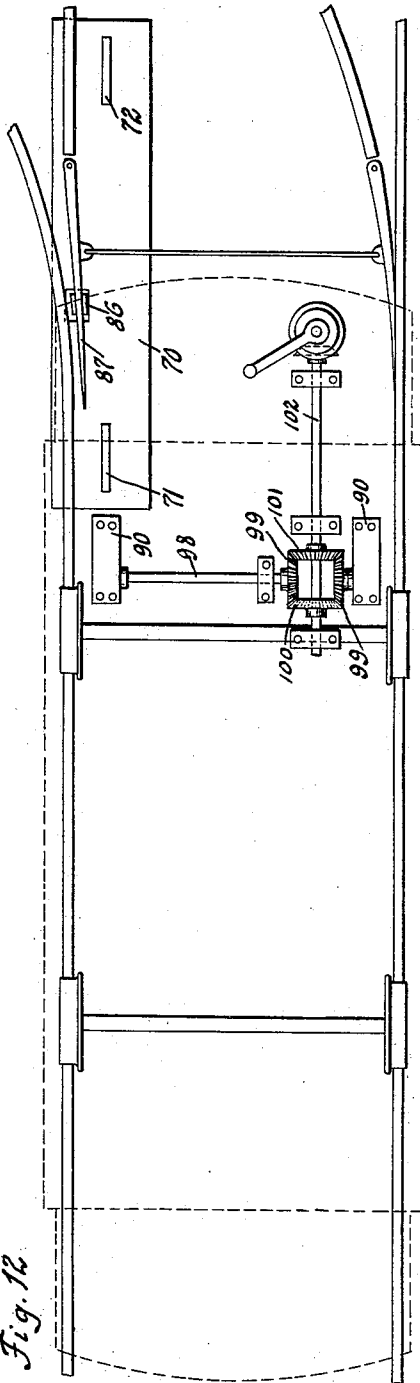


Fig. 12

WITNESSES:

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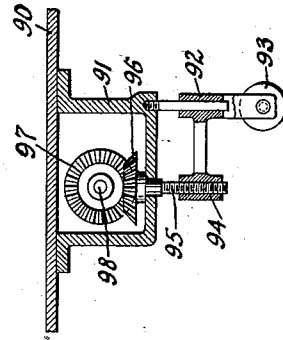


Fig. 14

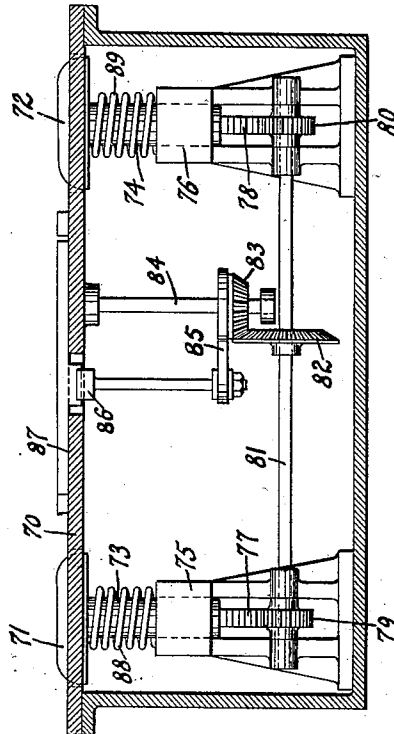


Fig. 13

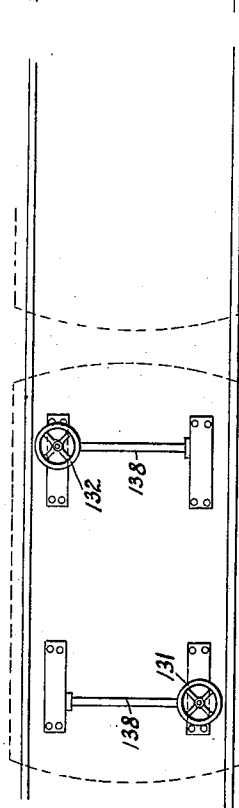
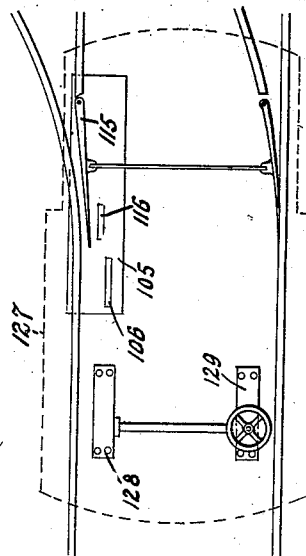
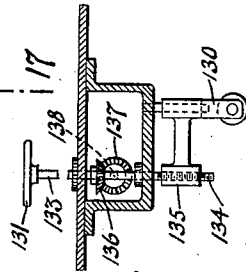
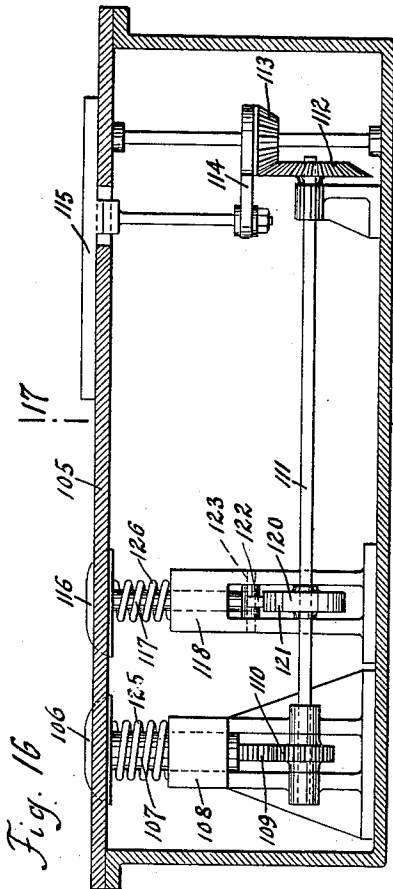
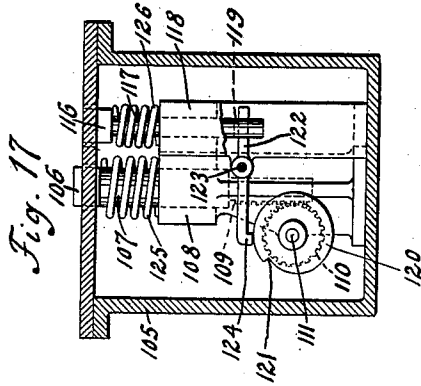
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Patented May 16, 1911.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOSEPH SAURUG, OF NEW YORK, N. Y.

SWITCH-OPERATING APPARATUS.

992,261.

Specification of Letters Patent.

Patented May 16, 1911.

Application filed July 16, 1910. Serial No. 572,266.

To all whom it may concern:

Be it known that I, JOSEPH SAURUG, a subject of the Emperor of Austria-Hungary, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Switch-Operating Apparatus, of which the following is a specification.

The present invention relates to switch operating apparatus, and more particularly to that class which enables the motorman on a moving car or the engineer of a moving train to set the movable member of a switch from the car and train, respectively.

One of the objects of the invention is to provide a device of this character by means of which left-hand or right-hand switches can be easily set from both platforms of a car, irrespective of the direction of travel of said car.

Another object of the invention is to provide a switch operating mechanism of a very simple construction for the purpose above specified, the movable member of the switch being automatically thrown back to its normal position after the car has passed over the same.

A still further object of the invention is to provide a switch operating apparatus for locomotives, in combination with means upon the cars of the train, for returning the movable member of the switch to its "main line" position after the last car has passed over the same.

With these and other objects in view, which will more fully appear as the invention is better understood, the same consists of the novel construction, arrangement and combination of parts hereinafter fully described, pointed out in the appended claims and illustrated in the accompanying drawings, in which:—

Figure 1 is a diagrammatic view of the track portion and the car portion of a switch operating apparatus, constructed in accordance with the present invention; Fig. 2 is a vertical longitudinal sectional view of a car with its switch operating apparatus; Fig. 3 is an enlarged sectional view of the track portion of the apparatus; Fig. 4 is a section taken on line 4, 4 of Fig. 3; and Fig. 5 is a section taken on line 5, 5 of Fig. 3. Fig. 6 is a longitudinal vertical section taken through a tappet pair of the car and its accessories; Fig. 7 is a section taken on line 7, 7 of Fig.

6; Fig. 8 is a detail view of part of the tappet actuating mechanism; Fig. 9 is a plan view thereof; and Figs. 10 and 11 are front elevations of two of a train of gears actuating the tappets. Fig. 12 is a diagrammatic plan view of a modified track portion and car portion of a switch operating apparatus; Fig. 13 is a vertical longitudinal section taken through the track portion of the device; and Fig. 14 is a vertical longitudinal section taken through the modified tappet and its accessories. Fig. 15 is a diagrammatic view of a switch operating mechanism adapted to set the movable member of the switch from the locomotive and to restore it to its normal position from the last car of the train; Fig. 16 is a vertical longitudinal section taken through the track portion of the device; Fig. 17 is a section taken on line 17, 17 of Fig. 16; and Fig. 18 is a longitudinal section taken through one of the tappets and its accessories for restoring the switch to its normal position.

Referring now more particularly to Figs. 1 to 11, inclusive, the numeral 20 indicates a casing which is arranged in the pavement between the rails of a street railway a suitable distance in front of a switch, and with its upperside flush with the surface of said pavement. The switch tongues 21, 21 are pivoted at 22, 22 in the usual manner to the rails and connected by a rod 23, so as to be operated simultaneously. One of these tongues is attached to a fork 24, carried by a lever 25, which is secured to a bevel gear 26, the shaft 27 of which is journaled in bearings attached to said casing. The cover of the casing is obviously provided with a slot 28, permitting of an oscillating movement of the tongue 21. The bevel gear 26 meshes with a similar gear 28', keyed or otherwise secured to a shaft 29, upon the other end of which is arranged a pinion 30 in mesh with racks 31 and 32, which are guided in their movement by blocks 33 and 34, respectively, and provided at their upper ends with shoes 35 and 36, which project through openings 37 in the cover of the casing above the ground. The two shoes are arranged alongside of each other, one serving to permit the switch to be set for the main line and the other for the branch line.

As the shoes 35 and 36 of the track apparatus are sometimes arranged adjacent to the left-hand side of the track and in other positions adjacent to the right-hand side of

the track, it is obvious that each car must be provided with two sets of tappets. The tappets are mounted upon base plates 38 and 39, which are attached to the underside of the car body between the front and rear wheels, and near to the sides thereof. Since the construction and operation of the two pairs of tappets are identical, it will be sufficient to describe one pair of the same. One of these pairs is shown in Figs. 2, 6 and 7, and comprises vertically movable tappets 40 and 41, guided by rods 42 and 43, attached to a casing 44, fastened to the base plate mentioned. The tappets are provided with anti-friction wheels 45 and 46, and with blocks 47 and 48, respectively, having oppositely threaded holes meshing with the screw threads of spindles 49 and 50, to which are attached spur wheels 51 and 52, meshing with each other. The spindle 49 carries fixedly attached thereto a bevel gear 53, meshing with a similar gear 54, upon the shaft 55 on which is arranged also a bevel gear 56.

The anti-friction wheels 45 and 46 are arranged in parallel planes so as to operate upon the shoes 35 and 36. The bevel gears 56 and 56 of the two sets of tappets mesh with bevel gears 57 and 58, each of which is provided with eight teeth in groups of two, spaced apart 90°. The gears 57 and 58 are carried by a shaft 59, having upon its free ends bevel gears 61 and 62. The gear 62 meshes with a bevel gear 63, the shaft 64 of which is rotatably mounted in the cylindrical shaft 65, which latter is adapted to operate the brake mechanism of the car, and more particularly independently of rotation of the shaft 64. The bevel gear 61 meshes with a gear 66, upon the shaft 67 of which is arranged a bevel gear 68 in mesh with a similar gear 63', carried by the shaft 64', mounted in the cylindrical shaft 65'.

As will be seen from an inspection of the drawings, all of the shafts are journaled in suitable bearings, some of which have not been mentioned in the description, as their arrangement is not important and their operation obvious.

The operation of the device is as follows: When a car approaches a switch, the motorman, if he wishes, for instance to remain on the main line, rotates the shaft 64 to the right a quarter of a turn, whereby the bevel gears 57 and 58 are turned in a given direction. Since these gears are keyed upon the shaft 59 in such a manner that when the teeth of the gears 56 mesh with the teeth of the gear 58, the teeth of the gear 57 do not mesh with the same, it will be seen that upon rotating the shaft 59 to the right, the shafts 55 will be turned in corresponding directions and lower thereby, for instance, the tappets 40 and raise the tappets 41. The tappets 40 will thus depress the shoe 35, arranged either

on the right or left side of the track, and throw thereby the tongues of the switch in position for the main line. As soon as the car has passed over the shoes, the motorman turns the shaft 64 again a quarter of a turn in the same direction, whereby the teeth of the gear 57 will operate and return the tappets 40 and 41 to their normal positions. If the motorman desires to take his car to the branch line, the shaft 64 must be turned to the left, in which case the tappets 41 will be lowered and the tappets 40 raised.

Figs. 12 to 14, inclusive, illustrate a modification of the device, in which the switch is returned to its normal position after the car has passed over the same. In this case the track portion of the device consists of a casing 70 embedded in the pavement in such a manner that the shoe 71 is arranged on one side of the switch, while the shoe 72 is located at the other side, and at distances hereinafter to be described. The shoes are mounted upon stems 73 and 74, respectively, slidably arranged in standards 75 and 76, and provided with racks 77 and 78. These racks mesh with pinions 79 and 80, keyed to a shaft 81, upon which is mounted a bevel gear 82 in mesh with a similar gear 83, which is secured to a spindle 84, rotatably mounted in the casing. A lever 85 is attached to the bevel gear 83 and carries thereon the fork 86, engaging the tongue 87 of the switch. Springs 88 and 89 are coiled upon the stems 73 and 74, respectively, and bear against the shoes and the standards 75 and 76, causing thus said shoes to protrude through their corresponding holes in the casing. Upon each side of the car is arranged a base plate 90, having casings 91 secured thereto. Upon each casing is slidably arranged a tappet 92, provided with a friction roller 93, and having a block 94 in screw threaded engagement with a spindle 95, to the upper end of which is secured a bevel gear 96 in mesh with a gear 97, which is mounted upon a shaft 98. Upon the other end of the shafts 98 are mounted bevel gears 99, 99 in mesh with bevel gears 100 and 101, arranged upon a shaft 102, corresponding to the shaft 59, shown in Figs. 1 and 2. The bevel gears 100 and 101 are provided with teeth upon one-half of their peripheries, and keyed in such a manner that the toothed portions are on diametrically opposite sections. The operation of this device is as follows: As shown in Fig. 12, the normal position of the switch allows the car to be taken to the main line. If, however, the motorman wishes to take his car to the branch line, the shaft 102 is given a half of a turn, whereby the tappets 92 are lowered. If now the said tappet depresses the shoe 71, the switch tongues will be set for the branch line and kept in such position until the wheels of the car are already upon said tongues, keeping thus the

same in this position until the front wheels of the car have passed over the same. As soon as the lowered tappets 92 depress the shoe 72, the switch is set for the rear wheels of the car. In turning the shaft 102 half of a turn in the same direction, the tappets 92 are raised.

The device illustrated in Figs. 15 to 18, inclusive, is intended for use upon railroad tracks. In this case a casing 105 is arranged in the pavement between the rails near to the switch. In this casing is provided a shoe 106, carried by a stem 107, slidably mounted in a standard 108. The stem carries a rack 109, in mesh with a pinion 110, keyed to one end of a shaft 111. Upon the other end of the shaft is keyed a bevel gear 112, in mesh with a bevel gear 113, actuating the lever 114, which operates the switch tongue 115. A second shoe 116 is arranged in the casing and provided with a stem 117. This stem is slidably arranged in a standard 118 and is slotted, as shown at 119, near to its lower end. The shaft 111 carries a disk 120, provided with a notch 121 on its periphery. The slot 119 in the stem 117 is in engagement with a two armed lever 122, pivoted at 123 to the standard 118, and being provided upon its free end with a nose 124 adapted to enter the notch 121. Springs 125 and 126 are coiled upon stems 107 and 117, respectively, for forcing the shoes 106 and 116 into their elevated positions. These two shoes are located at varying distances from the rail so that one of the same is arranged in the path of the tappet upon the locomotive, while the other is arranged in the path of the tappets upon the cars of the train. The locomotive 127 must obviously be provided with two tappets, which are attached to base plates 128 and 129 upon the two sides of the locomotive, whereby the engineer of the train is able to set switches, the corresponding shoes of which are arranged on either side of the track. Each of the cars is provided with four tappets 130, arranged in the four corners of the car and adapted to be lowered by hand-wheels 131 and 132, attached to shafts 133, which are screw threaded at their lower ends, as shown at 134, and mesh with the threads of the blocks 135 of the tappets. Bevel gears 136 upon the shafts 133 mesh with similar gears 137 upon shafts 138 for actuating the tappets upon the opposite side of the car. The operation of this device is as follows: The engineer of the train, when approaching a switch, sets the tappets of the locomotive in the manner hereinbefore described. The tappets will depress the shoe 106, whereby the nose 124 of the lever 122 will engage the notch 121 of the disk 120, holding thereby the shoe 106 in its lowered position against the action of the spring 125, and thus also the switch in its proper position. The brakeman standing

upon the last car will lower the rear tappets 130 of the car so that when such tappets pass over the shoe 116, the latter will be depressed, whereby the nose 124 of the lever 122 will be disengaged from the notch 121. The shoe 106 will thus be brought back to its normal position and so also the switch.

It is obvious that many minor changes may be made in the construction and arrangement of the several parts of the device without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim is:

1. In a switch operating apparatus, the combination with a casing adapted to be embedded in a pavement and having openings in its upper wall, of two shoes protruding upwardly through said openings and having racks attached thereto, a shaft rotatably mounted in said casing, a pinion upon said shaft meshing with said racks, a switch tongue, a connection between said switch tongue and said shaft, whereby upon depressing one of said shoes said switch tongue is moved in one direction and upon depressing the other of said shoes in the other direction, a car track, one of the rails of which is arranged adjacent to said shoes, a car movable on said track, two sets of vertically movable tappets carried by the car, and a single operating means adapted to be actuated from the front or rear platform of the car for lowering either set of tappets at will.

2. In a switch operating apparatus, the combination with a casing adapted to be embedded in a pavement and having openings in its upper wall, of two shoes protruding upwardly through said openings and having racks attached thereto, a shaft rotatably mounted in said casing, a pinion upon said shaft meshing with said racks, a switch tongue, a lever operated by said shaft, a fork carried by said lever and engaging said switch tongue, whereby on depressing one of said shoes the switch tongue is moved in one direction and upon depressing the other of said shoes in the other direction, a car track, one of the rails of which is arranged adjacent to said shoes, a car movable on said track, two sets of vertically movable tappets carried by said car, and a single operating means adapted to be actuated from the front or rear platform of the car for lowering either set of tappets at will.

3. In an apparatus for the purpose described, the combination with a car, of two sets of tappets carried thereby, means for connecting each member of one set with its corresponding member of the other set, and a single operating means to be actuated from the front or rear platform of the car for lowering either set of tappets and simultaneously raising the other set at will.

4. In a switch operating apparatus, the combination with a casing adapted to be embedded in a pavement and having openings in its upper wall, of a shoe protruding upwardly through one of said openings and having a rack attached thereto, a second shoe protruding through another of said openings, springs tending to force said shoes into protruded positions, a shaft rotatably mounted in said casing, a pinion on said shaft meshing with said rack, a notched disk on said shaft, a lever engaging said second shoe and adapted to enter said notch, a switch tongue; and a connection between said shaft and said switch tongue, whereby the latter is set to one position upon depressing said first shoe and restored to its normal position upon depressing said second shoe.
5. In a switch operating apparatus, the combination with a casing adapted to be embedded in a pavement having openings in its upper wall, of a shoe protruding upwardly through one of said openings and having a rack attached thereto, a second shoe protruding through another of said openings, springs tending to force said shoes into protruded positions, a shaft rotatably mounted in said casing, a pinion on said shaft meshing with said rack, a notched disk on said shaft, a pivoted lever engaging said second shoe and resting normally upon said disk and adapted to enter the notch thereof for holding said first shoe in its lowered position against the action of its spring, a switch tongue, and a connection between said shaft and said switch tongue, whereby the latter is set to one position upon depressing said first shoe and restored to its normal position upon depressing said second shoe.

Signed at New York, in the county of New York and State of New York this 23rd day of February, A. D. 1910.

JOSEPH SAURUG.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."