(No Model.) 3 Sheets—Sheet 1.

A. C. L. ENGSTFELD.

TRAMWAY SWITCH.

No. 503,474. Patented Aug. 15, 1893.

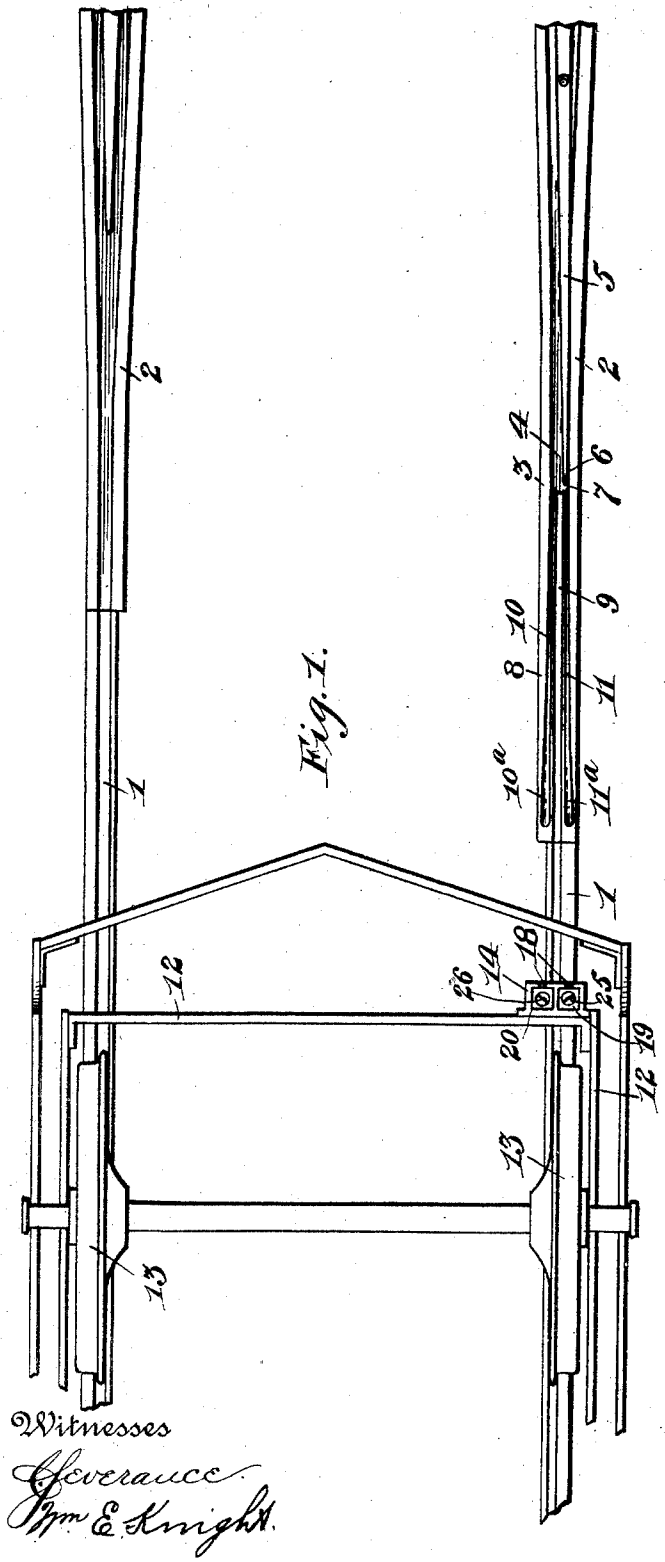

Fig. 1.

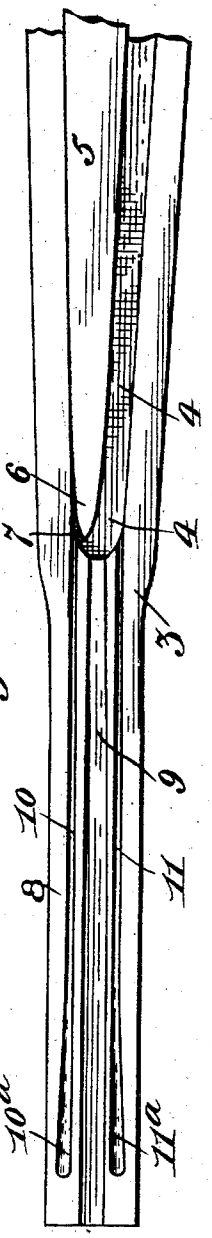

Fig. 10.

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(No Model.)

3 Sheets—Sheet 2.

A. C. L. ENGSTFELD.

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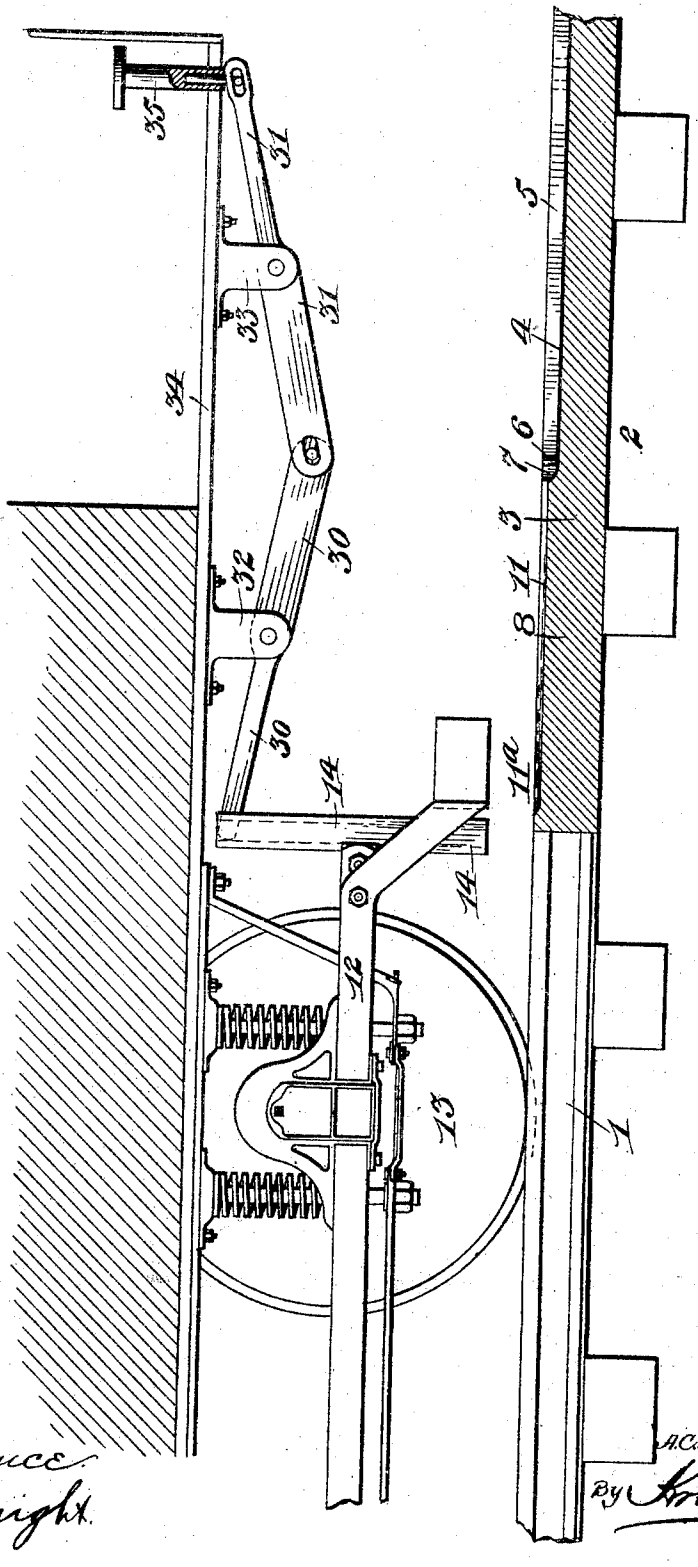

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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TRAMWAY SWITCH.

No. 503,474. Patented Aug. 15, 1893.

Fig. 3.

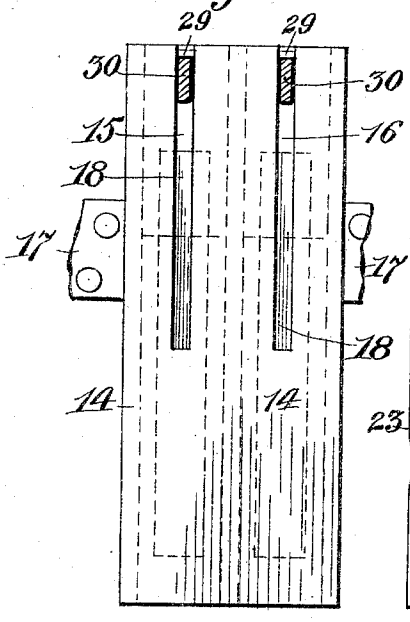


Fig. 4.

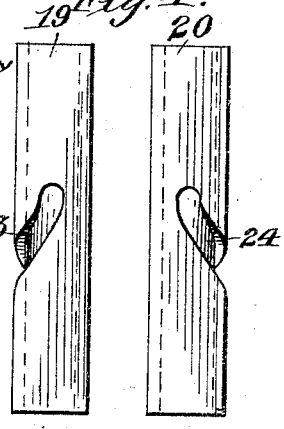


Fig. 5.

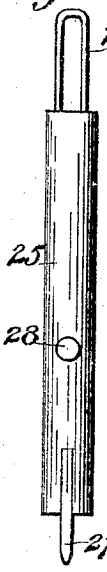


Fig. 6.

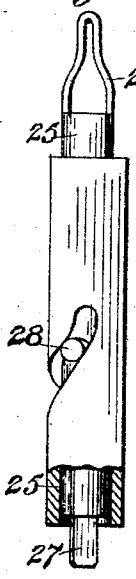


Fig. 7.

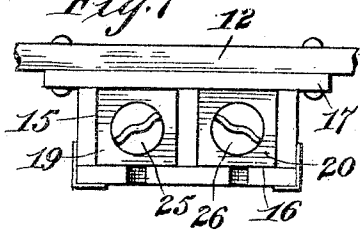


Fig. 8.

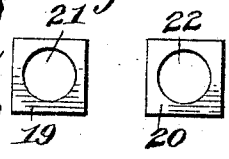


Fig. 9.

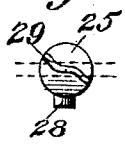


Fig. 11.

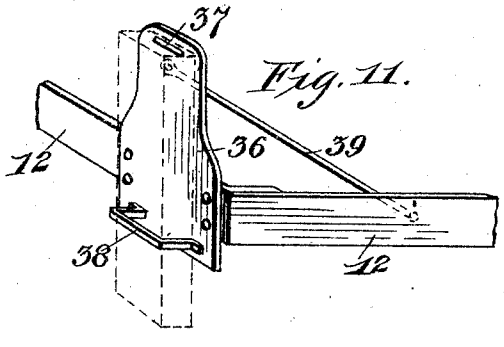
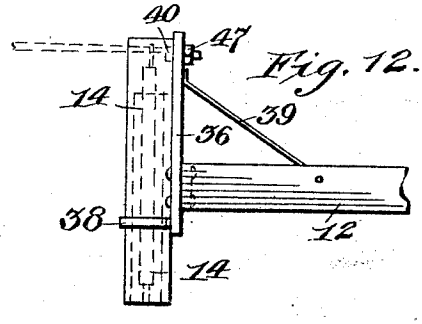


Fig. 12.



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UNITED STATES PATENT OFFICE.

AUGUSTIN CHARLES LOUIS ENGSTFELD, OF MEMPHIS, TENNESSEE.

TRAMWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 503,474, dated August 15, 1893.

Application filed July 8, 1892. Serial No. 439,387. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTIN CHARLES LOUIS ENGSTFELD, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Automatic Switches for Tram-Cars, of which the following specification, taken in connection with the accompanying drawings, is a full, clear, and exact description, such as will enable those skilled in the art to make and use the same.

My invention relates to that class of automatic switches in which the pivoted tongue of the switch is shifted by a device mounted on the car and under the control of the driver or motorman. All such devices known to me are more or less complex in their structure and expensive to put into practical use, and it is therefore the object of my invention to produce a simple automatic switching device which will employ the least possible number of parts, and will be economical to construct and maintain in repair and effective and easy in operation.

To this end my invention consists broadly of a vertically movable rotatable shifting blade carried by the car and adapted to engage the pivoted tongue of a switch and be rotated for shifting the switch.

My invention consists further of the combination of a pair of the vertically movable rotatable blades on the car, with the frog of a switch having the customary tongue pivoted in the triangular depression, and a pair of shallow grooves leading to each side of the depression in which the tongue operates, and adapted to guide the blades into engagement with the tongue and allow them to be automatically rotated for shifting the tongue.

In order that my invention may be fully understood, I will first describe it with reference to the accompanying drawings and then more particularly point out in the claims what I consider as new therein.

In said drawings:—Figure 1 is a top plan representation of my improved automatic switch, the body of the car being removed. Fig. 2 is a side elevation thereof, the switch frog being shown in section. Fig. 3 is an enlarged detail front elevation of the shifting device attached to the car. Fig. 4 is a front elevation of the sliding boxes removed from their casings. Fig. 5 is a front elevation of one of the vertically movable rotatable shifting rods. Fig. 6 is a front elevation of one of the sliding boxes and the vertically movable rotatable shifting rod in place therein and partly lowered and rotated. Fig. 7 is a top view of Fig. 3. Fig. 8 is a top view of Fig. 4. Fig. 9 is a top view of Fig. 5. Fig. 10 is an enlarged detail view of my improved switch frog. Figs. 11 and 12 are respectively a front perspective and side elevation of a modified arrangement for supporting my improved switching device on the truck frame.

1, 1, are the main track rails, and 2, 2, are the switch rails.

3 is my improved frog casting formed with the usual central depression or recess 4 in which is pivoted the tapered switch tongue 5. The forward end of the switch tongue is usually tapered so as to rest closely up against the sides of the recess or depression 4 when shifted from one position to the other, but for the purpose which will hereinafter appear, I form the forward end 6 of the tongue 5 with a more pronounced incline or taper than the sides of the recess in which it works, so that there will be a small space such as 7, between the end of the tongue and the frog casting in either position of the tongue.

8 is another section or casting forming a continuation of the frog 3, the usual flange groove or switch lead 9 extending from the forward end of the recess 4 through the section 8.

10 and 11 are guide grooves or leads in the castings 8 and 3 and leading to each side of the depression 4 as clearly shown in Figs. 1 and 10. Each of these grooves is very shallow and narrow, being about three sixteenths of an inch in depth and one-fourth of an inch wide, and widening out as much as possible at the beginning 10^a and 11^a, as shown in the drawings for the reception of the shifting blade presently to be described. It will be observed that the central depression 4 of the casting 3 is about one and three quarters or two inches in depth, and therefore there is a

drop from the lead grooves 10 and 11 to the bottom of the recess 4, which is for the purpose presently to be described.

12 is any approved form of truck mounted on the wheels 13.

Secured to the front frame piece of the truck-frame over the forward left wheel is a boxing 14, in which are supported my improved shifting devices. The boxing 14, as shown in Figs. 2, 3 and 7, consists of a metallic casing, formed of steel or iron plates with two chambers 15, 16, or only a single chamber. The boxing is also provided with the perforated side lugs 17, and the slots 18 in the front walls.

19 and 20 are a pair of square sliding boxes or casings fitting in the chambers 15 and 16 of the boxing 14, and adapted to move vertically therein; or arranged side by side in the single chamber of the boxing, when it is found with but one chamber. These casings 19 and 20 are formed with cylindrical openings or bores 21 and 22 respectively, extending longitudinally through them, and slanting slots 23 and 24 respectively which are cut through their walls into the central bores and extend from the center of the front faces to the center of their side faces. Each of these slots 23 and 24 extends through a vertical distance of one and one half inches, the upper three sixteenths of which extends vertically and the remainder on a slant. These casings surround and are supported by the shifting rods 25 and 26 which will now be described.

Each of the shifting rods 25 and 26 is a cylindrical bar having a thin blade 27 set into the lower end for engaging and shifting the switch tongue, a circular lug 28 projecting from its front edge and engaging in the slot formed in one of the casings 19 and 20, and a supporting loop or strap 29 attached to its upper end for the reception of the end of the supporting and operating lever 30. It will be seen that the casings 19 and 20 are supported upon the lugs 28 and move vertically with the shifting rods unless obstructed.

Pivoted to suitable brackets 32, 33 extending from the under side of the forward platform 34 of the car body, are two pairs of operating levers 30, 31 which are connected together at their adjacent ends by means of pins engaging in slots. The rear ends of the rear levers 30 pass through the loops 29 for supporting the shifting rods and their surrounding vertically movable casings, and in order to allow for the rotary movement of the shifting bar, the loop is attached to the upper end of the bar so as to extend diagonally across its face by attaching the ends on a line forty-five degrees to the levers 30, and then twisting the top parts around as illustrated in the drawings so as to extend at right angles to the supporting levers 30. This is also for the purpose of giving the parts a normal position when they hang from the levers.

Attached to the levers 31 are the foot-levers 35, which extend up through the platform in convenient position for the driver or motorman. The casings 19 and 20 are supported solely by the lugs 28 on the rods 25 and 26 engaging in the slanting slots, and move vertically with said rods. The arms of the levers 30 and 31 between the supporting brackets 32 and 33 are made heavy enough to support the parts normally as indicated in Fig. 2. In case of switches being located at the ends of very sharp curves, it may be found necessary to provide for an extra amount of play between the truck frame and the shifting device, and for this purpose I provide the arrangement shown in Figs. 11 and 12.

36 is a vertical plate rigidly riveted to the truck frame 12 and formed with a horizontal slot 37 at its upper end and an oblong loop or inclosing strap 38 at its lower end.

39 is a tie-rod securing the plate 36 to the truck frame 12.

14 is the boxing of my improved shifting device and 40 is a screw bolt extending from the rear side thereof and passing through the slot 37 where it is retained by a nut 47. The boxing is suspended by the bolt 40 and confined by the strap 38. This arrangement also provides for the proper adjustment of the device on the truck.

The operation of my device may be briefly described as follows: When the car reaches the switch-lead, the proper shifting device is pressed down until the blade and the surrounding casing rest on the rail. The blade then finds its way into its guide groove and descends three sixteenths of an inch below the surrounding casing, without turning, as the slot in the casing is vertical for this distance. The blade follows along in the guide groove until it reaches the depression in which the switch tongue works, when it is forced down into this depression between the pivoted tongue and the wall of the depression, the distance of one and one-half inches, the vertical extent of the slanting slots 23 and 24 of the casings 19 and 20. While the blade is making this latter descent, the surrounding casing is held against further downward movement by its contact with the tread of the frog casting, and the blade is therefore made to turn ninety degrees by reason of the lug on the shifting rod working in the slanting slot in the surrounding casing. By this movement the broad side of the blade is placed at right angles to the pivoted tongue and consequently shifts the same into its opposite position.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. An automatic switching device comprising a vertically movable rotatable bar suitably mounted upon a car, means for lowering said bar into engagement with the switch tongue, and means for simultaneously rotating said bar for shifting the switch tongue, substantially as set forth.

2. An automatic switching device comprising a vertically movable casing mounted on

the car and formed with a slanting or inclined slot, a vertically movable rotatable bar working in said casing and provided with a lug working in said slanting slot, and means for moving said casing and bar vertically, whereby the bar can be lowered into engagement with the switch and simultaneously rotated for shifting the switch tongue, as set forth.

3. An automatic switching device, comprising a vertically movable casing mounted upon the car and formed with a slanting slot, a vertically movable rotatable shifting bar located in said casing and provided with a lug which engages said slanting slot and a supporting loop on its upper end, and a suitable lever engaging said supporting loop for supporting the bar and casing and moving them vertically, substantially as and for the purpose set forth.

4. An automatic switching device, comprising a vertically movable rotatable bar provided with a twisted supporting loop attached to its upper end, means for rotating said bar, and the supporting operating lever engaged in said twisted loop, whereby the rod can be supported in its normal position by the lever and be rotated without interfering with the connection between the lever and the loop, substantially as set forth.

5. An automatic switching device, comprising a vertically movable rotatable bar provided with a supporting loop extending diagonally across its upper end, means for rotating said bar, and the supporting operating lever engaging said loop, whereby the bar can be moved vertically and rotated without interfering with the connection, as set forth.

6. An automatic switching device comprising a vertically movable rotatable bar having a blade at its lower end and a supporting loop at its upper end, means for rotating said bar, and a supporting and operating lever engaging in said loop and adapted to move the bar vertically, as set forth.

7. An automatic switching device, comprising a suitable boxing mounted upon the car and formed with a square chamber and slot in its front wall, a vertically movable square casing supported in said square chamber and formed with a cylindrical opening through it and a slanting slot in its wall, a vertically movable rotatable shifting bar working in the cylindrical opening of said vertically movable casing and formed with a lug which engages said slanting slot, and means for moving said bar vertically, substantially as set forth.

8. In an automatic switching device, the combination of a vertically movable casing mounted on the car, and a rotatable shifting bar supported in said casing and adapted to be rotated simultaneously with the lowering of the casing, with the switch frog formed with the deep recess in which the pivoted tongue works and the shallow lead grooves leading to the said deep recess, substantially as and for the purpose set forth.

9. In a switching device, the combination of a vertically movable rotatable shifting bar suitably mounted upon the car, with the switch frog formed with the recess having inclined walls, the tongue pivoted in said recess and having its forward end tapered or inclined at a more pronounced angle than the inclined walls of the recess, and lead grooves extending to said recess, substantially as set forth.

10. In an automatic switching device, the combination of the vertically movable rotatable shifting bar suitably mounted upon the car, the switch frog formed with the recess and the tongue pivoted in said recess, and lead grooves in the frog leading to the recess, the recess being deeper than the lead grooves, substantially as and for the purpose set forth.

11. In an automatic switching device, the combination of the vertically movable casing suitably mounted upon the car and formed with the slanting or inclined slot, and a vertically movable rotatable bar working in said casing and provided with a lug working in said slanting slot, with a switch frog formed with the deep recess in which the tongue is pivoted, and shallow lead grooves leading to the deep recess, substantially as and for the purpose set forth.

12. In an automatic switching device, the combination of the vertically movable casing suitably mounted upon the car and formed with a central cylindrical bore and the slanting slot or groove, a vertically movable rotatable shifting bar supported in said casing and provided with a lug which engages said slanting slot or groove, means for moving said bar and casing vertically, with a frog casting formed with the recess, the tongue pivoted in said recess, and lead grooves leading to said recess, the recess being deeper than the lead grooves, substantially as and for the purpose set forth.

13. In an automatic switching device for tram cars, the combination of the truck frame, a supporting plate rigidly attached to said truck frame and slot in the upper end of said supporting plate, a retaining strap or loop at the lower end of said supporting plate, the supporting casing of a shifting device inclosed by said strap or loop, and the bolt or pin extending from the upper end of said casing and engaging in the slot in said supporting plate, substantially as set forth.

AUGUSTIN CHARLES LOUIS ENGSTFELD.

Witnesses:
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W. C. BISHOP.