No. 795,157. PATENTED JULY 18, 1905.

H. B. NICHOLS.

RAILWAY SWITCH MECHANISM.

APPLICATION FILED JAN. 16, 1905.

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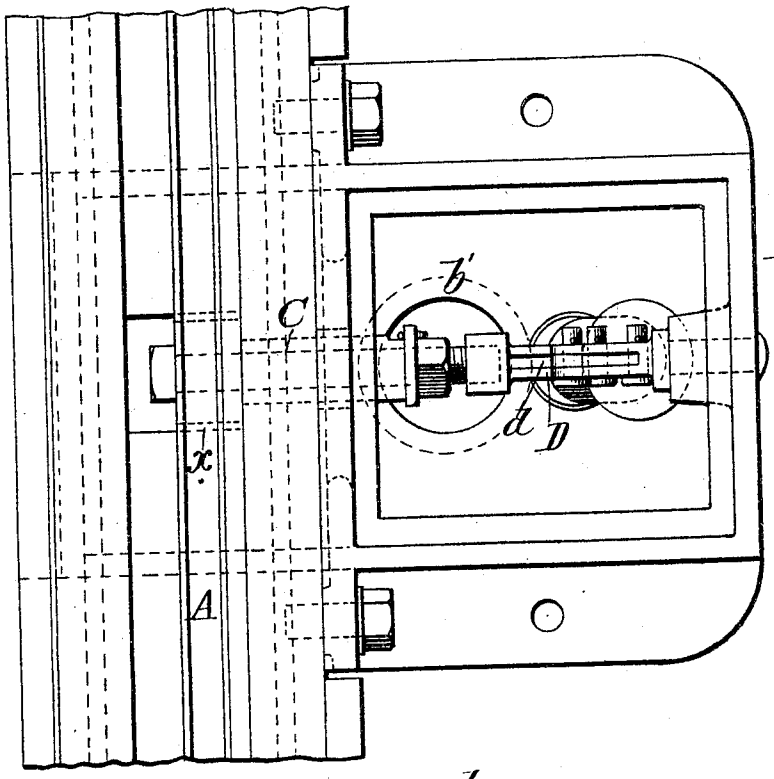
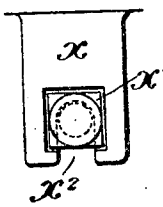


Fig. 2.

Fig. 1a



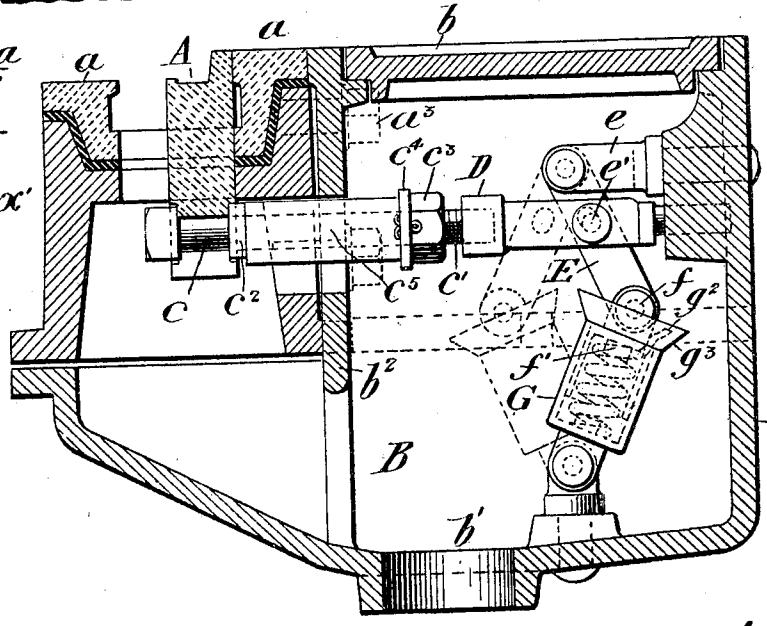


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 4.

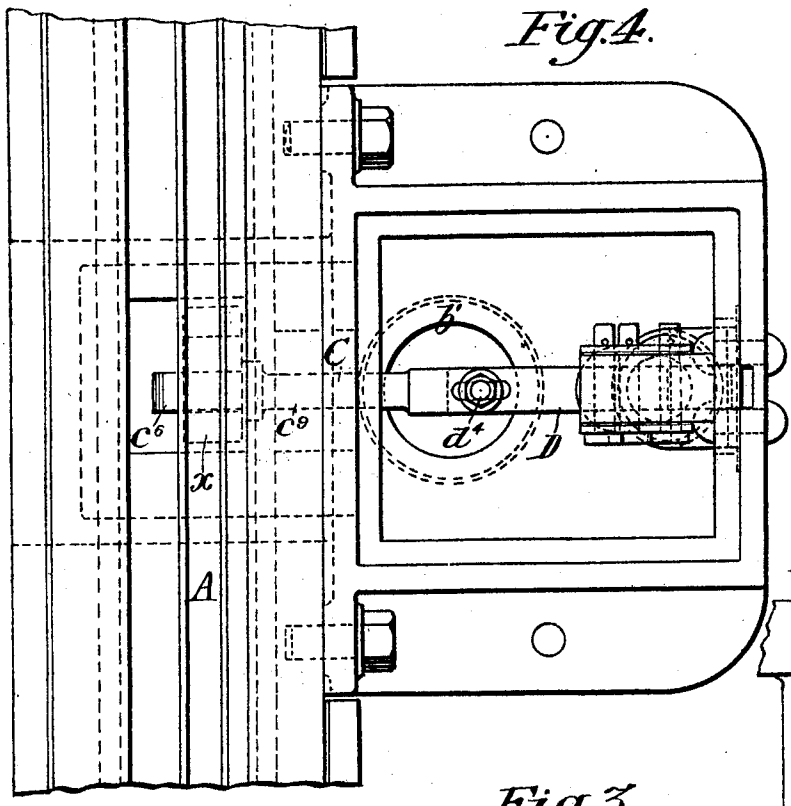


Fig. 3a.

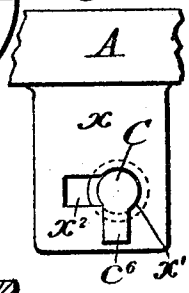
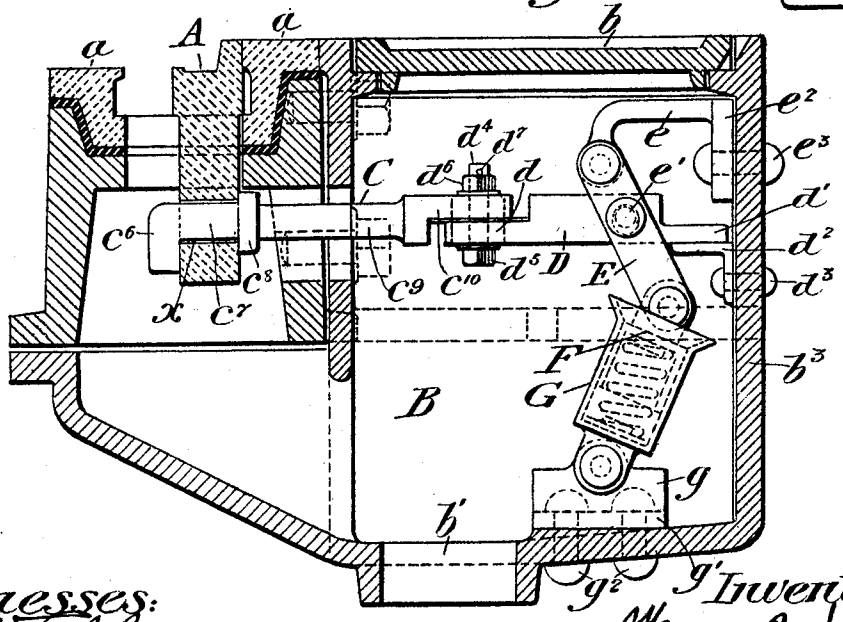


Fig. 3.



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No. 795,157. Patented July 18, 1905.

UNITED STATES PATENT OFFICE.

HENRY B. NICHOLS, OF PHILADELPHIA, PENNSYLVANIA.

RAILWAY-SWITCH MECHANISM.

SPECIFICATION forming part of Letters Patent No. 795,157, dated July 18, 1905.

Application filed January 16, 1905. Serial No. 241,358.

To all whom it may concern:

Be it known that I, HENRY B. NICHOLS, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Railway-Switch Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to railway-switch mechanism, and has for its particular object to provide means located adjacent to the movable switch-tongues of railway-tracks so constructed and arranged as to automatically move into and hold the tongues in either of their extreme positions as soon as they have been manually or otherwise moved slightly over one-half of the distance between said extreme positions.

While I have shown in the drawings and will describe an embodiment of my invention specially designed and adapted for street-railway work, it will be obvious to those skilled in the art that the principle of my invention is also applicable with but slight modifications in construction to railway-work in general.

In the drawings I have represented a mechanism comprising my invention by entirely inclosing the same in a casing adapted to be set below the track-level and with its upper surface approximately flush with the surface of the street, said upper surface being carried by a cover or lid which is readily removable to permit access to the operative parts. This arrangement is not, however, an essential and necessary feature of my invention, it being perfectly practicable to place said operative parts at any reasonable distance from the track, if desirable.

Other features and advantages of my invention will be more fully hereinafter pointed out in the detailed description and specified in the annexed claims.

In the drawings, Figure 1 is a central vertical section through the casing, showing the operative parts of my invention in side elevation, the section being taken transversely to the track. Fig. 1^a is a detail view of the switch-tongue drop. Fig. 2 is a plan view of the same. Fig. 3 is a sectional view similar to Fig. 1, showing modifications of certain of the parts. Fig. 3^a is a detailed face view of the switch-tongue-drop member shown in section in Fig. 3. Fig. 4 is a plan view of the same.

In the figures, A represents the switch-tongue, and a a the two railway-tracks, between which the tongue is mounted to move. Said tracks are shown as resting on the base-girder a', constituting a support for the same.

B represents the casing, above referred to, set in the ground at one side of and in part below said girder a' and secured thereto by bolts a^3 a^3. A cover b closes the open hand-hole in the casing, and a drain-opening b' is formed in the bottom thereof.

The above parts are common to both arrangements which I have illustrated herein. The external operative parts are shown in two forms, however, and I will describe each arrangement separately, pointing out the advantages thereof. The first arrangement is that shown in Figs. 1 and 2, and the second, or what at present I consider the preferred embodiment of my invention, is that shown in Figs. 3 and 4. I will first refer to Figs. 1 and 2, giving the construction and mode of operation of the parts as illustrated therein.

Connected to a drop or extension arm x on the switch-tongue A is the switch-rod C, the same passing through openings formed in the base a' and the side wall b^2 of the casing and being adjustably connected to one end of a rod D, the other end of which is slidably mounted in a guide-opening formed in the side wall b^3 of the casing B. The rod C is compound in its nature, being possessed of an inner bolt c, screw-threaded for some distance back from its end and provided with a sleeve c^5, washers c^2 and c^4, and a lock-nut c^3. The latter may be secured in any suitable manner to prevent its coming off when the parts are disassembled. The purpose of building up the rod in this way is this: switch-tongue extension x is provided with a squared opening x', as shown in Fig. 1^a, and a reduced neck x^2 to said opening, the metal being rabbeted out all around the squared opening on each face. This answers two purposes—first, when the

parts are in the position shown in Fig. 1 and the nut c^3 is screwed on the bolt-head and the washer c^2 are drawn together and seat in the opposite rabbeted openings, thus preventing the bolt from dropping out and disconnecting; second, the openings being squared, the bolt and its associated parts are prevented from turning, and thus from unscrewing the end where it engages the tapped opening in rod D and losing the adjustment. When it is desired to move the switch-tongue or any of the other parts, the nut c^3 is loosened and the sleeve c^5 can then be moved back, so as to spread apart the bolt-head and the washer c^2, whereupon the shank of the bolt c can be dropped down through the neck-opening a^2 and removed. The rod D is longitudinally slotted at d, and through the slot passes the lever E, pivoted above said rod D to a bracket e, attached to the wall b^2 of the casing, and having a pin-and-slot connection e' with the rod D. The lower end of said lever E is pivoted to an eye f, carried by the head of a plunger F, which is slidably mounted in a cylinder G, pivoted to a bracket g, secured to the bottom of the casing. Said plunger is hollow and incloses a coiled compression-spring g', which tends to force said plunger out of said cylinder, as will be apparent. Within the hollow plunger and surrounding the spring I fill up the cylinder with a suitable oil. In the plunger-head F, I produce an opening f', communicating from the inside of the cylinder to a point g^2 outside thereof, this opening being of sufficient diameter to permit a somewhat free passage of the oil in and out as the plunger moves up and down. By properly proportioning the diameter of this opening I can regulate the time constant of the device, the plunger-cylinder combination then acting as a dash-pot to retard the too sudden movement of the switch-tongue and connected parts. In order the more easily to attain this adjustment, I may provide a side screw having its point entering the passage through the head, this screw acting as a valve to partially close or open the passage-way when it is moved in and out. If it be desired to make the dash-pot single acting—that is, to retard the downward movement or perform the free upward movement, or vice versa—a simple form of jack-valve may be interposed in the head. In the present arrangement, however, I do not employ the cylinder G and the plunger F as a retarding device, the principal function of this arrangement being to protect the spring from oxidation or deterioration in resilient powers. I have found that by using a spring of this kind immersed in a suitable oil or other liquid the life of the spring is prolonged as well as its average efficiency during its life. Around the upper edge of the cylinder G, I produce a flaring extension g^3, which is intended to catch the drip and prevent an overflow of the oil as the plunger moves up and down. As a matter of fact, in practice there is very little if any loss of the oil, particularly if the latter is of considerable density.

The operation of the parts described is as follows: The switch-tongue A being, for example, in the position shown in Fig. 1 and it being necessary to move the same over adjacent to the left-hand rail in said figure, the motorman of the car which it is desired to switch or a workman stationed at the switch for that purpose will pry or force over the tongue by using a suitable implement for about one-half of the distance between the two rails, after which it moves over the rest of the way by itself. During the first part of this movement the spring g' is compressed; but as soon as the pivotal point of connection f between lever E and plunger F has passed the straight line joining the pivots at g and e of the cylinder G and lever E, respectively, the expansion of the spring g' throws the said lever over to the dotted-line position in Fig. 1, and consequently bar D, switch-rod C, and switch-tongue A are moved to their other extreme position.

The arrangement thus described and illustrated in Figs. 1 and 2 is possessed of a number of advantages and a number of disadvantages, the latter minor in their nature and not such as to affect the character of the arrangement as an improvement over former structures, but still such as to call for some further development, which I illustrate in Figs. 3 and 4. Thus with the mounting of the pivoted parts, as shown in Fig. 1, the inclosing casing requires a somewhat difficult casting by reason of the projecting bosses in which the standards e and g are mounted and in which also the guide-opening for the rod D is formed. Again, the rods C and D require considerable machine-work in finishing them ready for assembling, and when this device is assembled in its entirety the final adjustment of parts requires some skill.

In Figs. 3 and 4 the arrangement illustrated permits of a plainer casting for the box and of the use of either cast or punched parts with practically no machine-work in finishing them, the adjustment being of the simplest character and requiring absolutely no skill in their production. Here, as in the previous figures, A is the switch-tongue, a designates the rails between which it plays, B is the box or casing containing the apparatus, E is a double-pivoted connecting bar or link, F its plunger, and G the cylinder in which the plunger works. As these parts are all the same, they need no further description. The operating-rod C D, however, with its coöperating parts and its method of attachment to the switch-tongue, requires special description. The rod C is formed with a shank c^9, shoulder c^8, neck c^7, and head c^6, extending to one side of the neck. At the

other end the rod is flattened and cut away, so as to form a fish-joint with the extension-rod D. The flat bars c^{10} and d have central longitudinal slots through which the bolt d^4 is passed, with its head d^5 and its nut d^6 on opposite sides of the point, preferably with the nut up, and prevented from coming off by the cotter-pin d^7. The inner faces of the two bars are toothed or roughened, so that when the nut d^6 is screwed down tight it is practically impossible to move the bars upon each other. The extension-rod D is pivoted to the lever E at e', and its end d' rests upon a bracket d^2, riveted to the side of the casing b^3, as indicated at d^3. This bracket may obviously be a punching or a casting and requires no special conformation in the side of the box to receive it. The pivot-lever E is swung at its upper end from a bracket e, whose vertical member e^2 is also riveted to the side wall b^3, as shown at e^3. This also is a superior construction and requires nothing but a flat face on the box-wall. With this arrangement the opening in the lower end of the switch-tongue-drop member x is in the shape of a keyhole-slot x' x^2, the slot being turned horizontally. It will be noted that the head c^6 of rod C is at right angles to the plane of the fish-joint. Hence when the parts are in position the head c^6 is held vertically. The best recommendation of this form of my invention is that it may properly be called "fool-proof." No tools are required for its adjustment except a wrench. The adjustment itself is automatic and calls for no special skill whatever. In assembling the device the rod C is turned sidewise and its head c^6 passed through the keyhole-slot in the lug x. Being then turned with the head c^6 vertically and the bar c^{10} horizontally, the bolt d^4 is inserted, the nut screwed down, and the cotter-pin put in place. In order to make this assembling still easier, the bar c^{10} may be simply forked on the end, so that the nut d^6 and cotter-pin d^7 need never be removed, the parts being put together by a sliding motion After assembling, the operation of the device is the same as that heretofore described.

It will be obvious that various changes in form and dimensions of parts from that described and illustrated may be made without departing from the principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a railway-switch, the combination with the movable switch-tongue, of a rod rigidly connected thereto, a lever pivoted at one end and having a connection with said rod, a spring arranged to act on the free end of said lever to hold said rod and switch-tongue in either extreme position and means for retarding the action of the spring.

2. In a railway-switch, the combination with the movable switch-tongue, a casing located adjacent thereto, a rod rigidly connected to said switch-tongue and guided at its end by means connected with the wall of said casing, a lever pivoted at one end to said rod, a spring connected to the other end of said lever and to said casing, adapted and arranged to hold said lever and rod in either extreme position and means for retarding the action of the spring.

3. In a railway-switch, the combination with the movable switch-tongue, of a rod rigidly attached thereto, a lever pivoted at one end and connected to a spring-pressed plunger at the other, said lever engaging said rod intermediate its ends and a pivoted cylinder in which said plunger is slidably mounted, the pivots of said cylinder and lever being in the same plane, whereby said spring-pressed plunger tends to hold said lever and rod in either of their extreme positions.

4. In a railway-switch, the combination with the movable switch-tongue, a casing located adjacent to said tongue, a switch-rod connected to said tongue, a second or extension rod in axial alinement with said switch-rod and adjustably secured thereto, a lever pivoted in said casing and engaging said second rod and a spring connected to the free end of said lever and to said casing and arranged to hold said rods and tongue in either extreme position.

5. In a railway-switch, the combination with the movable switch-tongue, of an operating-rod secured thereto, a lever engaging said rod, a spring-pressed plunger attached to said lever, a cylinder in which said plunger is slidably mounted, said cylinder having a passage communicating with both sides of said plunger, and a liquid within the cylinder covering and protecting the actuating-spring therein.

6. In a railway-switch mechanism, a switch-tongue, an operating-lever therefor, an actuating-spring therefor, a vessel containing the spring and a body of oil within the vessel covering the spring.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY B. NICHOLS.

Witnesses:
WM. S. TWINING,
CLARKE S. TERHUNE.