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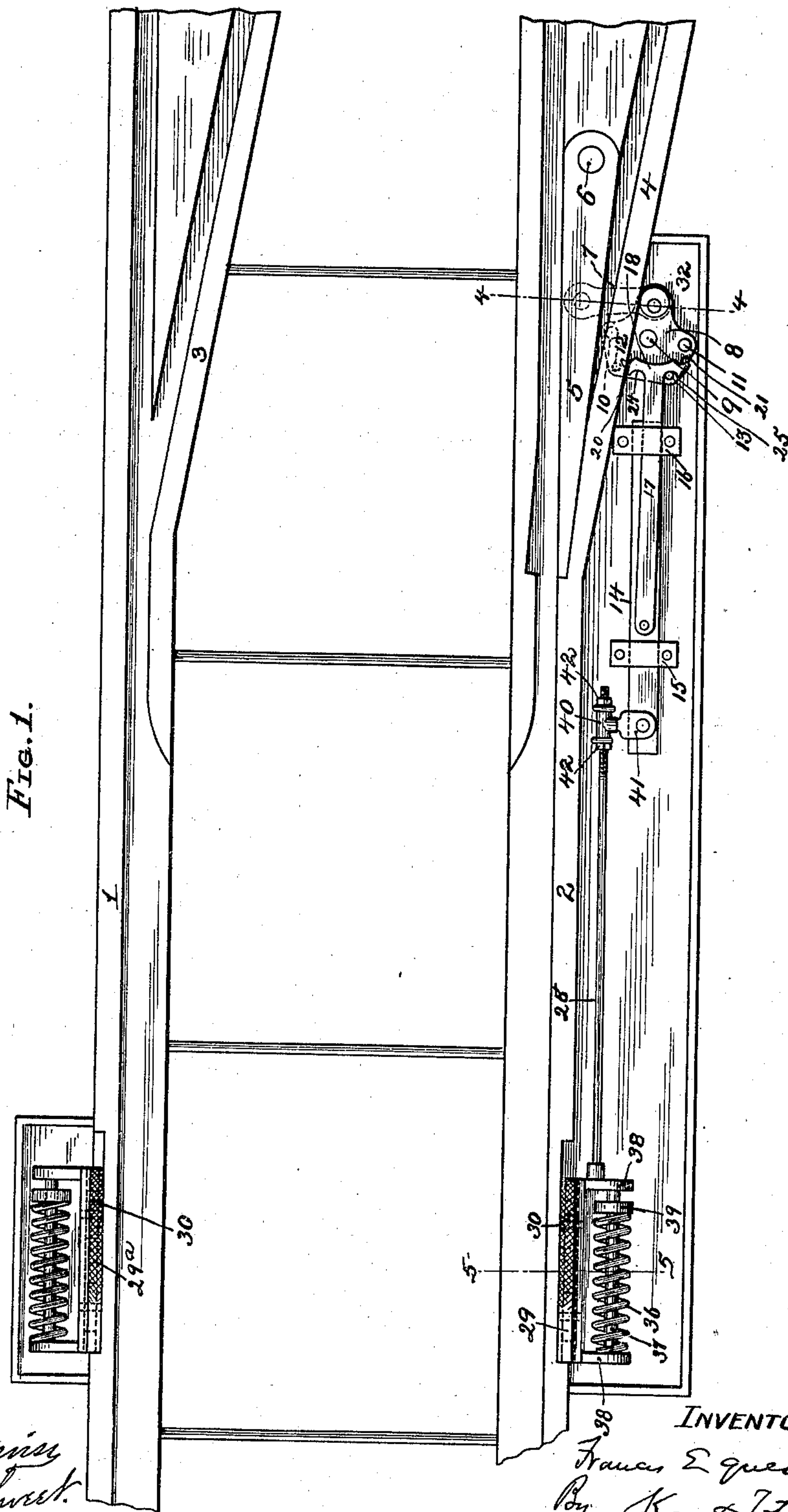
Patented Sept. 9, 1902.

F. E. QUEST.
SWITCH OPERATING DEVICE.

(Application filed Jan. 25, 1902.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:
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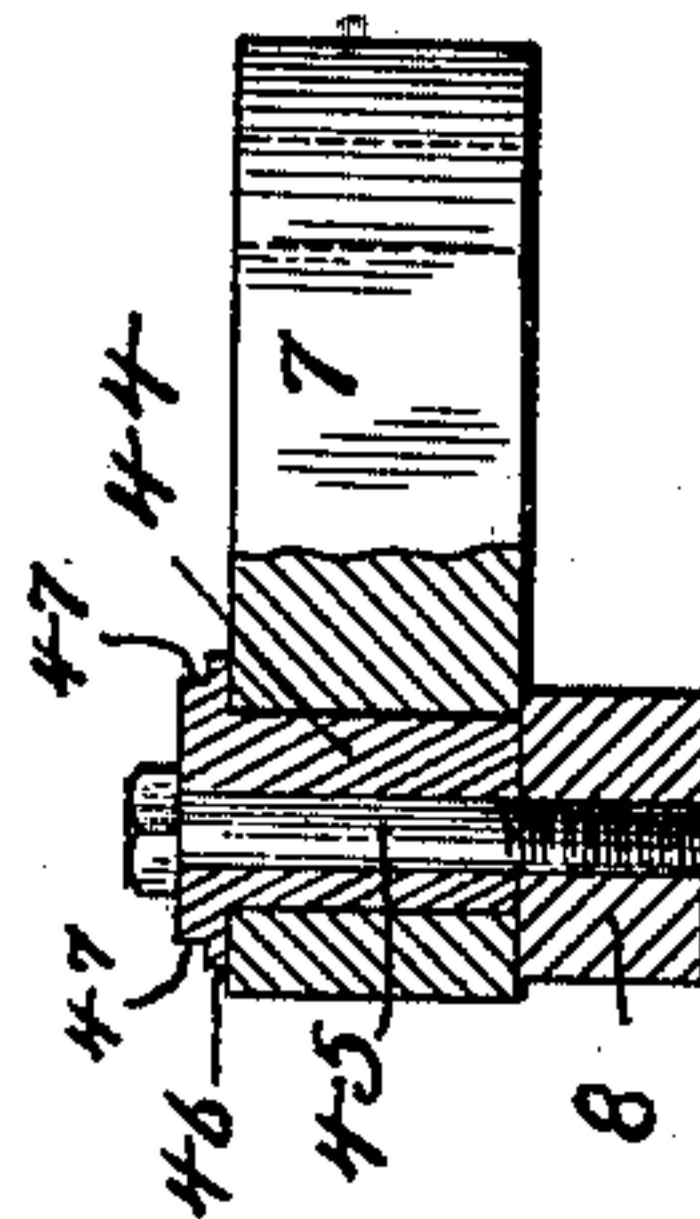
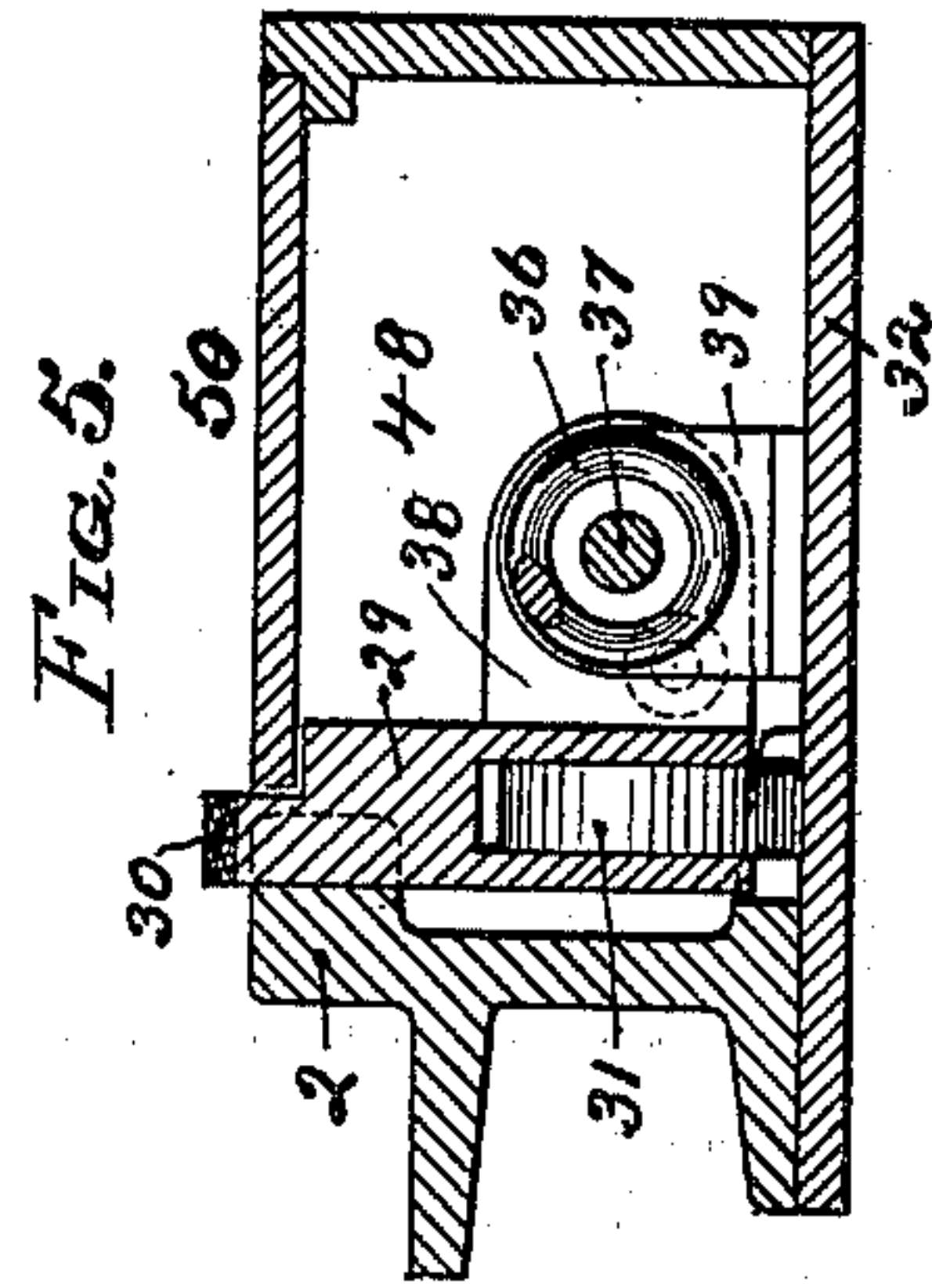
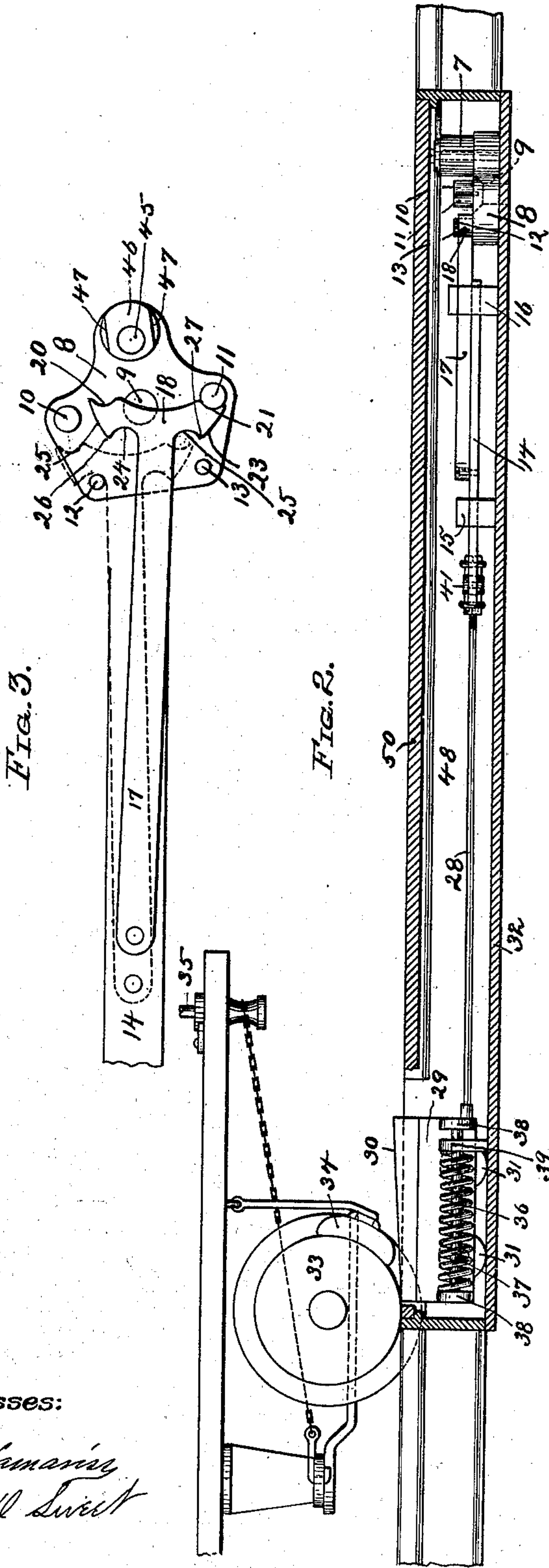
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2 Sheets—Sheet 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

FRANCIS E. QUEST, OF KNOXVILLE, PENNSYLVANIA.

SWITCH-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 708,971, dated September 9, 1902.

Application filed January 25, 1902. Serial No. 91,212. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS E. QUEST, a resident of Knoxville, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switch-Operating Devices; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to mechanism for operating switch-points, and more especially to mechanism which is adapted to be actuated by the wheels of a moving car or locomotive, although parts thereof are adapted for switch-operating mechanism actuated by any part of the moving car or locomotive.

The object of my invention is to provide mechanism for operating switch-points which is simple, strong, and positive in its action and which cannot get out of order easily.

A further object of my invention is to provide mechanism forth is purpose which will insure the switch-point being thrown over fully to the desired position and which will be then held or locked in such position.

A further object of my invention is to provide mechanism for this purpose whereby the flattening of the wheels of the car is prevented and the motion of the car not interfered with.

To these ends my invention consists, generally stated, in the employment of a movable part, which may be either a portion of the car-track or a part independent thereof and lying in the path of a wheel or wheels of the car or locomotive and adapted to be moved longitudinally when such wheel or wheels are retarded by the brake, together with suitable connections between such movable part and the switch-point so constructed as to move the switch-point in both directions by successive forward strokes or leave the same unmoved, as desired, and which on its back stroke will complete the movement of the switch-point to the desired position, if it has not already been moved into such position, and will then hold the same in that position until the next actuation of such mechanism.

My invention also comprises in connection with such movable part adjacent to the car-track of a similar-constructed idle or dummy part on the opposite side of the track to re-

ceive the opposite wheel of the car, carry it forward, and relieve it from friction during the actuating of the switch-point-operating mechanism, so as to prevent flattening of the wheels of the car and prevent checking the motion of the car, thereby rendering the operation of the switch-operating mechanism more reliable.

My invention also comprises certain improvements in details of construction, as will hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a plan view of a car-track, showing my invention applied thereto. Fig. 2 is a side elevation of the switch-actuating mechanism, the casing being shown in section. Fig. 3 is a plan view of the switch-operating mechanism on an enlarged scale. Fig. 4 is a transverse vertical section on the lines 4 4, Fig. 1; and Fig. 5 is a similar section on the line 5 5, Fig. 1.

In the drawings the rails of the main track are shown at 1 and 2 and the rails of the branch track at 3 and 4.

5 represents the switch-point, which is or may be of the usual construction, and it is pivoted at 6. The switch-point is connected by a link 7 to a rocking block or lever 8, which is pivoted at 9 to a plate 32 or other part conveniently located adjacent to the track. The rocking block or lever 8 is provided on each side of its longitudinal axis and on its end opposite to the point where the link 7 is connected thereto with two pair of studs, shoulders, projections, or similar devices 10, 11, 12, and 13. The studs 12 and 13 are preferably located somewhat nearer to the longitudinal axis of the rocking lever than the studs 10 and 11, although this is not essential. Mounted in line with the normal longitudinal axis of the rocking lever 8 is a slide-bar 14, which moves in any suitable guides, such as the bearings 15 and 16, and which is projected forwardly by the car-wheels and retracted by a spring, as will hereinafter be fully described. A comparatively long lever 17 is provided at its rear end to this slide, and it carries at its forward end the cross-head 18, which is adapted to engage with the studs on the rocking lever 8 and rock the same about its pivot 9. The lever 17 is so guided in the bracket-bearing 16 that it can swing beyond the longitu-

dinal center of the slide 14 in both directions. In Fig. 3 it is shown in full lines considerably to the right of such center and in dotted lines to the left thereof.

5 For the purpose of rocking the lever 8 the head 18 is preferably provided on its forward face, near each end thereof, with the notches or depressions 20 and 21, which are adapted when the head is projected forwardly to en-
 10 gage either with the stud 10 or the stud 11, depending upon the position of the head, and thus rock the lever 8 and through the link 7 throw the switch-point. On its rear side the head 18 is provided near its ends with the
 15 rounded or inclined faces 22 and 23. Inside the same, toward the longitudinal center of the head, the rear side is provided with the inclined or concave faces 24 and 25, which form with the faces 22 and 23, respectively,
 20 the angles or points 26 and 27. When the head 18 is projected, as by means of the car-wheel, we will assume that it is in such position that the notch 21 will engage the stud 11, and the full forward movement of said head
 25 will carry the parts to the position shown in full lines in Fig. 3. This will swing the rocking lever 8 to such a position that the stud 13 is carried outside of a line drawn parallel to the axis of the slide 14 and through the
 30 point 27. When the head is retracted, as by the spring which will be hereinafter described, the point 27 will pass inside of the stud 13, and the said stud will bear against the rounded or inclined face 23. This will cause the head
 35 to be swung on its lever over toward the left, and the parts are so proportioned that this will bring the point 26 outside of the stud 12 and bring the concave face 24 into engagement with said stud. In case the lever 8
 40 should not have been moved quite to the extreme of its throw the pull of the spring on the head, through the inclined face 24, engaging the stud 12, will move the said lever to the limit of its throw, thus insuring the switch-
 45 point being fully moved over. At the same time the lever 17 has been moved to the left of the longitudinal axis of the slide, as shown in dotted lines, so that the notch 20 is practically in line with the stud 10. As a conse-
 50 quence on the next forward projection of the head said notch will be sure to engage the stud 10 and rock the lever 8 in the opposite direction. Furthermore, the concave face 24, engaging, as it does, the outside of the stud
 55 12, will hold or lock the rocking lever 8 in this position until it is thrown in the opposite direction, when the concave face 25 will, in connection with the stud 13, perform the same function. The slide 14 may be recip-
 60 roated by any convenient mechanism, and for this purpose I have shown it connected by means of a rod 28 with a reciprocating or sliding block or carriage 29, located adjacent to the rail 1 and in position to be engaged by
 65 a wheel or wheels of the car or locomotive. This block or carriage 29 is preferably provided with a roughened upper face 30, which

projects somewhat above the tread of the rail and is preferably inclined, as shown, to allow the wheels to run onto the same with ease. 70
 It is provided on its lower side with suitable wheels 31 or other antifriction devices, which bear upon a suitable plate, such as the plate 32 or other bearing. This carriage, as above stated, is adapted to be moved longitudinally 75
 by the car-wheel 33 when the latter has its rotation checked or retarded, as by applying the brake-shoes 34 thereto. The brake-shoes may be of the ordinary type and actuated in any suitable way, as from the brake-staff 35. 80
 When the block or carriage 29 is moved forward, it reciprocates the slide 14 and head 18, and the latter will engage either the stud 10 or the stud 11, depending upon the position of the switch-point, and rock the lever 8 85
 on its pivot and throw the switch-point 5, as above described. Some means must be provided for retracting the head 18 and for returning the carriage 29 and the connected mechanism to its original position, so that 90
 it will be in position to be actuated to throw the switch-point in the opposite direction, if desired. Various forms of mechanism for this purpose may be used, but I prefer to use a strong spiral spring 36, which may be con- 95
 nected to either the carriage 29, rod 28, or slide 14 at any convenient place or in any convenient manner. I have, however, shown said spring surrounding a guide-rod 37, con- 100
 nected at its ends to brackets 38, projecting from the carriage 29. Secured to the base-plate 32 or to any other convenient part is a bracket or arm 39, which is perforated at its upper end and surrounds the guide- 105
 rod 37. One end of the spiral spring 36 bears against this stationary bracket and the opposite end bears against one of the brackets 38 on the carriage 29. As a consequence when the said carriage is moved longitudinally 110
 by the car the spring 36 will be compressed, and as soon as the car passes beyond said carriage the spring will at once return the carriage and the connected mechanism to its original position. The connecting-rod 28 115
 may be secured to the carriage 26 in any desired manner—as, for instance, by threading the same into a sleeve on the carriage or bolting the same thereto, or otherwise. In order that the slide 14 and its head 18 may lie in just the proper position with reference to the 120
 rocking lever 8, I form an adjustable connection between said slide and the rod 28. Various forms of connections for this purpose will readily suggest themselves, and I have shown for this purpose a sleeve 40, which 125
 loosely surrounds the rod 28 and is connected to the slide 14 in any suitable manner—as, for instance, by the ears or bracket 41. Threaded onto the rod 25 at each side of the sleeve 40 are the jam-nuts 42, and by suitably 130
 manipulating these nuts, as will be readily understood, the sleeve can be secured to the rod 28 at any desired position thereon.

Different switch-points throw to different

distances, and in order to adapt the rocking lever 8 to various switch-points some adjustable connection between said lever and the point should be used. Various mechanisms for this purpose can be employed. I have shown the link 7 connected to the lever 8 by means of an eccentric sleeve 44, which is adapted to be connected to the outer end of the rocking lever 8 by means of a suitable bolt 45. The upper end of the eccentric sleeve 44 is formed with a flange 46, which projects over the top face of the link 7 and prevents displacement of the latter, said flange-head being provided with suitable means, such as the flattened faces 47, for receiving a spanner-wrench or other instrument whereby the sleeve can be held while adjusting the same. By adjusting the eccentric sleeve 44 around the pivot-bolt 45 the connection between the lever 8 and link 7 will be correspondingly adjusted.

The switch-operating mechanism above described is mounted adjacent to the track and should preferably be inclosed, so that it will not become clogged with dirt and refuse. For this purpose I have shown it inclosed in a box 48, having a tight cover 50 thereon.

When the brake is applied to the car-wheel and it passes onto the carriage 29, the latter will move with the car, thus carrying the wheel forward and stopping its rotation. This will cause the wheel on the opposite side of the car to stop and slide, which will tend to flatten the latter. Furthermore, the friction of the latter wheel on the rail will necessitate a former application of the brakes to cause the first-named wheel to stop rotating when it passes onto the carriage 29. To obviate these difficulties, I locate adjacent to the rail 2 a carriage 29^a, which may be exactly similar to the carriage 29, mounted in the same way and provided with a spring for returning it to its original position. This "dummy carriage," as I call it, is, however, not connected to the switch-operating mechanism and merely serves to raise the wheel on that side of the car from the rail and carry it forward. This prevents flattening of the wheel and relieves both wheels from all frictional contact with the track, thus necessitating only a light setting of the brake, so light, in fact, that the same pressure applied to the rear wheels of the car will not cause the latter to slide or skid.

The operation of the mechanism is as follows: When the car approaches the switch, if the point 5 is in proper position for the car to proceed either on the main track or branch track, as is desired, the motorman will of course do nothing and the car-wheels will run over the carriages 29 and 29^a without moving the same, the movement of the car over these carriages being facilitated by the inclined upper faces thereof. Should, however, the switch-point not be properly placed and its movement be necessary in order for the

car to proceed upon the right track, then the motorman will set the brake-shoes quite firmly against the wheels, but not necessarily tight enough to cause said wheels to slide. When the wheels, however, reach the carriages 29 and 29^a, the resistance of the brake-shoes on the wheels will be greater than the resistance of the carriages on their plates or ways, so that the wheels of the car will stop rotating, and under the momentum of the car the carriages 29 and 29^a will be moved forward. This through the connecting-rod 28 will project the slide 14 forward and will cause the oscillating head 18 to rock the lever 8 in the manner heretofore described. This through the link 7 will throw the switch-point over to the desired side. As soon as the car-wheels leave the carriages 29 and 29^a the latter will be returned by their springs 36, thereby giving a back stroke to the slide 14. On this back stroke the inclined face 24 or 25 on the rear of the head 18 will engage the stud 12 or 13, as the case may be, and the strength of the spring 36 will be sufficient to thereby move the lever 8 over to the limit of its throw, if it has not already been moved to that extent, this thereby insuring that the switch-point is in proper position. The spring 36 then, by reason of the engagement of the inclined face 24 or 25 with the stud 12 or 13, will hold the lever 8 in this position and prevent accidental displacement of the switch-point—as for instance, should a carriage with narrow wheels come along the track in the right direction it would naturally crowd the switch-point partly over, but the spring 36, through the connection described, will prevent this; or should it occur as soon as the carriage-wheel has passed it will immediately move the switch-point back to its proper position. When the next car comes along, if the switch-point must be again actuated, the same operation is repeated, except that the lever 8 will be rocked in the opposite direction. The lever 17, it will be observed, is so pivoted and mounted that it can swing beyond its center in both directions. This absolutely insures engagement of one or the other end of the head 18 with the proper stud or shoulder on the rocking lever 8.

While I have shown the slide 14 reciprocated by means of a carriage lying in the path of the car-wheel, it will be understood that my invention in its specific aspect is not limited thereto, as the slide 14 could be reciprocated by any other means actuated either by hand or by any part of the car and the lever 8 would be rocked in exactly the same way, and on the back stroke of the slide 14 would be thrown to the limit of its position, if not already there, and would then be locked or held in place.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a railway-switch-operating device, the combination with a switch-point, of a horizon-

tally-movable part lying in the path of a wheel or wheels of the car and adapted to be moved thereby when the rotation of the wheel is retarded, means for returning said movable part in its normal position after having been moved longitudinally by the car-wheel, and normally disconnected mechanism between the movable part and the switch-point, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said connecting mechanism being constructed and arranged to complete the throw of the switch-point on the backward stroke of the movable part.

2. In a railway-switch-operating device, the combination with a switch-point, of a horizontally-movable part adapted to be actuated from a car, means for returning said movable part to its normal position after having been moved longitudinally, and normally disconnected mechanism between said movable part and the switch-point, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said connecting mechanism being constructed and arranged so that when returned to its normal position it will hold the switch-point in the position to which it has been moved.

3. In a railway-switch-operating device, the combination with a switch-point, of a horizontally-movable part lying in the path of a wheel or wheels of the car and adapted to be moved thereby when the rotation of the wheel is retarded, means for returning said movable part to its normal position after having been moved longitudinally by the car-wheel, a rocking lever connected to the switch-point, and means connected to the movable part and adapted to engage the rocking lever, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said means being constructed and arranged to engage the rocking lever and complete its throw on the backward movement of the movable part.

4. In a railway-switch-operating device, the combination with a switch-point, of a rocking lever connected thereto and provided with two pair of studs or shoulders, one of each pair being on opposite sides of the longitudinal axis of the lever, a horizontally-movable part adapted to be moved longitudinally from the car, means for returning it to its normal position after having been moved longitudinally, and an oscillating head connected to said movable part and arranged to swing beyond its center in both directions, said head being arranged to engage on its forward stroke alternately with the studs or shoulders of one pair, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said head having inclined or rounded faces on its rear side which on the back stroke engage

alternately with the studs of the other pair to swing said head beyond its longitudinal center.

5. In a railway-switch-operating device, the combination with a switch-point, of a rocking lever connected thereto and provided with two pair of studs or shoulders, one of each pair being on opposite sides of the longitudinal axis of the lever, a horizontally-movable part adapted to be moved longitudinally from the car, means for returning it to its normal position after having been moved longitudinally, and an oscillating head connected to said movable part and arranged to engage on its forward stroke alternately with the studs or shoulders of one pair, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said head being provided on its rear side with inclined or concave faces which slope toward the center of said head and which on the back stroke engage alternately with the studs of the other pair on the lever and move said lever to the limit of its throw.

6. In a railway-switch-operating device, the combination with a switch-point, of a rocking lever connected thereto and provided with two pair of studs or shoulders, one of each pair being on opposite sides of the longitudinal axis of the lever, a horizontally-movable slide adapted to be moved longitudinally from the car, means for returning it to its normal position after having been moved longitudinally, and a comparatively long lever pivoted to said slide and carrying at its forward end a head, said head being arranged to engage on the forward stroke alternately with the studs or shoulders of one pair, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said head being provided on its rear side with inclined or rounded faces which on the back stroke engage alternately with the studs of the other pair, whereby said head is swung beyond its longitudinal center.

7. In a railway-switch-operating device, the combination with a switch-point, of a rocking lever connected thereto and provided with two pair of studs or shoulders, one of each pair being on opposite sides of the longitudinal axis of the lever, a horizontally-movable part adapted to be moved longitudinally from the car, means for returning it to its normal position after having been moved longitudinally, and an oscillating head connected to said movable part and arranged to swing beyond its center in both directions, said head being arranged to engage on its forward stroke alternately with the said studs or shoulders of one pair, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said head being provided on its rear side with inclined or rounded faces near its ends and

inside the same with inclined or concave faces sloping toward the center of said head, which inclined or rounded faces on the back stroke are adapted to engage one of the other pair of studs or shoulders on the rocking lever, whereby said head is swung beyond its longitudinal axis and the inclined or concave face on its opposite side is brought into engagement with the other one of said pair of studs to move the oscillating lever to the limit of its stroke.

8. In a railway-switch-operating device, the combination with a switch-point, of a rocking lever, adjustable connections between said switch-point and lever, a horizontally-movable part lying in the path of a wheel or wheels of the car and adapted to be moved longitudinally thereby, when the rotation of the wheel is retarded, means for returning said movable part to its normal position, and means connected to the movable part and adapted to engage the rocking lever, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, said means being constructed and arranged to engage the rocking lever and complete its throw on the backward stroke of the movable part.

9. In a railway-switch-operating device, the combination with a switch-point, a rocking lever, an eccentric sleeve connected to said lever, a link pivoted on said eccentric sleeve and connected to the switch-point, said rocking lever being provided with a pair of shoulders or studs on opposite sides of its longitudinal axis, a horizontally-movable slide adapted to be actuated from the car, means for returning the same to its normal position after having been moved longitudinally, an oscillating head connected to said slide and having means on opposite sides of its longitudinal axis for engaging the shoulders or studs on the rocking lever both on its forward and backward strokes, whereby successive movements of the slide in the same direction will effect opposite movements in the switch-point.

10. In a railway-switch-operating device, the combination with a switch-point, of a rocking lever connected thereto and provided with shoulders or studs on opposite sides of its longitudinal axis, a horizontally-movable slide, an oscillating head connected to the same and having means on opposite sides of its longitudinal axis for engaging the shoulders or studs on the rocking lever, whereby successive movements of the slide in the same direction will effect opposite movements of the switch-point, a horizontally-movable part lying in the path of the wheel or wheels of the car and adapted to be moved longitudinally thereby, means for returning said movable part to its normal position after having been moved longitudinally, and adjustable connections between said movable part and the reciprocating slide.

11. In a railway-switch-operating device,

the combination with a switch-point, of a horizontally-movable carriage, a projection on said carriage provided with an inclined upper surface lying in the path of a wheel or wheels of the car and adapted to be moved longitudinally thereby when the rotation of the wheel is retarded, means for returning said carriage to its normal position after having been moved longitudinally by the car-wheel, and normally disconnected means between the movable part and switch-point, whereby successive movements of the movable part in the same direction will effect opposite movements of the switch-point.

12. In a railway-switch-operating device, the combination with a switch-point, of a horizontally-movable part adjacent to one of the rails of the track and in the path of the wheel or wheels on that side of the car and adapted to be moved longitudinally thereby when the rotation of the wheel is retarded, connections between the said movable part and the switch-point for moving the latter, and an independent movable part located adjacent the opposite rail of the track and lying in the path of the wheel on that side of the car and adapted to support and carry forward the said wheel when the opposite wheel is on the first-named movable part.

13. In a railway-switch-operating device, the combination with a switch-point, of a horizontally-movable part lying adjacent to one of the rails of the track and in the path of a wheel on one side of the car and adapted to be moved longitudinally thereby when the rotation of the wheel is retarded, means for returning said movable part to its normal position after having been moved longitudinally by the car-wheel, normally disconnected means between the movable part and the switch-point, whereby successive movements of the movable part in the same direction will effect opposite movements in the switch-point, an independent longitudinally-movable part adjacent the opposite rail and lying in the path of the wheel on the opposite side of the car and adapted to move longitudinally with the said wheel when locked, and means for returning said second movable part to its normal position after having been moved longitudinally by the car-wheel.

14. In a railway-switch-operating device, the combination with a switch-point, of a horizontally-movable carriage adjacent to one of the rails of the track and provided with a projection having an inclined upper face lying in the path of a wheel or wheels of the car and adapted to be moved longitudinally thereby when the rotation of the wheel is retarded, means for returning said movable part to its normal position after having been moved longitudinally by the car-wheel, normally disconnected means between the movable part and the switch-point, whereby successive movements of the movable part in the same direction will effect opposite move-

ments in the switch-point, a longitudinally-movable carriage adjacent the opposite rail of the track and provided with a projection having an inclined upper face lying in the
5 path of the wheel on the opposite side of the car and adapted to be moved longitudinally thereby when the wheel is locked, and means for returning said second carriage to its nor-

mal position after having been moved longitudinally by the car-wheel.

In testimony whereof I, the said FRANCIS E. QUEST, have hereunto set my hand.

FRANCIS E. QUEST.

Witnesses:

ROBERT C. TOTTEN,
GERTRUDE KREMER.