

H. F. ROACH.
MECHANISM FOR ACTUATING AND LOCKING THE MOVABLE ELEMENTS OF RAILWAY TRACK
STRUCTURES.

APPLICATION FILED MAY 16, 1910.

1,014,095.

Patented Jan. 9, 1912.

4 SHEETS-SHEET 1.

Fig. 1.

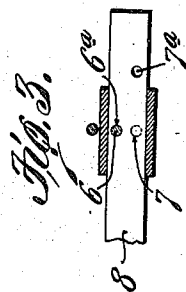
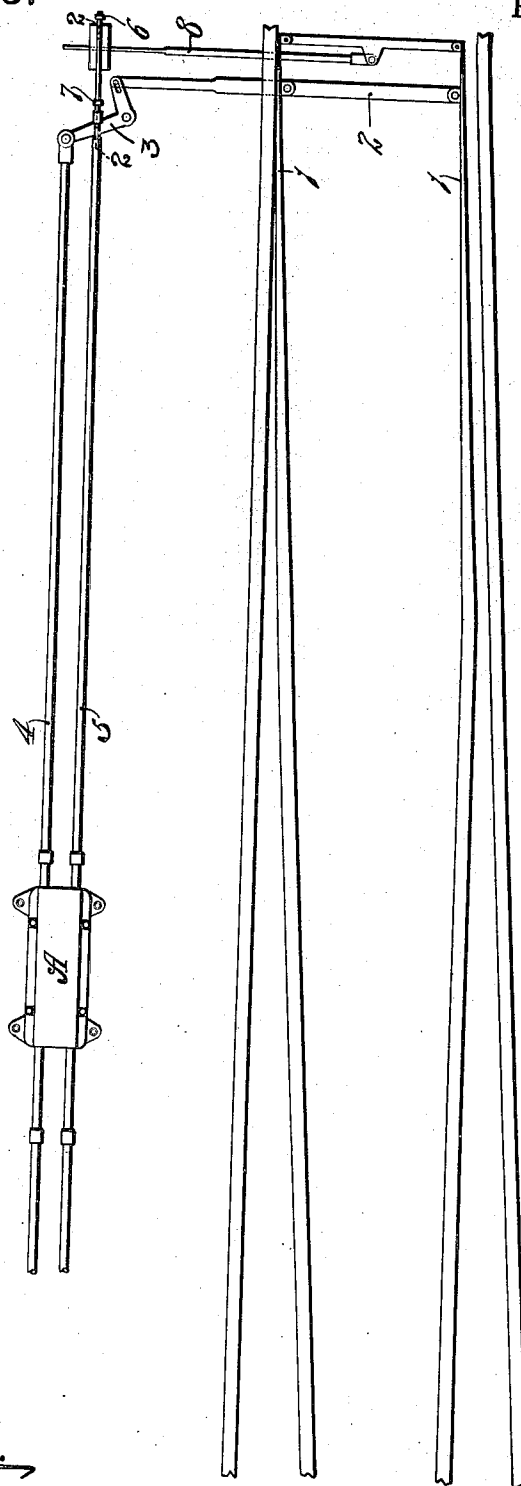
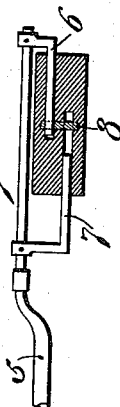


Fig. 2.



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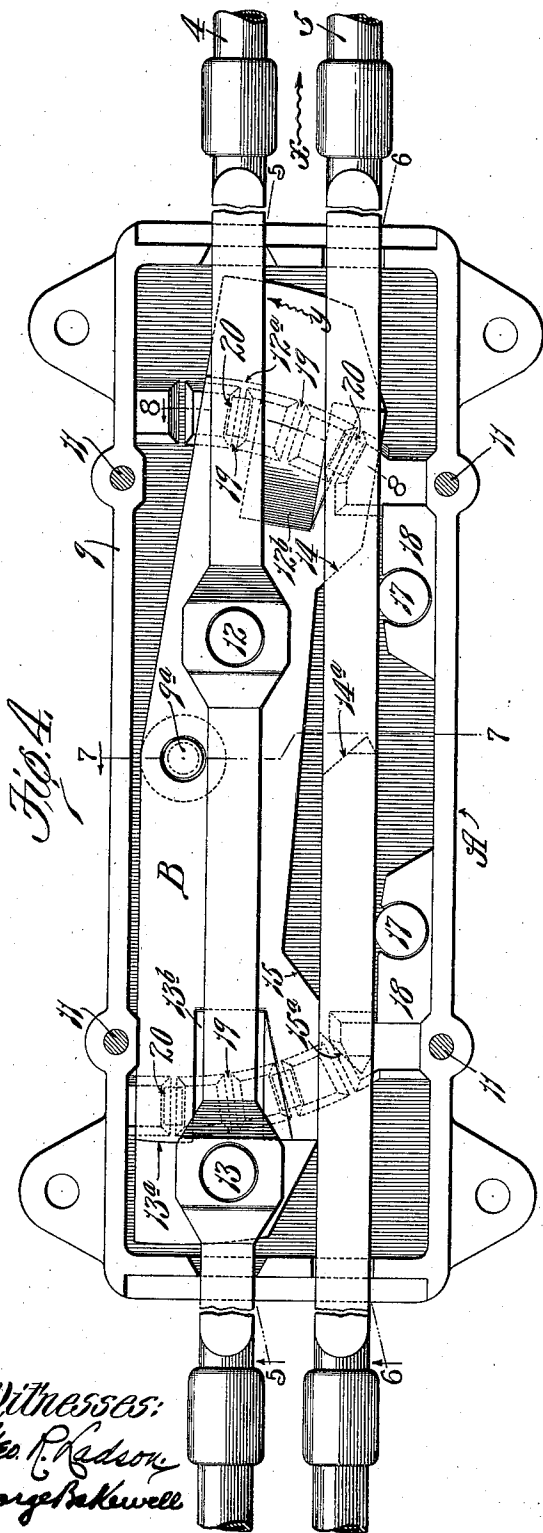
Inventor,
Harry F. Roach.
By Paul Wakewell Atty.

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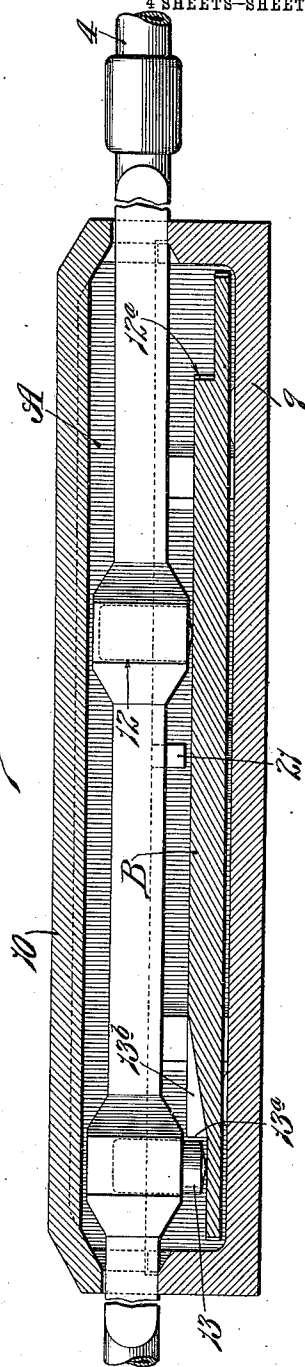
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4 SHEETS—SHEET 2.



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Fig. 5.



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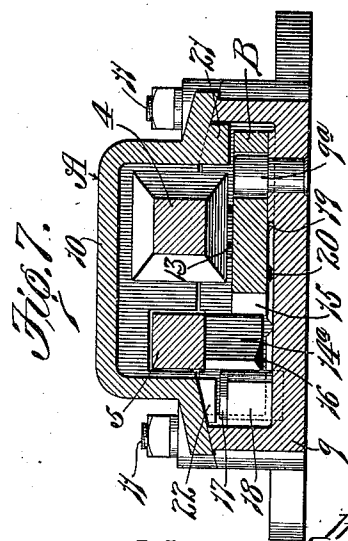
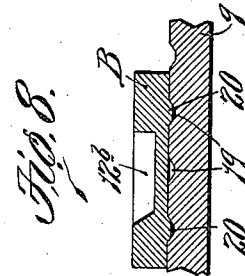
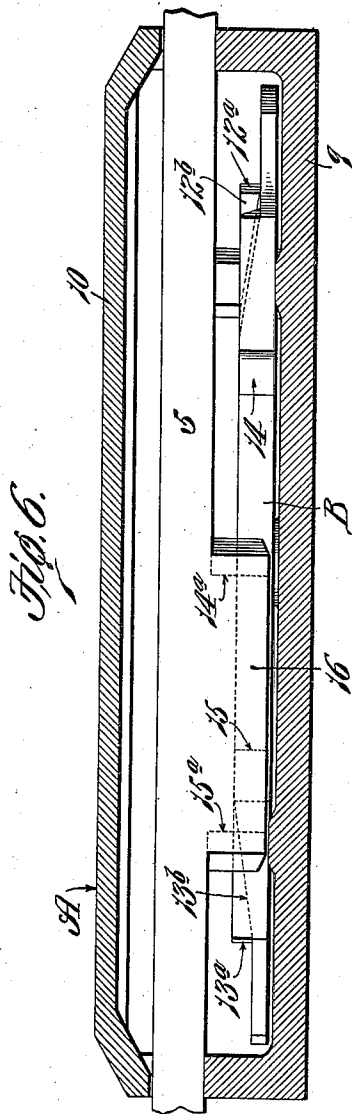
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 9.

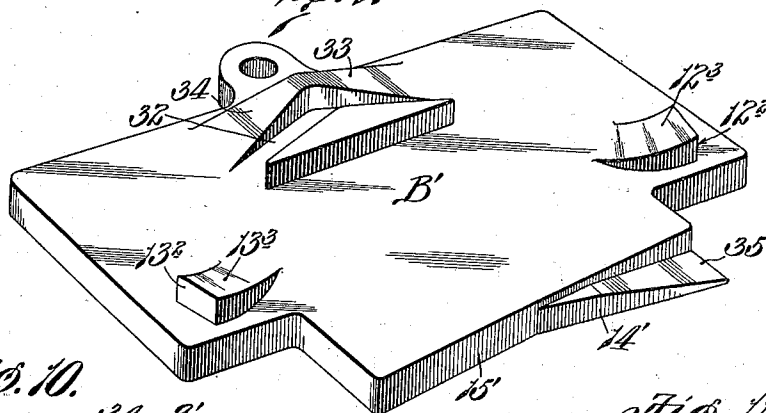


Fig. 10.

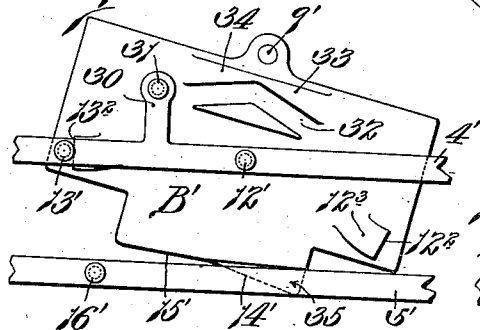


Fig. 11.

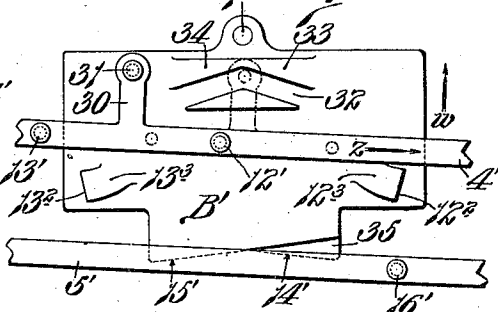


Fig. 12.

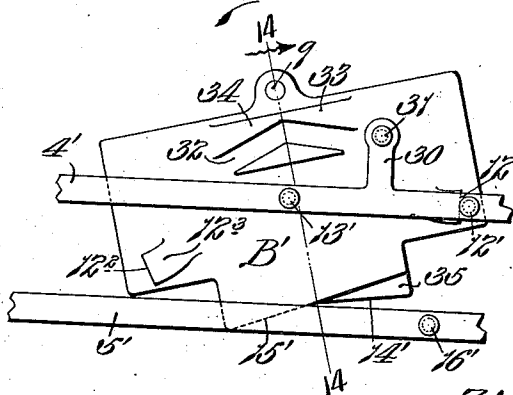


Fig. 13.

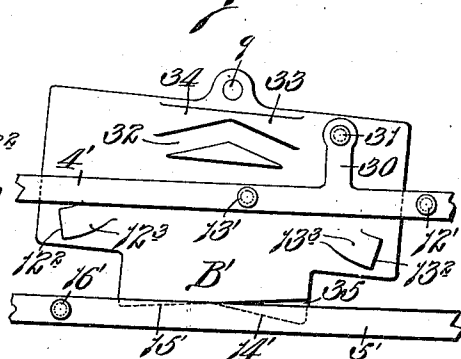
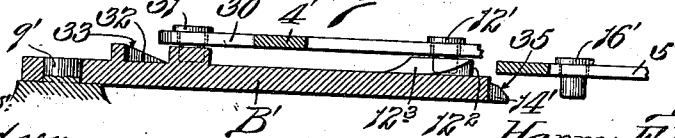


Fig. 14.



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UNITED STATES PATENT OFFICE.

HARRY F. ROACH, OF ST. LOUIS, MISSOURI.

MECHANISM FOR ACTUATING AND LOCKING THE MOVABLE ELEMENTS OF RAILWAY-
TRACK STRUCTURES.

1,014,095.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed May 16, 1910. Serial No. 561,680.

To all whom it may concern:

Be it known that I, HARRY F. ROACH, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Mechanism for Actuating and Locking the Movable Elements of Railway-Track Structures, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to mechanisms for actuating and locking the movable elements of railway track structures.

One object of the invention is to provide a mechanism of the character described which is so designed that the movable element with which the mechanism is used will be locked automatically when it reaches either of its extreme positions.

Another object is to provide a mechanism of the character described that comprises two separate and distinct means for locking the movable element, one of said locking means operating automatically when said movable element reaches either of its extreme positions, and the other locking means being adapted to be operated manually or by some force under the control of a switchman or a man in the switch-tower.

Another object is to provide a mechanism of the character described comprising an automatic locking device which is so designed that it remains set or arranged in an operative position when the manually-operated locking means is inoperative, and which is rendered inoperative or moved into an inoperative position when said manually-operated locking means is moved into an operative position.

Another object is to provide a mechanism of the character described that comprises an operating rod for controlling the movable element, a lock rod for controlling the manually-operated locking device, an automatic locking means consisting of a movable abutment and stops on one of said rods that coöperate with said abutment, and means on the other rod for shifting said movable abutment into and out of operative position. And still another object is to provide a mechanism of the character described which is so designed that said movable abutment and stops are protected from dirt, ice and other foreign matter, and also designed in such a manner that it will not

be jarred or moved accidentally into an improper position by the vibration of the roadbed in which the mechanism is installed.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is a diagrammatic view of a railway track structure equipped with my improved actuating and locking mechanism; Fig. 2 is a detail sectional view of the double plunger lock taken on the line 2—2 of Fig. 1; Fig. 3 is a detail view of the bar on the movable element that coöperates with said plunger lock; Fig. 4 is an enlarged top plan view of the housing in which the movable abutment is arranged, the top of said housing being removed; Figs. 5 and 6 are longitudinal vertical sectional views of said housing taken on approximately the lines 5—5 and 6—6 of Fig. 4; Fig. 7 is a cross sectional view of said housing taken on the line 7—7 of Fig. 4; Fig. 8 is a detail sectional view taken on the line 8—8 of Fig. 4; Fig. 9 is a perspective view of the locking device that is used in a mechanism having a single plunger lock; Figs. 10 to 13, inclusive, are top plan views of said locking device and the parts coöperating with same, illustrating the different positions of said device; and Fig. 14 is a vertical sectional view taken on the line 14—14 of Fig. 12.

I have herein illustrated my improved actuating and locking mechanism used in connection with a railway switch but I wish it to be clearly understood that it is not limited to this use, and that it can be used successfully with numerous other kinds of railway track structures that comprise a movable element which has to be shifted into different positions and locked.

Referring to the drawings which illustrate the preferred form of my invention, 1 designates the movable points or rails of a railway switch, and 2 and 3 designate, respectively, the head rod and a bell crank lever that transmit the movements of an operating rod or actuating rod 4 to said switch-points, said actuating rod being connected to a switch-stand or to an operating device in a switch-tower, not shown. Means is provided for locking the switch-points in their two extreme positions, said means being actuated by a rod 5 which I will hereinafter refer to as a lock rod. This rod 5

leads to a switch-stand or to some suitable force or device under manual control, and while I have herein referred to the lock that the rod 5 operates as being a "manual lock" I do not wish it to be understood that my broad idea is limited to a construction in which the lock is moved manually into and out of operative position for various types of electrically or fluid-operated locking devices could be used for this purpose. In the embodiment of my invention shown in Fig. 1 the lock rod 5 controls a double plunger lock which consists of two plungers 6 and 7 that cooperate with a bar 8 connected to the switch-points and provided with holes 6^a and 7^a for receiving said plungers, as shown in Figs. 2 and 3, a slight movement of the rod 5 in one direction causing the plunger which is then operative to be withdrawn from its cooperating opening, and the completion of the throw of the rod 5 in this direction after the switch-points have been shifted causing the other plunger to be forced into its cooperating opening.

The various elements and devices above described may be of any preferred type or design, and, as previously stated, it is immaterial so far as my present invention is concerned whether the rod 4 is used for operating switch-points or any other movable element of a railway track structure, as my invention consists in means of novel construction for locking the operating rod or throw rod when certain conditions exist. Referring to Figs. 4 to 8, inclusive, which illustrate the means that I prefer to use for this purpose, A designates a housing through which portions of the rods 4 and 5 pass, said housing preferably consisting of a lower part 9 and a removable top part or cover 10 that is secured to said lower part by means of bolts 11 or other suitable fastening devices that pass through cooperating lugs on said lower part and cover. An oscillating abutment B is arranged in the housing A under the rods 4 and 5, and the rod 4 is provided with a pair of movable stops 12 and 13 which cooperate with shoulders 12^a and 13^a on the movable abutment B, the stops 12 and 13 consisting of pins that are loosely mounted in thickened portions of the rod 4. The shoulders 12^a and 13^a are located at the ends of a raised portion on the abutment B, and said raised portion is provided with grooves 12^b and 13^b whose bottoms are inclined upwardly from the top surfaces of the reduced end portions of the abutment B to the top surface of the raised intermediate portion of said abutment. Two oppositely inclined surfaces 14 and 15 are formed on one edge of the member B, and the rod 5 is provided on its under side with a lug 16 having oppositely inclined faces 14^a and 15^a that cooperate with

the inclined faces 14 and 15, respectively, on the edge of the member B so as to rock or oscillate said member on a fulcrum pin 9^a that projects into an opening in said member, said fulcrum pin being preferably connected to the bottom of the lower part 9 of the housing A, as shown in Figs. 4 and 7. If desired, friction rollers 17 can be mounted in pockets 18 inside of the housing A so as to bear against one edge of the rod 5, as shown in Fig. 4, and thus cause said rod to move freely.

When the switch-points 1 are in one of their extreme positions the rods 4 and 5 and the movable abutment B will occupy the positions shown in Fig. 4, and the plunger 6 of the manually-operated locking means will project into its cooperating opening in the bar 8 and thus securely lock the switch-points. If it is desired to shift the switch-points to their other extreme position, the operator first moves the lock rod 5 far enough in the direction indicated by the arrow x in Fig. 4 to withdraw the plunger 6 from engagement with the bar 8 and thus cause the manually-operated locking means to become inoperative. The rod 4 is then moved in the direction indicated by the arrow x in Fig. 4 so as to shift the switch-points into their other extreme position, and when the pin or stop 12 in the rod 4 reaches the righthand end of the raised portion on the movable abutment B said pin will drop downwardly behind the shoulder 12^a and thus prevent the rod 4 from being restored to its former position without first shifting the abutment B from the position shown in Fig. 4. The abutment B thus automatically locks the switch-points when they reach their extreme position and thereafter the switchman completes the throw of the rod 5 in the direction indicated by the arrow x in Fig. 4 so as to force the plunger 7 into its cooperating opening in the bar 8, this movement of the rod 5 causing the inclined face 14^a on the lug 16 on the under side of said rod to engage the inclined face 14 on the abutment B and rock said abutment in the direction indicated by the arrow y in Fig. 4 so as to bring the groove 12^b into alinement with the pin 12 in the rod 4. The automatic locking device B will now be in an inoperative position with reference to the pin 12 and in an operative position with reference to pin 13, and if the switchman desires to throw the switch-points back to their former position he first moves the lock rod 5 in an opposite direction to that indicated by the arrow x in Fig. 4 so as to withdraw the plunger 7 from the bar 8. The rod 4 is then moved in an opposite direction to that indicated by the arrow x in Fig. 4 and when the movable stop or pin 13 in said rod reaches the opposite end of the raised portion on the movable abutment B it will drop down be-

hind the shoulder 13^a and thus automatically lock the switch-points. The final step of manually locking the switch-points is effected by completing the throw of the rod 5 so as to force the plunger 6 into engagement with the bar 8, this final movement of the rod 5 causing the inclined surface 15^a of the lug on the under side of same to engage the inclined face 15 on the locking device B and thus shift said device back to its former position shown in Fig. 4.

From the foregoing it will be seen that a mechanism of the construction above described automatically locks the movable element with which it is used when said movable element reaches either of its extreme positions, and that it will be impossible for said movable element to be returned to its former position after it has been actuated without first completing the throw of the lock rod 5 which causes the automatic locking device or movable element B to be moved into an inoperative position, namely, such a position that the inclined bottom groove in the raised portion thereof alines with the movable stop in the rod 4 that has just prevented said rod from being shifted. Consequently, such a structure reduces the liability of accidents for if the switchman neglects to manually lock the movable element after it has been shifted no harm will be done if a train passes over said movable element because the locking device B automatically locks the movable element when it reaches either of its extreme positions. In other words, a construction of the character above described provides a double lock on a movable element, one lock always being operative and being rendered inoperative or set in an inoperative position when the other lock is moved into an operative position.

The housing A completely protects the movable abutment B and the stops 12 and 13 from dirt, ice and other foreign matter, and the bottom of the housing is preferably provided with a number of grooves 19 that cooperate with teeth 20 on the under side of the member B, as shown in Fig. 8, so as to prevent said member from being shifted accidentally by the vibration of the roadbed in which the housing A is arranged. The locking device B is loosely mounted on the fulcrum pin 9^a so that it can be removed easily therefrom, and the top or cover 10 of the housing A is provided with a lug 21 that projects over the member B, as shown in Fig. 7, so as to prevent it from jumping off the fulcrum pin or being lifted therefrom without first removing the cover of the housing. Similar lugs 22 are also provided on the cover of the housing, as shown in Fig. 7, so as to prevent the friction rollers 17 from jumping out of the pockets 18 in which they are mounted.

I, of course, do not wish it to be under-

stood that my invention is limited to a housing and an automatic locking mechanism of the exact construction herein shown but I prefer this construction on account of its simplicity and low cost of manufacture and the ease with which the various parts thereof can be assembled.

In Figs. 9 to 14 inclusive, I have illustrated a slightly modified form of my invention that is adapted to be used with a single plunger lock, namely, a lock that consists of a single plunger which is moved into operative position by a single movement of the lock rod 5 and withdrawn from operative position by a single movement of said lock rod in the opposite direction. In this form of my invention a movable abutment or locking device B' is oscillatingly mounted on a fulcrum pin 9' and is provided at one edge with oppositely inclined surfaces 14' and 15' that cooperate with a pin 16' loosely mounted in the rod 5' and projecting from the under side of same, said pin having a head that rests upon the top face of the rod, as shown in Fig. 14. The operating rod 4' is provided with movable pins 12' and 13' that cooperate with shoulders 12² and 13² on the member B', said shoulders being formed by inclined lugs 12³ and 13³ that slope upwardly from the top face of the member B'. The operating rod 4' is provided with a laterally projecting arm 30 in which a pin 31 is loosely mounted, and the movable abutment B' is provided with an approximately inverted V-shaped slot 32 that is adapted to receive said pin and also oppositely inclined surfaces 33 and 34 that slope upwardly from the top face of the member B' at one edge of the slot 32. When the abutment B' moves into the position shown in Fig. 10 the switch-points will be locked automatically by the shoulder 13² on said abutment which alines with the pin 13' on the operating rod 4' and thus prevents said rod from being moved to the right of Fig. 10. When it is desired to throw the switch, the operator first moves the lock rod 5' to the right and when the pin 16' on said rod strikes against the inclined surface 14' on the device B', said device will swing into the position shown in Fig. 11, thereby carrying the shoulder 13² out of alinement with the pin 13' on the operating rod 4'. Said operating rod can now be moved to the right to throw the switch and when the pin 31 in the arm 30 on said rod strikes the upwardly inclined surface 34 on the device B', it will ride up same and then drop downwardly into the apex or middle portion of the slot 32, as shown in broken lines in Fig. 11. As the rod 4' continues to move in the direction indicated by the arrow *z* in Fig. 11 the pin 31 traveling in the slot 32 causes the device B' to swing in the direction indicated by the arrow *w* in Fig. 11 thereby

bringing the shoulder 12² into alinement with the pin 12', said pin dropping down behind said shoulder and thus automatically locking the rod 4' against movement in the reverse direction, as shown in Fig. 12. When the operator moves the lock rod 5' in an opposite direction or to the left of Fig. 12 so as to lock the switch-points, the projection 16' on said rod will engage the inclined surface 15' on the member B' and thus shift said member into the position shown in Fig. 13 so as to carry the shoulder 12² out of alinement with the stop 12' and thus render the automatic locking device inoperative, as shown in Fig. 13. When it is desired to shift the switch-points back to their former position, the operator first moves the lock rod 5' to the right and this movement of said rod causes the abutment B' to be shifted back into the position shown in Fig. 11. The operating rod 4' is then moved to the left back to its former position, and during this movement of the rod the pin 31 rides up the inclined surface 33, drops down into the intermediate portion of the slot 32 and causes the abutment B' to oscillate in an opposite direction to that indicated by the arrow *w* in Fig. 11 while the pin 31 is traveling through the other half of the slot 32, this movement of the member B' causing the shoulder 13² to move into alinement with the stop 13', and thus automatically locking the switch-points when said stop drops down behind said shoulder as shown in Fig. 10. The final step is to move the plunger lock into operative position and this is effected by moving the lock rod 5' to the left, the oscillating member B' being provided with an upwardly inclined surface 35 that causes the pin 16' to ride upwardly over that corner of the member B' on which the inclined surface 14 is formed. The continued movement of the lock rod causes the pin 16' to drop downwardly when it leaves the inclined surface 35 so that it will be in operative position to engage the inclined surface 14' on the member B' and thus move said member into the position shown in Fig. 11 when the lock rod is again shifted to the right.

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

1. In a railway track structure, a movable element, an operating means which shifts said element into different positions, a device which operates automatically and locks said element when it arrives in either of its extreme positions, an independent locking device coöperating with said movable element, and means under control of an operator for moving said independent locking device into operative position and simultaneously causing the automatic locking device to become inoperative and vice versa.

2. In a railway track structure, a movable element, an operating means which shifts said element into different positions, a device which locks said operating means when said movable element reaches either of its extreme positions, a second locking device that coöperates with said movable element, and means under control of an operator for causing one of said locking devices to become operative when the other locking device becomes inoperative and vice versa.

3. In a railway track structure, a movable element, means for operating said element, means under control of an operator for locking said element, and automatic locking means for said element which is inoperative when the other locking means is operative.

4. In a railway track structure, a movable element, means for operating said element, means under control of an operator for locking said element, automatically operating means for preventing the operating means for said movable element from being actuated after said element reaches a certain position, and means for causing said automatically operating means to become inoperative when the locking means first referred to moves into operative position.

5. In a railway track structure, a movable element, an operating means for said movable element, a device that according to its position automatically locks said operating means when said element reaches certain positions, an independent lock for said movable element, means for controlling said independent lock, and means operated by said lock-controlling means for determining the position of said automatic locking device.

6. In a railway track structure, a movable element, a lock for holding said element in certain positions, independent devices for operating said movable element, and lock respectively, stops on the operating device for said movable element, an abutment that coöperates with said stops to lock the operating device for said movable element in certain positions, and means controlled by the lock-operating device for shifting said abutment relatively to the stops with which it coöperates.

7. In a railway track structure, a movable element, a lock for retaining said element in certain positions, independent devices for operating said movable element and lock respectively, stops on the operating device which coöperate with said movable element, an abutment that coöperates with said stops to automatically lock the operating device for said movable element when said element reaches certain positions, and means for causing said abutment to move into an inoperative position when said lock moves into operative position.

8. In a railway track structure, a movable

element, a lock for holding said element in certain positions, an operating rod for actuating said movable element and a rod for actuating said lock, an abutment arranged adjacent the path in which said rods travel and provided with shoulders, stops carried by the operating rod which are adapted to cooperate with the shoulders on said abutment, and means on the other rod for shifting said abutment so as to change the positions of the shoulders thereon relatively to said stops.

9. A mechanism of the character described, comprising an operating rod and a lock rod, stops carried by said operating rod, a pivotally mounted or oscillating abutment provided with shoulders that move into and out of the path of the stops on said rod, and means on the lock rod for shifting said movable abutment.

10. A mechanism of the character described, comprising an operating rod and a lock rod, movable stops carried by said operating rod, a pivotally mounted or oscillating abutment provided with shoulders that move into and out of the path of movement of the stops on said rods, means on said lock rod for shifting said abutment in opposite directions when said rod is moved in opposite directions, and inclined surfaces on said abutment that cause said stops to move into horizontal plane as high as the upper ends of the shoulders on said abutment when said operating rod is reciprocated.

11. A mechanism of the character described comprising an operating rod and a lock rod, a pivotally mounted or oscillating abutment arranged under said rods and provided with a raised central portion whose ends form shoulders, stops loosely mounted in said operating rod and bearing upon the top face of the raised portion of said movable abutment, grooves or slots in the raised portion of said abutment having bottoms that incline downwardly from the top face of said raised portion and outwardly to the ends of said raised portion, and cooperating means on said lock rod and movable abutment for causing said abutment to shift in opposite directions when said lock rod is reciprocated and thus bring said grooves into alinement with the stops in said operating rod.

12. A mechanism of the character described comprising a movable element, a device for locking said movable element, an operating rod for actuating said movable element, a lock rod for actuating said locking device, a housing through which said operating rod and lock rod pass, a movable abutment arranged in said housing under

said rods, stops on said operating rod that cooperate with said abutment, and means which tends to prevent said abutment from being moved accidentally by the jarring and vibrations to which the housing is subjected.

13. A mechanism of the character described comprising a movable element, a device for locking said movable element, an operating rod for actuating said movable element, a lock rod for actuating said locking device, a housing through which said operating rod and lock rod pass, stops on said operating rod, an oscillating abutment arranged in said housing under said rods and cooperating with said stops, and cooperating teeth and grooves on the housing and on said movable abutment for preventing accidental movement of said abutment.

14. A mechanism of the character described comprising a movable element, a device for locking said movable element, an operating rod for actuating said movable element, a lock rod for actuating said locking device, a housing through which said operating rod and lock rod pass, a removable top portion for said housing, a fulcrum pin projecting upwardly from the bottom of the housing, an oscillating abutment loosely mounted on said pin, devices on said operating rod that cooperate with said abutment so as to lock said rod against movement, and means on the removable top portion of the housing for preventing said abutment from moving upwardly off its fulcrum.

15. A mechanism of the character described comprising a movable element, a device for locking said movable element, an operating rod for actuating said movable element, a lock rod for actuating said locking device, a housing through which said operating rod and lock rod pass, a removable top portion for said housing, a fulcrum pin projecting upwardly from the bottom of the housing, an oscillating abutment loosely mounted on said pin, devices on said operating rod that cooperate with said abutment so as to lock said rod against movement, means on the removable top portion of the housing for preventing said abutment from moving upwardly off its fulcrum, friction rolls loosely mounted in pockets in said housing for engaging one of said rods, and means on the top portion of the housing for preventing said friction rolls from jumping out of their pockets.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this fourteenth day of May, 1910.

HARRY F. ROACH.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.

It is hereby certified that in Letters Patent No. 1,014,095, granted January 9, 1912, upon the application of Harry F. Roach, of St. Louis, Missouri, for an improvement in "Mechanism for Actuating and Locking the Movable Elements of Railway-Track Structures," errors appear in the printed specification requiring correction as follows: Page 4, line 43, for the reference-numeral "14" read *14'*; page 5, line 32, before the word "horizontal" insert the article *a*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of February, A. D., 1912.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.