No. 683,224.

Patented Sept. 24, 1901.

I. ROBBINS.

AUTOMATICALLY OPERATED RAILWAY SWITCH.

(Application filed Oct. 29, 1900.)

(No Model.)

2 Sheets—Sheet I.

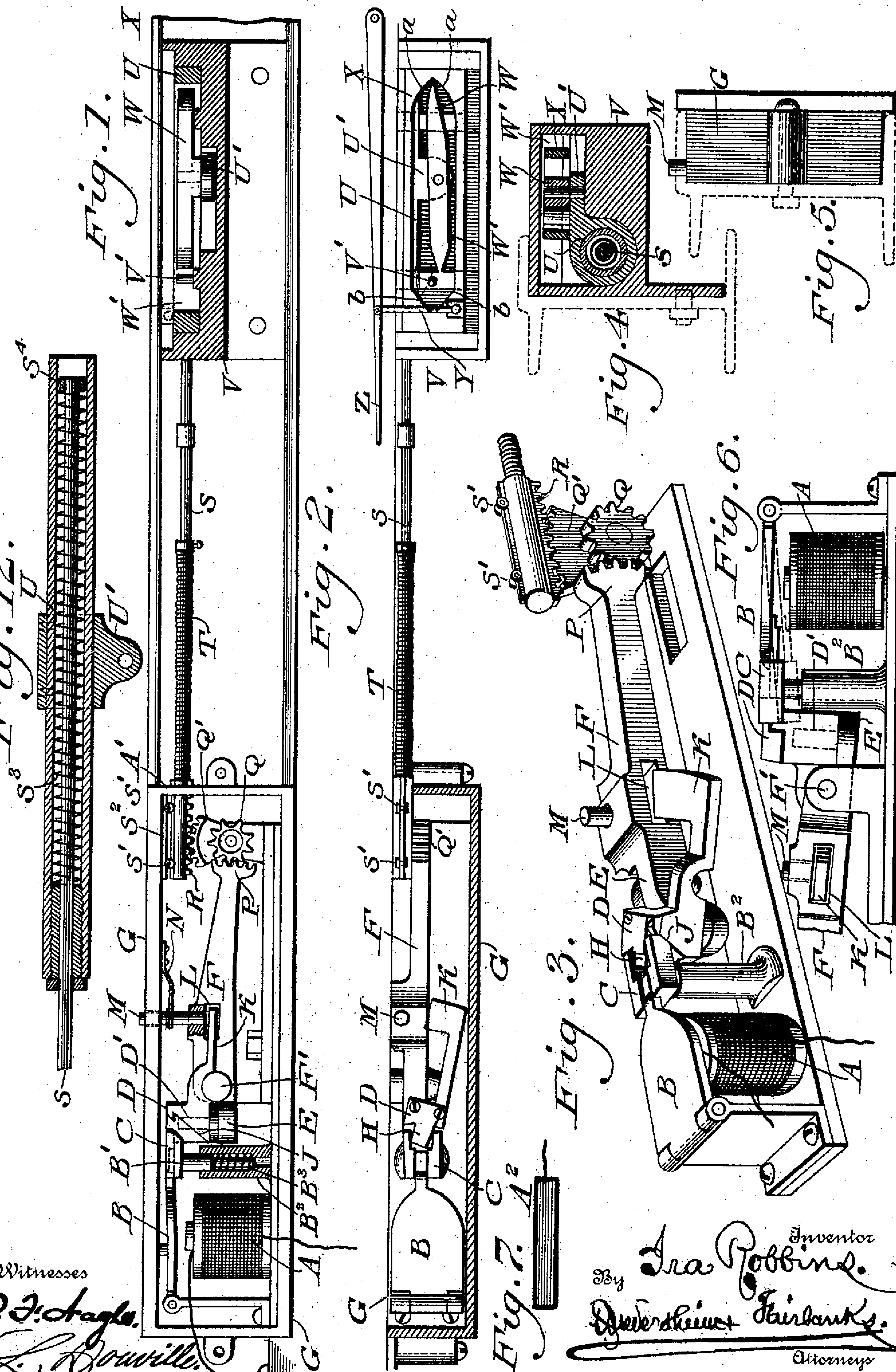

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Fig. 8.

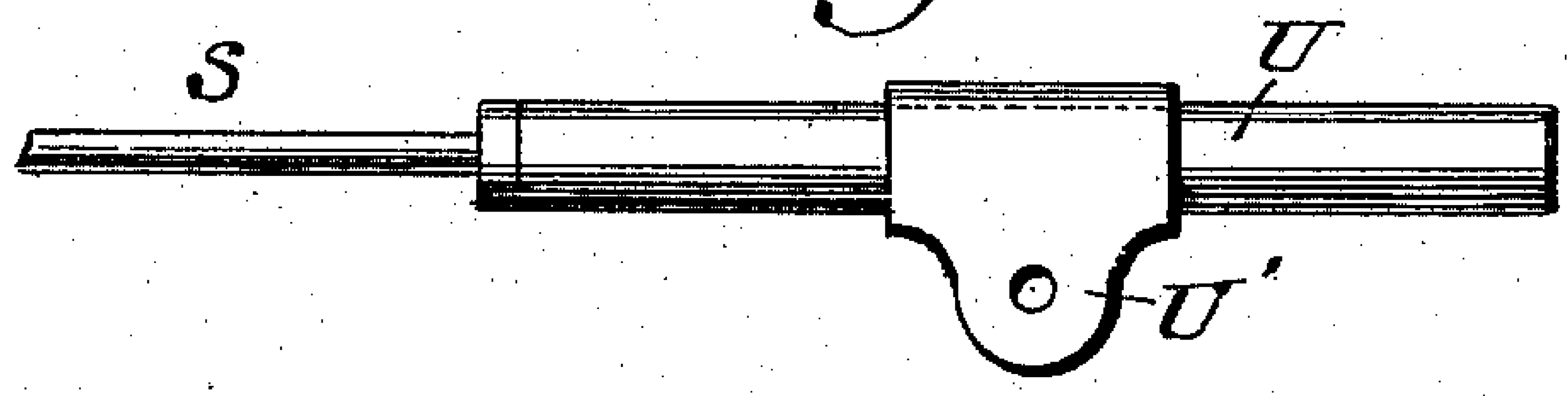


Fig. 9.

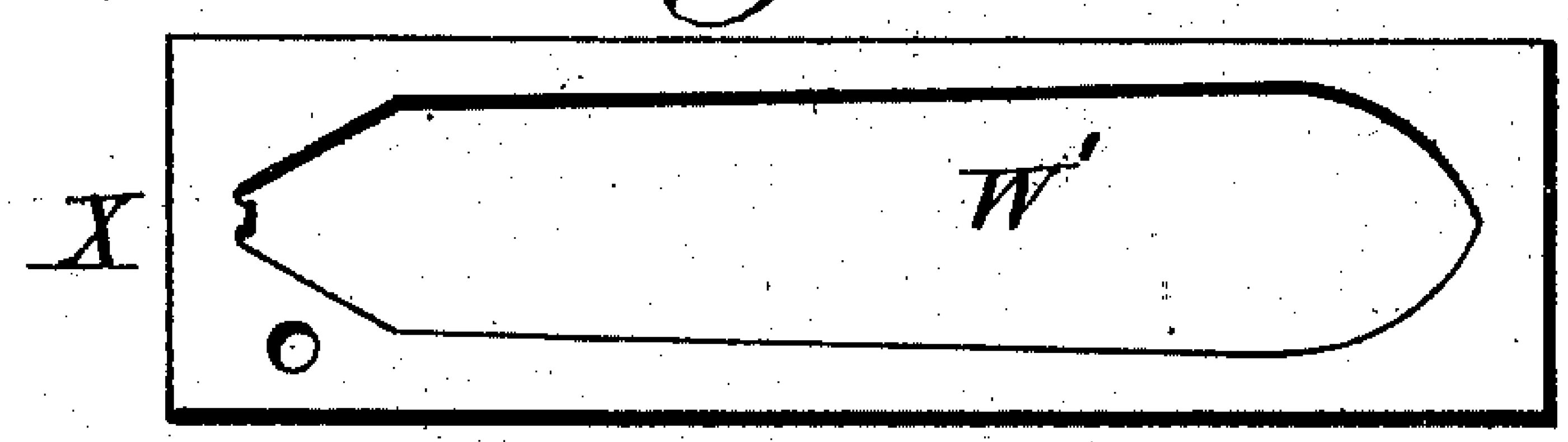


Fig. 10.

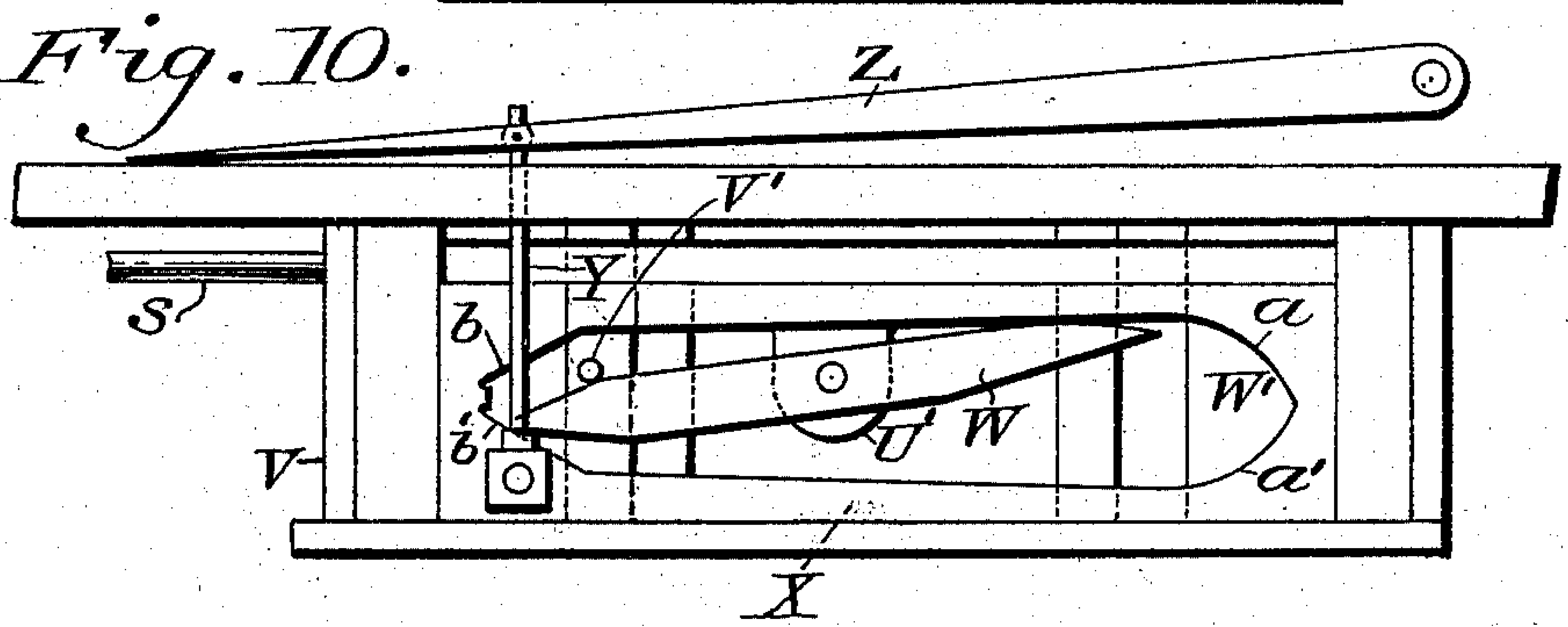
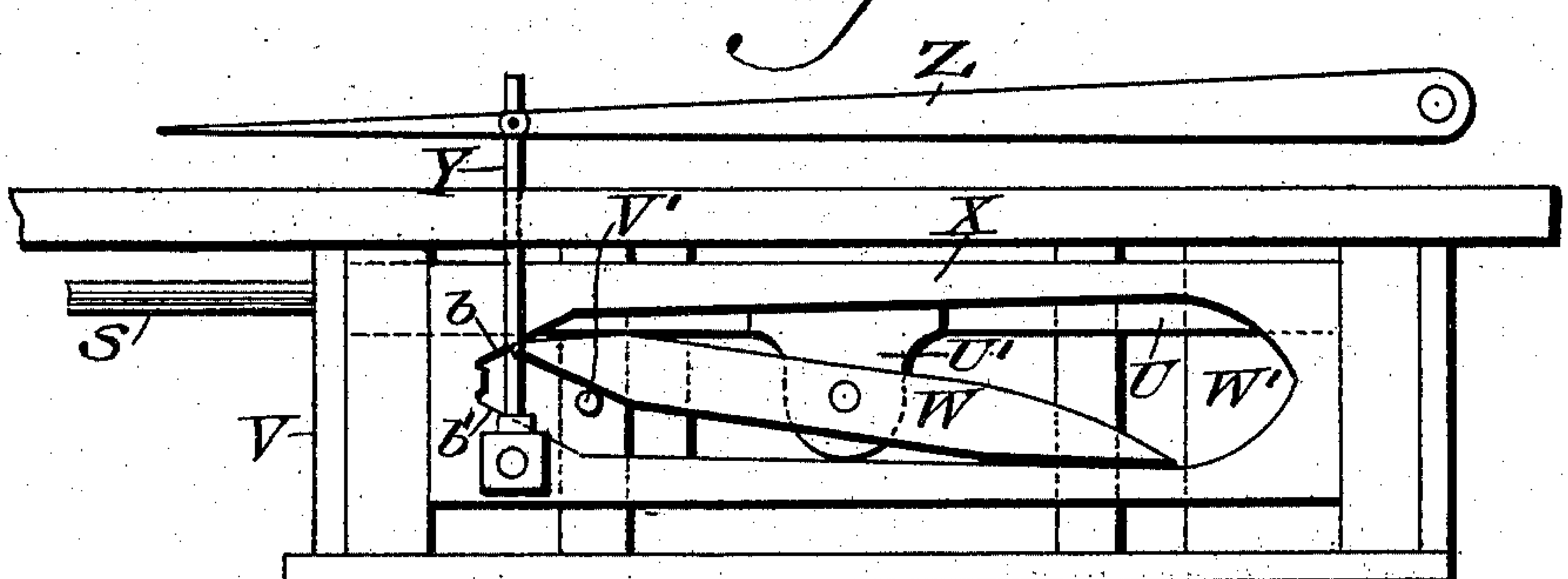


Fig. 11.



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UNITED STATES PATENT OFFICE.

IRA ROBBINS, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATICALLY-OPERATED RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 683,224, dated September 24, 1901.

Application filed October 29, 1900. Serial No. 34,750. (No model.)

To all whom it may concern:

Be it known that I, IRA ROBBINS, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Automatically-Operated Railway-Switches, of which the following is a specification.

My invention relates to an automatically-operated railway-switch; and it consists of means whereby certain mechanism may be set by electric action to cause the motion of a primary device due to the wheel of a car bearing against the same.

It further consists of the novel means whereby the switch-piece may be thrown into opening and closing positions, due to the action of the primary device.

It further consists of details of construction, as will be hereinafter described.

Figure 1 represents a partial side elevation and partial vertical section of an automatical railway-switch embodying my invention. Fig. 2 represents a top or plan view thereof. Fig. 3 represents a perspective view of a portion thereof on an enlarged scale. Fig. 4 represents a transverse vertical section on line *x x*, Fig. 2. Fig. 5 represents an end view thereof. Fig. 6 represents a perspective view of a detached portion. Fig. 7 represents a plan view of a detached portion. Figs. 8 and 9 represent plan views of separate portions of the switch-shifting mechanism. Figs. 10 and 11 represent plan views of said mechanism, the parts thereof being shown in different positions in the two figures. Fig. 12 represents a longitudinal section of a portion of the switch-shifting mechanism on an enlarged scale.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates an electric magnet, and B an armature therefor. To the free end of said armature is connected the fork or forked arm C, which freely engages the headD, which is rotatably mounted on the limb E of the lever F, the latter being mounted on the box or casing G, which contains the aforesaid parts. The head D has a longitudinally-extending tongue H, which is freely embraced by the fork C and having on its side an inclined shoulder J, which is adapted to have said head D bear downwardly against the same, it being noticed that the axis D′ of said head is vertical and that F′ of the lever F is horizontal. Extending from the head is the foot K, which is adapted to enter the opening L in the lever F, its normal position being outside of said opening.

M designates a vertically-arranged pin or plunger which passes freely through the top of the casing G and freely enters the lever F, as most clearly shown in Fig. 1, it being adapted to bear downwardly on the foot K when the latter occupies the opening L and to be elevated to its normal position by the action of the spring N, which is suitably connected with said pin and a fixed point. (See Fig. 1.) The end of the lever opposite to the head D has thereon a toothed segment P, which meshes with the pinion Q, the latter carrying the segment Q′, which engages with the rack R, which is attached to the rod S, said rack R being guided in the wall A′ of the casing A and provided with rollers S′, which are adapted to ride upon the track S^2 on the top of said casing A, whereby said rack is caused to move true and with great freedom. Bearing against the wall A′ and connected with the rod S is the spring T, whose tendency is to return said rod and connected parts to their normal position. The end of the rod S opposite to the rack R enters the tubular slide U, which is mounted in the casing V and contains the spring S^3, which bears against a shoulder or collar S^4 on said rod and the end of said slide, whereby when the rod is moved and the spring is compressed, acting as a cushion, motion is imparted to said slide without abruptness or strain. Projecting from said slide is an ear U′, on which is pivoted the double-ended dog W, which occupies a position in a recess W′ of the slide X, which is also fitted in said casing V and adapted to have a motion at a right angle to the slide U. The end walls of said recess converge, as at *a a′ b b′*, and the ends of the dog W are adapted to bear against and ride over said walls, as will be hereinafter more fully explained. Connected with the slide X is the link Y, which is attached to the switch-piece Z. Within the casing V is the stud V′, on which the opposite sides of

one end of the dog W are adapted to ride, as will be hereinafter more fully referred to. In order to guide the armature B, the same is provided with a depending limb B′, the same entering the sleeve B^2, which rises from the base of the casing G and contains the spring B^3, which bears against said stem B′ for restoring the armature to its normal position, and with it the fork C, it being noticed that the return motion of the lever F is accomplished by the action of the spring T of the rod S, and as said lever moves it raises the head D of the foot K, causing said head to bear against the fork C and also said foot to emerge from the opening L in the lever F, thus restoring it to its normal position, removed from the path of the plunger M, as shown in Fig. 3.

The operation is as follows: When the armature is attracted, it descends and carries with it the fork C, and the latter bears against the inclined shoulder J of the foot K, whereby the latter is advanced into the opening L and placed beneath the plunger M, it being noticed that in Figs. 1 and 5 said plunger projects above the casing G, so as to be in the path of the advancing wheels of the car or train, so that the weight of the latter may be superimposed upon said plunger, thus depressing the lever F and causing the rotation of the pinion Q and toothed segment Q′, which, meshing with the rack R, advances the rod S, and consequently the slide U. As the dog W is in the position shown in Fig. 8 and is carried forward by said slide it rides against the stud V′ and bears against the member of the divergent ends *b* of the recess W′ of the slide X, and consequently moves the latter in the direction of arrow *l*, moving the switch with it to the position shown in said figure. When the plunger M is relieved of weight, the spring T becomes operative and causes the return of the slide U to its first position, carrying with it the dog W, and as the end of said dog opposite to the stud V′ rides on the member of the divergent end *a* of the slide X said dog is deflected and placed in the position shown in Fig. 9, the switch Z, however, remaining undisturbed. Simultaneously with the return of the slide U the rack R causes the operation of the segment Q′, pinion Q, and segment P, whereby the lever F returns to its first position, in the meanwhile cut off from the magnet. This causes the foot K to be withdrawn from the opening L, removed from the path of the plunger M, whereby as the other car is passed over said plunger it may depress the same without operating said foot or said lever F, whereby the switch-piece Z remains unaffected. Should it be desired to change the switch, the magnet A is again charged, whereby the operations hereinbefore described are repeated; but as the dog W advances its nose rides against the stud V′ on the side opposite to that shown in Fig. 8, as now apparent in Fig. 10, and, contacting with the adjacent members of the divergent end *b*, bears against the slide X and returns it to the position shown in said Fig. 10, and thus drawing with it the link Y and switch-piece Z, placing the latter in the position shown in said Fig. 10. Then the magnet is again relieved of its current, causing the removal of the foot K from beneath the plunger M, whereby the intermediate parts are also placed, and the switch-piece will remain in the position in which it was last set. Where the switch is designed for electrically-operated street-cars, an insulated rail, such as A^2, Fig. 7, is placed along the rails of the track in such manner as to have a wheel of a car contact therewith, thus forming an electric circuit through the trolley or other electric mechanism, the car being equipped with a suitable electric switch, so as to throw on and take off the current, said switch being controlled or operated by the motorman or other car-hand, whereby when the switch-piece Z is to be shifted the current is turned on from the car, whereby the armature is attracted, and the subsequent operations will be readily understood from the previous description thereof. For steam-car purposes the electric conductor of the magnet may extend to a signal-house, where the operator may control the circuit with the same results as in the other case.

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

1. In a railway-switch, a magnet, an armature therefor, a head adapted to be engaged by said armature, a foot connected with said head, a lever by which said foot is carried, said head being pivotally mounted on said lever, and a plunger along the line of a railroad adapted to be depressed by a passing car, whereby when the magnet is energized said lever will be operated.

2. In a railway-switch, a plunger, a lever, a foot mounted on said lever and adapted to be engaged by said plunger, whereby said lever may be operated, a head on said foot, and an armature adapted to engage with said head, said head being pivotally mounted on said lever and provided with a tongue which is adapted to be engaged with a member of said armature, said member and head having inclined contacting faces.

3. In a railway-switch, an armature, a lever, and a foot mounted on said lever, said foot being provided with a head having inclined faces and said armature being adapted to engage with said faces, whereby said foot is rotated and caused to enter said lever, in combination with a plunger which is adapted to be operated by a passing train and engaged with said foot, thus depressing said lever and causing the operation of a connection of the switch-shifting mechanism.

4. In a railway-switch, a lever adapted to be operated by a passing train, a connection with a switch-shifting mechanism, and gear-

ing intermediate of said lever and connection, a track and a friction-roller on said connection adapted to run on said track, a lever having openings therein at an angle to each other, a foot adapted to enter one of said openings, and a plunger adapted to enter the other opening.

5. In a railway-switch, a lever, a foot adapted to intersect the same, a plunger adapted to be advanced by a passing car and engage said foot and thus operate said lever, in combination with electrically-actuated means for causing the movement of said foot, said foot being mounted on said lever and adapted to enter an opening therein.

6. In a railway-switch, a member adapted to be operated by a passing car, a lever provided with a movable attachment, and means for electrically operating said attachment, whereby it may be placed in the path of said member and said lever accordingly operated, said lever having a toothed member, a pinion with which said lever engages, a toothed member connected with said pinion, a rack meshing with the second-named toothed member, a rod connected with said rack, and switch-moving mechanism attached to said head.

7. In a railway-switch, a longitudinally-extending slide, an ear connected with said slide and the primary mechanism of the switch, a dog mounted on said slide, an auxiliary slide, with which said dog may engage in opposite directions, and a fixed abutment on the opposite sides of which said dog may ride, the first-named slide being tubular and containing a compressible cushion, whereby when said cushion is actuated, the first-named slide receives motion and with it said ear.

8. In a railway-switch, a tubular slide, a cushion therein, an ear mounted on said slide and connected with the primary mechanism of the switch, a double-acting dog mounted on said slide, a transversely-movable slide, said dog being adapted to engage with opposite portions of the latter-named slide, and an abutment on a fixed member against the opposite sides of which said dog may ride, said transversely-movable slide having the switch-piece connected with it, and said ear being an unitary member of said tubular slide.

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