

(No Model.)

2 Sheets—Sheet 1.

S. L. COLE.
TRAMWAY SWITCH.

No. 515,396.

Patented Feb. 27, 1894.

FIG. 5.

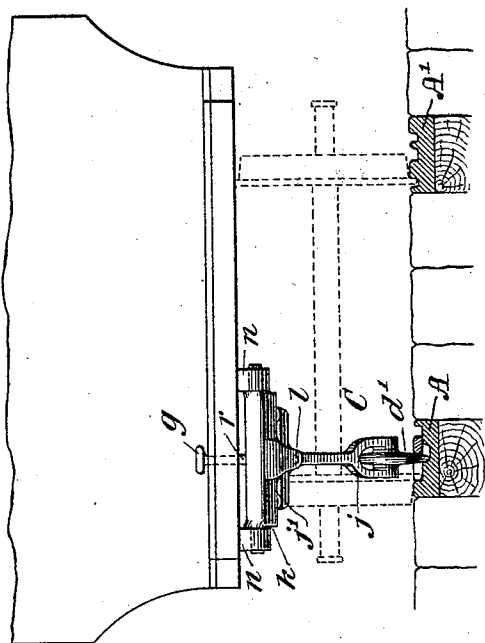
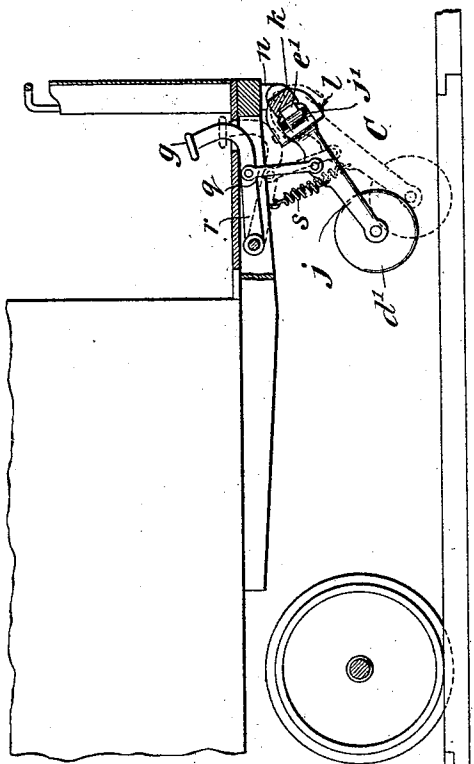


FIG. 1.



WITNESSES:

Fred White
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FIG. 4.

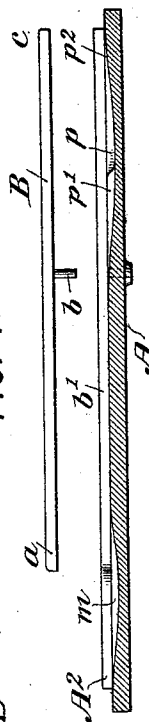


FIG. 3.

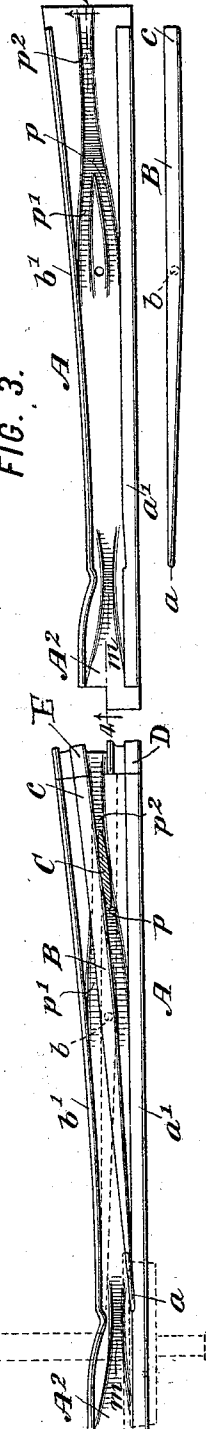
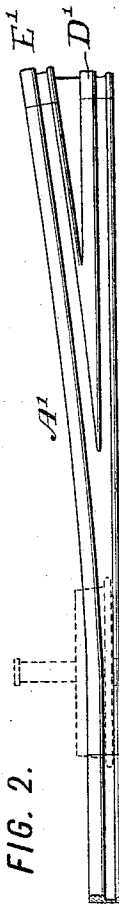


FIG. 2.



INVENTOR:

Simon L. Cole

By his Attorneys,

Arthur C. Fraser & Co.

(No Model.)

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FIG. 8.

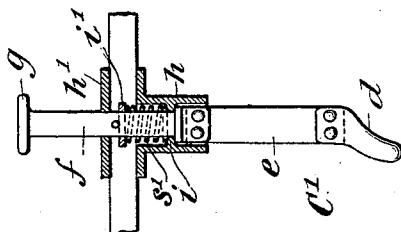


FIG. 7.

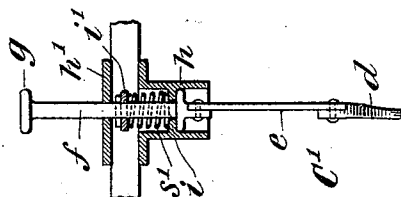
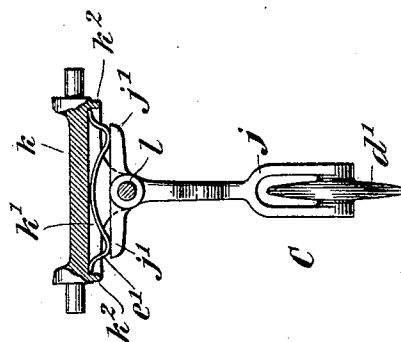


FIG. 6.



WITNESSES:

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L. K. Fraser.

INVENTOR:

Simon L. Cole,

By his Attorneys,

Arthur C. Fraser & Co.

UNITED STATES PATENT OFFICE.

SIMEON L. COLE, OF BROOKLYN, NEW YORK.

TRAMWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 515,396, dated February 27, 1894.

Application filed April 26, 1893. Serial No. 471,871. (No model.)

To all whom it may concern:

Be it known that I, SIMEON L. COLE, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Tramway-Switches, of which the following is a specification.

This invention provides an improved means for operating railway switches, and particularly those on tramways or street car lines, by means of which the switch may be thrown by the driver of the car.

My invention relates to that class of switch operating devices wherein a switch-shifter is carried by the car and is pressed down by a treadle whenever it is required to throw a switch which the car is approaching. Such switches as heretofore constructed have usually involved considerable complication, such as treadle or cam devices projecting at the switch midway of the rails.

My invention provides a simpler and cheaper construction and one less liable to get out of order, and better adapted for use on a street pavement.

My invention also provides an improved construction of switch-shifter carried by the car.

Figure 1 of the accompanying drawings is a sectional side elevation of a tram car, as for example an electric car, provided with a switch-shifter according to my invention. Fig. 2 is a plan of the switch. Fig. 3 is a plan of the switch-plate and tongue removed. Fig. 4 is a longitudinal section of the switch-plate on the line 4—4 in Fig. 3 with the tongue lifted off. Fig. 5 is a front elevation of the car showing the switch in section and the shifter in operation. Fig. 6 is a detail view showing the shifter-arm detached, on a larger scale. Figs. 7 and 8 are front and side elevations of a modified construction or shifter.

Referring to Figs. 2, 3 and 4, let A designate the switch-plate on which is mounted the pivoted switch-tongue B, and let A' designate the opposite switch-plate or frog, it being customary in tramways to apply the movable tongue to only one side of the switch, and to employ such a frog as shown at A' on the other side.

Let D D' designate the rails of the main or straight track beyond the switch, and E E' the rails of the siding or diverted track.

It is customary to pivot the switch-tongue B at the end remote from its tip, but according to my invention I arrange its pivot *b* between its tip *a* and its opposite end *c* and preferably approximately midway thereof, so that the switch-tongue becomes a lever of the first class. The tip *a* of the tongue has the customary movement from one side of the grooved or recessed plate A to the other, while the opposite or butt-end *c* of the after arm of the tongue has preferably sufficient movement to admit the width of the switch-shifter between its opposite positions. The after-arm is extended into coincidence with the rail E when the switch is set to the siding, and when set to the main track it is extended parallel or substantially so to the rail *a'* which merges into the rail D, so that in either position of the switch free space is left for the flanges of the car wheels to pass over it without disturbing the switch-tongue.

The switch-shifter C, the preferred form of which is shown in Figs. 1, 5 and 6, and a modified form in Figs. 7 and 8, where it is lettered C', consists merely of a vertically movable part carried by the car normally elevated and with a treadle or other means for pressing it down, and so guided that when it is thrust down it shall enter the switch approximately midway of the two extreme positions of the tip *a* of the tongue, so that whichever way the tongue is turned the shifter shall slide in along one side of it, and after passing its pivot *b* shall act upon the after-arm of the switch-tongue in order to shift the switch to the opposite position. The shifter has to be so mounted as to yield laterally to a sufficient extent to enable it to be deflected to either one side or the other of the pivotal portion of the tongue. By preference this mounting is elastic, so that while it shall normally take a position midway of the extreme positions of the switch-tongue, it shall elastically resist a deflection to either side of such normal position. To the extent of such elastic resistance, the shifter would exert on reaching the after-arm *c* of the switch-tongue,

a tension against the arm in a direction tending to throw the switch to the opposite position, and by preference the spring tension applied to the shifter is made sufficient of itself to throw the switch, although this is not absolutely essential to my invention.

The simple modified form of switch-shifter shown in Figs. 7 and 8 will readily enable its operation in connection with the switch-tongue to be understood. This form of shifter consists of an upright plunger pressed up by a spring movable in suitable vertical guides, and having in itself sufficient elasticity to resist lateral displacement. It is constructed of a toe *d*, a plate spring *e*, and a sliding plunger *f* having a foot piece *g* on top. The plunger slides in guides *h h'*, and is pressed up by a spring *s'* reacting downwardly against lugs *i* on the guide *h*, and upwardly against a washer, plate or flange *i'* fixed on the plunger. The toe *d* stands normally a few inches above the rail, and just before reaching the switch it is pressed down by the driver who places his foot on the treadle *g*. The movement of the switch-shifter is such that on being pressed down its toe *d* shall strike the plate *A* before the shifter has reached the limit of its downward movement relatively to the car, in order that as the car advances the toe of the shifter shall slide or rub along over the top surface of the plate *A*, the purpose of this being that the toe shall be guided vertically by the switch-plate and shall not partake of any up and down movement of the car. The switch-plate *A* is preferably extended at *A*² for a sufficient distance beyond the tip of the switch-tongue to afford room for the shifter to be pressed down just before reaching the switch, and so that when thus pressed down the shifter shall strike on this portion of the plate and slide along its smooth surface, thereby avoiding risk of injury that might result if it were pressed down on the street pavement.

The switch-plate *A* is formed on one side with a rail *a'* as usual, and on the other side with an inner flange *b'*, as also is customary. This inner flange serves to prevent the displacement of the shifter away from the switch-tongue, while the rail *a'* at the other side serves the same function. In order the better to guide the shifter, the plate *A* is by preference varied on its surface between the rail *a'* and flange *b'* by forming certain grooves and inclines upon it, as I will now describe with reference to Figs. 2, 3 and 4. The end portion *A*² of the plate is formed with a groove *m* which as it approaches the tip of the switch-tongue narrows to a width approximately the same as that of the toe *d* of the switch-shifter, the groove *m* being gradually deepened until opposite the tip of the tongue it is deep enough to effectually guide the toe of the shifter. By means of this groove the shifter is guided so that it enters the switch in a position exactly midway of the two opposite posi-

tions of the tip *a* of the switch-tongue. This has the advantage that in case the tongue is slightly misplaced from its proper position to either side, so that the shifter if not thus guided might perhaps enter on the wrong side of the tongue, by being thus guided the shifter is forced to travel exactly in the middle, and consequently enters with certainty on the proper side of the tongue, except in the improbable contingency that the tongue is misplaced to almost exactly mid-position. The groove *m* may decrease in depth until it vanishes some distance back of the tongue as shown, since its function having been performed there is no further need of the shifter running in a groove. Toward the opposite end of the plate *A* it is formed with two grooves *p p'* commencing on opposite sides of the switch-tongue, preferably adjacent to its pivot *b*. These grooves may constitute continuations of the groove *m* if preferred, although this is not necessary; however, the respective grooves will in course of time become continuous by reason of wear. The grooves *p p'* becoming preferably gradually deeper as they extend beyond the pivot *b*, finally curve toward the middle and merge together, as clearly shown in Fig. 3, constituting a single groove *p*², which is continued preferably until it runs off the end of the plate *A*. The grooves *p p'* should be made deep enough to laterally guide the toe of the shifter, which should be kept pressed down to the bottom of the groove. The purpose of these grooves is to force the shifter to act laterally against the after-arm of the switch-tongue, whether its own lateral tension be sufficient to shift the switch or not. The toe of the shifter by sliding along the groove moves from a position at one side to a position in the middle as the groove *p* or *p'* curves, and merges into the groove *p*², so that this lateral movement of the shifter pushes the switch-tongue laterally and throws it to the opposite position. Accordingly by making use of these grooves, which are provided according to the preferred construction of my invention, the tension of the lateral spring of the shifter is not relied upon to shift the switch, and this lateral tension may consequently be very slight and essentially only sufficient to insure the proper lateral position of the shifter at the instant when it enters upon the switch.

The preferred form of shifter *C* shown in Figs. 1, 5 and 6, is constructed with a wheel or disk *d'* instead of the toe in the modified construction, in order to reduce the wear. This wheel is carried in the forked end of an arm *j*, which is pivoted at *l* to a rocker *k*, as best shown in Fig. 6. This rocker is formed with journals which are pivoted in blocks or brackets *n* attached to the platform of the car. The arm *j* is a T-lever, having opposite branch arms *j'* which are acted upon by a spring or springs *e'* reacting against the rocker *k*. The construction of spring shown is a convenient and effective

one, consisting of a single plate or bar of spring metal (of one or more thicknesses or leaves) housed in a recess k' formed in the rocker k , and confined at its ends within lips or lugs k^2 formed on the rocker, and having two bends or bulges which bear against the ends of the lateral arms j' , as clearly shown in Fig. 6. The tension of this spring consequently keeps the lever j of the shifter in a direct line, and strongly resists any displacement thereof to either side. The spring is laterally confined in the recess k' , the opposite side flanges of which are prolonged in the middle to form ears for receiving the pivotal pin l . The lever j is loosely connected by a link q with a treadle-lever r pivoted beneath the floor of the platform, and extending at its free end up through the floor and terminating in a foot-piece g .

A suitable spring s is connected to the lever j and to the car platform, acting to draw the lever j upward and thereby elevate the shifter and treadle. In operation the pressing down of the treadle vibrates the lever j from the position shown in full lines in Fig. 1 to that shown in dotted lines, and exerts a thrust through the link q to throw down the shifter lever to the position shown in dotted lines, thereby bringing the wheel d' down into rolling contact with the surface of the plate A. The proportions and arrangement of the parts are such that as the treadle is pressed down the lever r and link q assume a position like that of the arms of a toggle during the movement of straightening it, without however reaching the position in line with each other as in the case of a toggle, but to the extent shown having the advantage of a toggle in that the leverage by which the shifter is pressed down is greatly increased. This action ceases sufficiently far from the lever and link reaching the alignment of a straightened toggle, to avoid converting the depressing parts into an unyielding strut or brace for holding down the shifter, it being desirable that the shifter can be capable of yielding upwardly in case it should encounter any obstruction, as for example if a stone were wedged against the switch-tongue, in which case the wheel d' of the shifter will roll over the obstruction, forcing the shifter upward and forcibly raising the treadle.

The operation of the construction of shifter just described is the same as that of the modified form first described in its action on the switch-tongue. The wheel d' travels in the grooves m and p or p' in the same manner as the toe of the construction first described, and exerts the same lateral thrust against the switch-tongue. By reason of the arrangement of the switch-shifter as a trailing lever, it is better adapted to ride over obstructions without injury.

In the operation of my improved switch, the driver or motor man running the car has to press down the treadle of the switch-shifter

with his foot at the instant when he reaches a switch if he finds that the switch is wrongly set and requires shifting. If the switch is correctly set, he does not operate the shifter. After pressing down the treadle he holds it down until the shifter has thrown the switch, and preferably also until the flange of the advancing wheel has entered upon the switch, so that there is no possibility of the switch-tongue becoming displaced again. He then releases the treadle, preferably before or as the shifter runs off the after end of the plate A. In Fig. 2 the shifter C has just thrown the switch, and the advancing wheel shown in dotted lines is just about to enter upon it.

It will of course be understood that my invention is not limited to the employment of a treadle for operating the switch-shifter, as any other equivalent means for communicating motion to the shifter may be substituted. For example, the connecting parts may extend up high enough to be operated by the hand instead of by the foot.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. A tramway switch having its switch-tongue pivoted between its ends as a lever of the first class, with its after-arm extending, in one position of the switch, into coincidence with one track rail, and in the other position extending parallel with the other track rail, and shaped to afford in either position a free space for the passage of the flanges of the car wheels, whereby the position of the switch-tongue is not disturbed by the passage of a car over the switch.

2. A tramway switch having its switch-tongue pivoted between its ends as a lever of the first class, in combination with a car having a switch-shifter dependent from its front end, movable downward at will to engage the tongue, and constructed to bear against the after-arm of the tongue to throw the switch.

3. A tramway switch having its switch-tongue pivoted between its ends as a lever of the first class, in combination with a car having a switch-shifter dependent from its front end, movable downward at will to engage the tongue, and constructed to be movable laterally, with a spring for restoring it to its normal mid-position, whereby as the shifter enters on either side of the switch-tongue it is deflected laterally against the tension of its spring, and after passing the pivot of the tongue the lateral tension of its spring is exerted against the after-arm of the tongue in direction to throw the switch.

4. A tramway switch consisting of a base-plate and the switch-tongue pivoted thereto between its ends, the plate having guiding grooves adapted to direct a switch-shifter to act on the after-arm of the tongue to throw the switch.

5. The combination with switch-tongue B pivoted between its ends, of a base-plate A

having a groove *m* for guiding a switch-
shifter to a path midway of the opposite po-
sitions of the tip of the tongue, and having
inclined grooves *p p'* for guiding a switch-
5 shifter in its action against the after-arm of
the tongue to throw it from either side to the
other.

In witness whereof I have hereunto signed
my name in the presence of two subscribing
witnesses.

SIMEON L. COLE.

Witnesses:

GEORGE H. FRASER,
CHARLES K. FRASER.