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# RAILWAY SWITCH.

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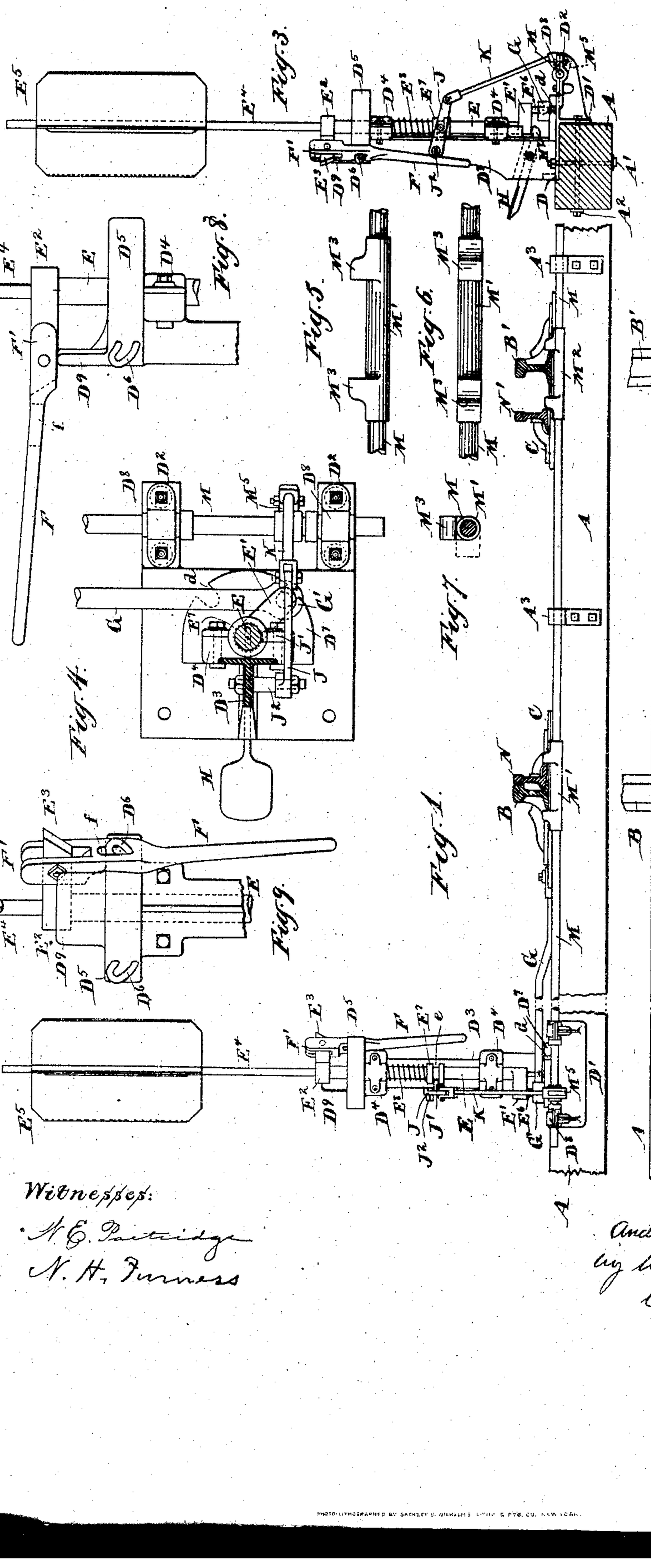


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No. 778,262. Patented December 27, 1904.

# UNITED STATES PATENT OFFICE.

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## RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 778,262, dated December 27, 1904.

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*To all whom it may concern:*

Be it known that I, ANDREW J. NEAFIE, a citizen of the United States, residing in Boonton, in the county of Morris and State of New Jersey, have invented a certain new and useful Improvement in Railway-Switches, of which the following is a specification.

The invention relates to means for operating and controlling railway-switches, and more particularly to means for securely locking the switch-point in the desired position. In the usual switch-controlling mechanism the main safeguard against misplacement is the locking at the switch-stand, generally more or less removed from the switch, of the train of connections from the stand to the switch-point, and as there is more or less play in the several joints in the mechanism it is often found that the locking at the switch-stand may be performed without insuring the close relation between the switch-point and adjacent rail necessary to avoid danger of accident.

I employ a switch-stand in which in addition to the locking means is provided an auxiliary lock or "bolt" operating directly on the switch-point and actuated by the switch-throwing mechanism.

The objects of the invention are to provide a bolt serving to hold the switch-point against movement while the switch is set and means whereby such bolt is automatically moved by the action of the switch-throwing mechanism in setting the switch, in addition to a locking means for such mechanism, and also an additional safeguard preventing the switch-throwing mechanism from assuming the position of safety until the switch-point is properly thrown and locked in either the fully closed or open condition.

The invention consists in certain novel mechanisms and arrangements of parts and in certain details of construction, to be hereinafter described, by which the above objects are attained.

The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is an elevation of the improved switch-stand and bolt-operating mechanism adapted to lock both switch-points seen transversely of the rails, which are shown in cross-section. Fig. 2 is a corresponding plan view with certain portions of the switch-stand omitted, and Fig. 3 is an elevation of the switch-stand seen at a right angle to Fig. 1. The remaining figures are on a larger scale. Fig. 4 is a horizontal section through the switch-stand, showing the bolt-operating mechanism in plan view. Fig. 5 is an elevation of the bolt. Fig. 6 is a corresponding plan view, and Fig. 7 is an end view. Fig. 8 is a side view of a portion of the stand, showing the means for holding the switch-lever and its shaft out of the inoperative position until the switch-throwing mechanism and bolt are properly conditioned. Fig. 9 is a rear elevation corresponding to Fig. 8, but showing the parts in the inoperative position after the switch-throwing mechanism and bolt have been properly set and locked.

Similar letters of reference indicate the same part in all the figures.

I will describe the invention as applied to a "quarter-throw" switch-stand, in which the switch-point is thrown by turning the vertical shaft through one-fourth of a revolution and in which the bolt is arranged to lock both switch-points.

A is a timber supporting the switch-stand and extending beneath the rails B B′, analogous to a tie and carrying the rails on the slide-plates C C, as usual. The switch-stand comprises a plate D, having the apron D′, either formed in one therewith, as shown, or in a separate casting, secured to the timber A by bolts A′ $A^2$, extending through in both directions. Upon the plate is the upright standard $D^3$, having the vertical bearings $D^4$ $D^4$ and head $D^5$. These parts are preferably in a single casting. The apron D′ carries two outwardly-extending lugs $D^2$ $D^2$, serving as bearings for a shaft to be presently described.

E is the switch-stand shaft, extending vertically through the bearings $D^4$ $D^4$ and head $D^5$ and carries above the latter a collar $E^2$, having a lug $E^3$, to which is pivoted the jaws F′ of the hand-lever F, the head of which is slotted at *f* to receive either of the staples $D^6$ on the head $D^5$, by which the hand-lever is locked in the dependent or inoperative position by a padlock (not shown) engaged in the staple, as

usual. From the upper end of the shaft extends a rod $E^4$, carrying the vanes $E^5$, forming the target. At the lower end of the shaft is a crank E', having a long crank-pin $E^6$, extending loosely through the eye G' of the switch-rod G and engaging when at either extreme of its throw in one of the slot-holes *d* in a thickened portion $D^7$ of the stand-plate D. The shaft is raised to withdraw the crank-pin $E^6$ from the slot-hole by a foot-lever H, pivoted in the base of the stand and having a head H' bearing upwardly against the under face of the crank E'.

About midway between the bearings $D^4$ $D^4$ on the shaft is a collar $E^7$, having an annular groove *e*, in which is engaged a pin J', extending laterally from a lever J, pivoted at one end to a stud $J^2$, secured to the stand and carrying at its free outer end a link K, the lower end of which is pivotally attached to an arm $M^5$ on a tumbling rod or shaft M, received in the horizontal bearings $D^8$ on the lugs $D^2$.

$E^8$ is a helical spring encircling the shaft E between the collar $E^7$ and the upper bearing $D^4$ and serving to assist gravity in forcing the shaft downward.

The switch-rod G extends transversely beneath the rails and is connected to the switch-points N N' as usual or in any preferred manner.

The tumbling-rod M extends parallel with the switch-rod, but at a slightly lower level and passes beneath the rails and switch-points and is supported in bearing $A^3$ $A^3$, secured to the side of the timber A or otherwise. The rod M at points adjacent to the rails is thickened, as indicated at M' $M^2$, and provided with lugs $M^3$ $M^3$ and $M^4$ $M^4$, the former serving with the rail B and switch-point N nearest to the stand and the latter with the outer rail B' and switch-point N'. Both pairs of lugs are in line with each other and project from the same face of the rod, and the lugs of each pair are located at such distance apart as to receive the flanges of the adjacent rail and switch-point between them, and thus to hold the switch-point securely in the closed position when desired. The lugs are also so spaced as to present one between the switch-point and rail when the point is in the open position, and thus prevents the accidental movement of the point toward its rail in the direction to close.

The operation is as follows: Assuming the parts to be in the position shown in Figs. 1 and 2 and it is desired to open the switch, the attendant raises the hand-lever F to release the mechanism and depresses the foot-lever H, which correspondingly elevates the shaft E against the force of gravity and the spring $E^8$ sufficiently to lift the crank-pin $E^6$ out of engagement with its slot-hole *d* and free the mechanism. The upward movement of the shaft through the collar $E^7$ and pin J' causes the free end of the lever J to rise and through the link K and arm $M^5$ induces a partial rotation of the tumbling-rod M and turns the lugs $M^3$ $M^3$ and $M^4$ $M^4$ from the vertical position in engagement with the switch-points and rails to the inoperative horizontal position and permits the switch-points to be thrown by the movement of the hand-lever F, acting through the shaft E, crank E', pin $E^6$, and switch-rod G, connected to the switch-points, until the pin $E^6$ reaches the second slot-hole *d*, in which it immediately engages, being forced downward by the weight of the parts, aided by the spring $E^8$. This downward movement produces a partial revolution of the tumbling-rod in the reverse direction and causes the lugs thereon to again rise, the pair $M^4$ $M^4$ embracing the outer switch-point N' and rail B' between them, and one of the pair $M^3$ $M^3$ lying between the inner rail B and switch-point N to prevent the approach of the latter to its rail. The parts are thus securely locked and held in the new position until a repetition of the operation and a reverse movement of the shaft E returns them to the original position.

By locking the ends of the switch-points directly to the adjacent rails at the points of service the danger of slight movements of the switch-points due to lost motion in the switch-stand mechanism and its connections is avoided, and any accidental strains on the switch-rod G produce no movement of the switch-points until the tumbling-rod M has been rotated sufficiently to release them.

It will be observed that no additional manipulation by the attendant is required in operating a switch-stand equipped with my invention. The act of raising the shaft to withdraw the pin $E^6$ from the slot-hole and permit the switch to be moved also unlocks the points, and the lowering of the shaft again locks them. Thus the same movements required to be made by the attendant in operating the switch in the usual manner also actuates the bolt, and in addition to the locking effected by the engagement of the pin $E^6$ in its slot-hole the bolt serves as an auxiliary lock acting directly and automatically upon the switch-points at the points of greatest efficiency. The interposition of one of the lugs of the bolt between the open switch-point and rail is of secondary importance, the transverse connections between the points being usually sufficient to insure the proper relative positions; but in situations in which the vibration and shocks due to passing trains or other causes tend to cause the switch-point to crawl toward its rail the position of the lug insures the required space between them under all conditions.

As an additional safeguard against inadvertently leaving the switch open or but partially closed I provide means for preventing the return of the parts and also of the hand-lever F to the locked position until the shaft E has been turned sufficiently in one direc-

tion or the other to insure the proper placing of all the parts and permit the slot *f* in the hand-lever to engage one or the other of the staples $D^6$. This is effected by a partial flange or guard $D^9$ on the rear of the head $D^5$ and occupying the arc described by the movement of the lever in swinging from one extreme position to the other. The guard is of such height as to be cleared by the lug $E^3$ and the lever when the shaft E and its connections have been elevated by the action of the foot-lever. Thus conditioned the shaft may be turned in either direction without interference, but cannot be lowered until turned far enough to permit the lug and lever to descend at one side or the other of the guard in such position that the staple will enter the slot and it is certain that the complete movement of the switch-point has been made.

Modifications may be made in the forms and proportions of the parts without departing from the invention or sacrificing its advantages, and parts of the invention may be used without the whole.

Although I have shown the invention as arranged to lock both switch-points, one in the open and the other in the closed condition, it will be understood that one bolt may be omitted, preferably at the switch-point that lies normally open, depending upon the switch-rod and its connections to control the other switch-point.

The invention may be applied to switches of other types than the quarter-throw shown and described, and will also serve to hold the movable point in a "stub-switch." The spring $E^8$ may be dispensed with, depending upon gravity alone to insure the descent of the shaft E and the performance of the operations induced by such descent. The guard $D^9$ may be omitted or may be used on switch-stands of other types equipped with different switch throwing and locking mechanism.

All the parts not specifically described may be understood to be of any ordinary or approved construction, and any parts omitted from the drawings and description may be as usual in mechanism of this class.

I claim—

1. In a railway-switch, a switch-stand and connections therefrom to a switch-point whereby the latter is thrown, an oscillating rod, lugs thereon to engage between the switch-point and rail to act directly upon the switch-point to hold the switch in a closed position, mechanism carried on said switch-stand and connecting to said rod whereby the operation of conditioning said mechanism to throw the switch moves said rod and releases the switch-point, and means whereby the axial movement of the switch-stand shaft actuates the auxiliary locking means.

2. In a railway-switch, a switch-stand having a shaft and means for turning it, a crank on said shaft and connections therefrom to a switch-point, means for moving said shaft axially, a tumbling-rod extending beneath said switch-point, a locking means carried on said tumbling-rod adapted to engage said point and hold it against movement, and means actuated by the axial movement of said shaft for inducing a partial rotation of said tumbling-rod, whereby said switch-point is released by said locking means.

3. In a railway-switch, a switch-stand having a shaft and means for turning it, a crank-pin on said shaft and connections therefrom to a switch-point, a slot-hole receiving said pin and serving to hold said switch-point against movement, means for moving said shaft axially to withdraw said pin and permit said switch-point to be moved, a tumbling-rod extending beneath said switch-point and its adjacent rail, an auxiliary locking means carried by said tumbling-rod and comprising a pair of lugs adapted to receive said switch-point and rail between them and hold them closely together, and means actuated by the axial movement of said shaft for inducing a partial rotation of said tumbling-rod, whereby said lugs are moved to hold or to release said rail and switch-point.

4. In a railway-switch, a switch-stand having a shaft and means for turning it, a crank on said shaft and connections therefrom to a switch-point, means for moving said shaft axially to permit turning, an auxiliary locking means for holding said switch-point in position relatively to the rail, and mechanism carried by said switch-stand whereby said axial movement of said shaft automatically actuates said auxiliary locking means.

5. In a railway-switch, a switch-stand having a shaft and means for turning it, a crank on said shaft and connections therefrom to the switch-points, means for moving said shaft axially, a tumbling-rod extending beneath the rails and said switch-points, a locking means comprising pairs of lugs carried by said rod, each pair adapted to receive and hold one of said switch-points and rails between them when closed, and to hold such point and rail apart when separated, and means actuated by said axial movement for partially rotating said rod, whereby said locking means are automatically turned to release said switch-points by the movement of said shaft in one direction and automatically turned to lock said points by a movement of said shaft in the opposite direction.

6. In a railway-switch, a switch-stand, a shaft mounted therein and having a crank, means for turning said shaft and means for moving it axially, connections from said crank to the switch-point, a grooved collar $E^7$ on said shaft, a lever J having a pin J′ engaged in said collar, a tumbling-rod M supported in said stand and having an arm $M^5$ thereon, a link K from said lever to said arm, a pair of lugs on said rod adapted to engage and hold

said switch-point between them, whereby the axial movement of said shaft in one direction turns said lugs to release said switch-point and an axial movement of said shaft in the opposite direction turns said lugs to lock said switch-point.

7. In a railway-switch, a switch-stand, a shaft mounted therein and having a crank, means for turning said shaft and means for moving it axially, connections from said crank to the switch-points, a grooved collar on said shaft, a lever J having a pin J′ engaged in said collar, a tumbling-rod supported in said stand and having an arm $M^5$ thereon, a link K from said lever to said arm, the pairs of lugs $M^3$ $M^3$ and $M^4$ $M^4$ extending outwardly from said rod on the same face of the latter, each of said pairs adapted to receive and hold a switch-point and adjacent rail between them, whereby the axial movement of said shaft in one direction turns said lugs to release said switch-points and rails, and an axial movement of said shaft in the opposite direction turns said lugs to engage said switch-points.

8. In a switch-stand having a shaft and connected mechanism for throwing a switch-point by the partial rotation of said shaft, a lever secured to said shaft for imparting such rotation, and means carried by said switch-stand for preventing the depression of said lever until said shaft has been turned sufficiently to insure the proper movement of said switch-point.

9. In a switch-stand, a shaft arranged to be raised to permit its partial rotation, mechanism operated by such rotation for throwing a switch-point, a lever secured to said shaft for imparting such rotation, and means carried by said stand for preventing the lowering of said lever and shaft until the latter has been turned sufficiently to insure the proper movement of said switch-point.

10. In a switch-stand, a shaft arranged to be raised and lowered to permit its partial rotation, mechanism operated by such rotation for throwing a switch-point, a lever secured to said shaft for imparting such rotation and arranged to fold downward relatively to said shaft and be locked in such depressed position, a guard on said stand arranged to allow said lever to clear it when said shaft is raised, and to prevent the lowering of said shaft and the depression of said lever until the latter has swung sufficiently to escape said guard and impart the required rotation to said shaft.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

A. J. NEAFIE.

Witnesses:
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