No. 692,050. Patented Jan. 28, 1902.

W. A. N. DORLAND.

AUTOMATIC SWITCH CONTROLLER.

(Application filed July 26, 1901.)

(No Model.) 4 Sheets—Sheet 1.

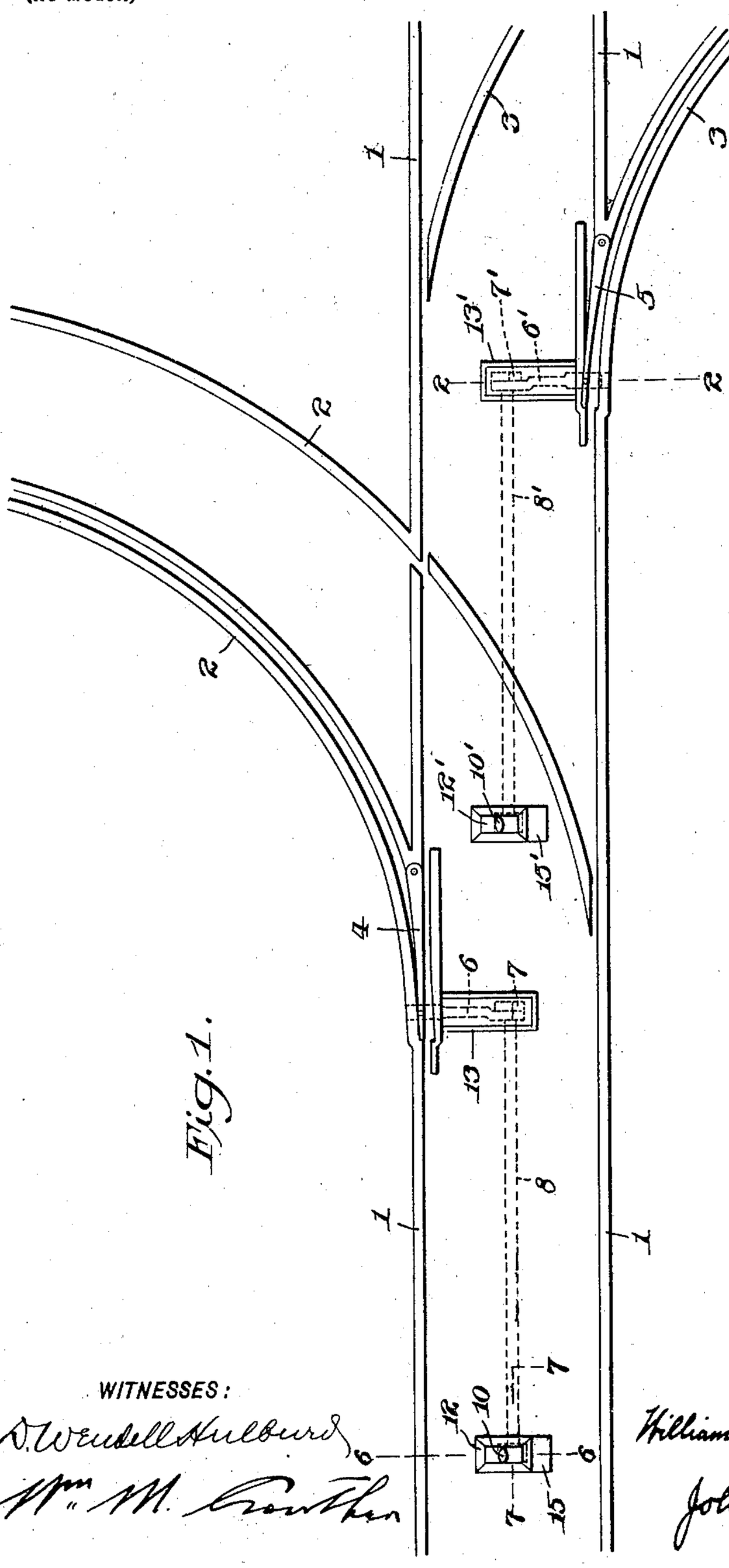

Fig. 1.

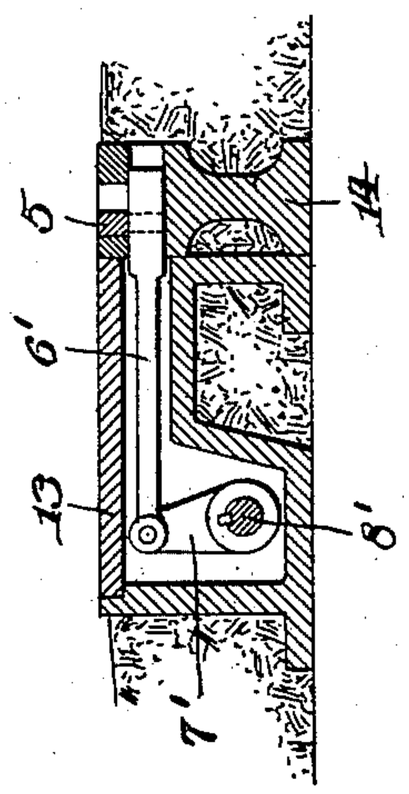

Fig. 2.

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No. 692,050. Patented Jan. 28, 1902.

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(No Model.) 4 Sheets—Sheet 2.

Fig. 3.

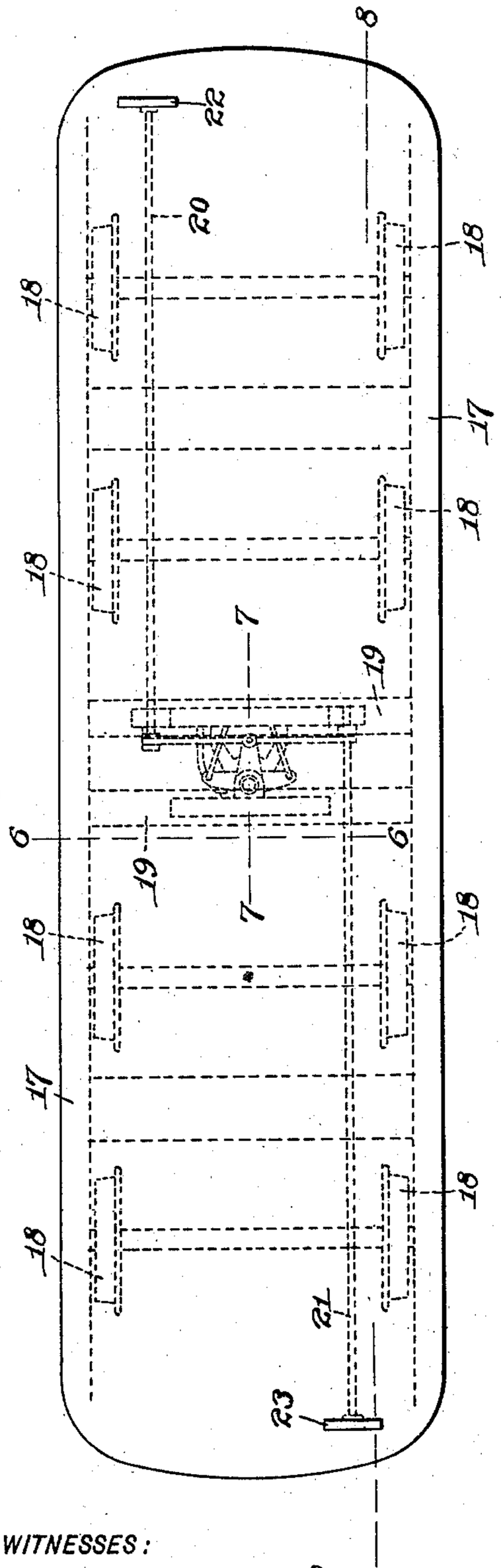


Fig. 5.

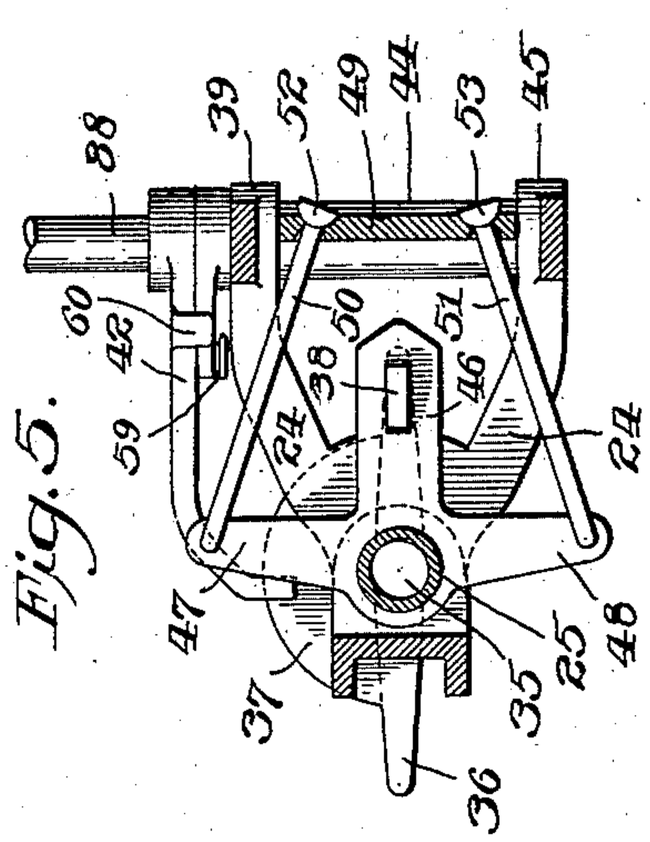
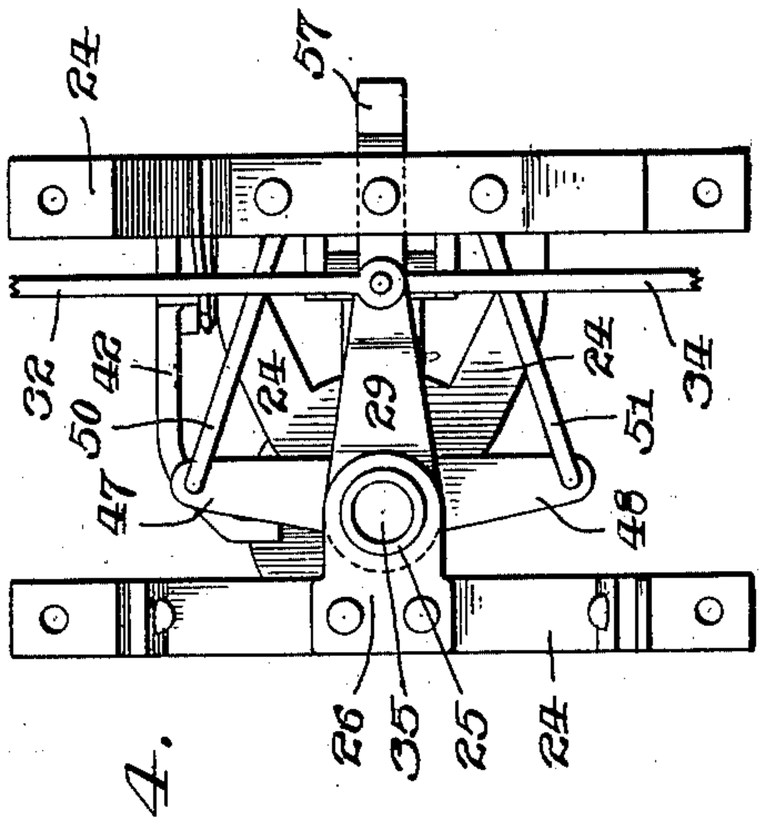


Fig. 4.



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AUTOMATIC SWITCH CONTROLLER.

(Application filed July 26, 1901.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 7.

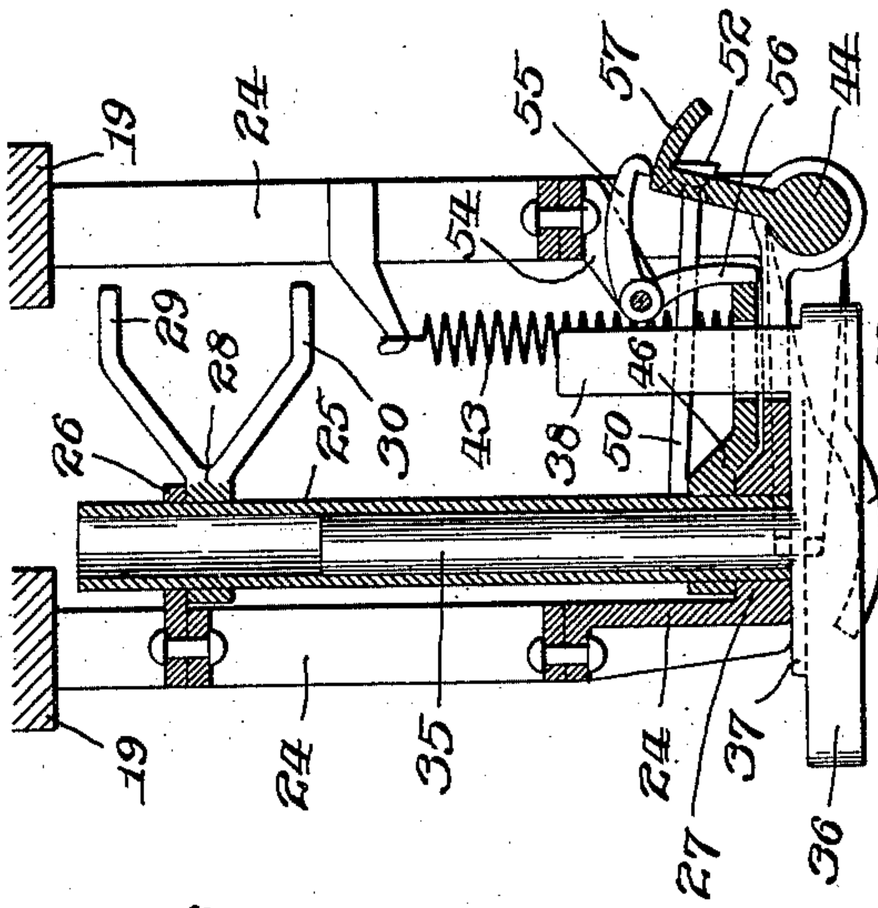


Fig. 12.

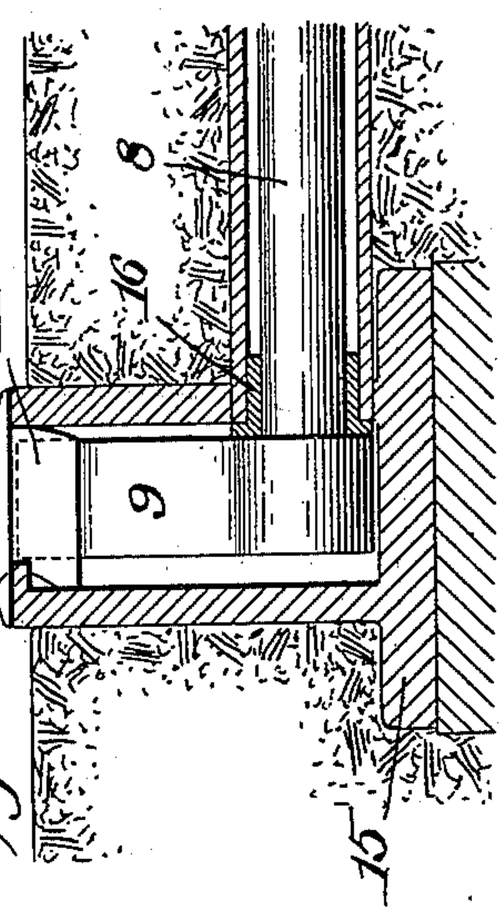


Fig. 6.

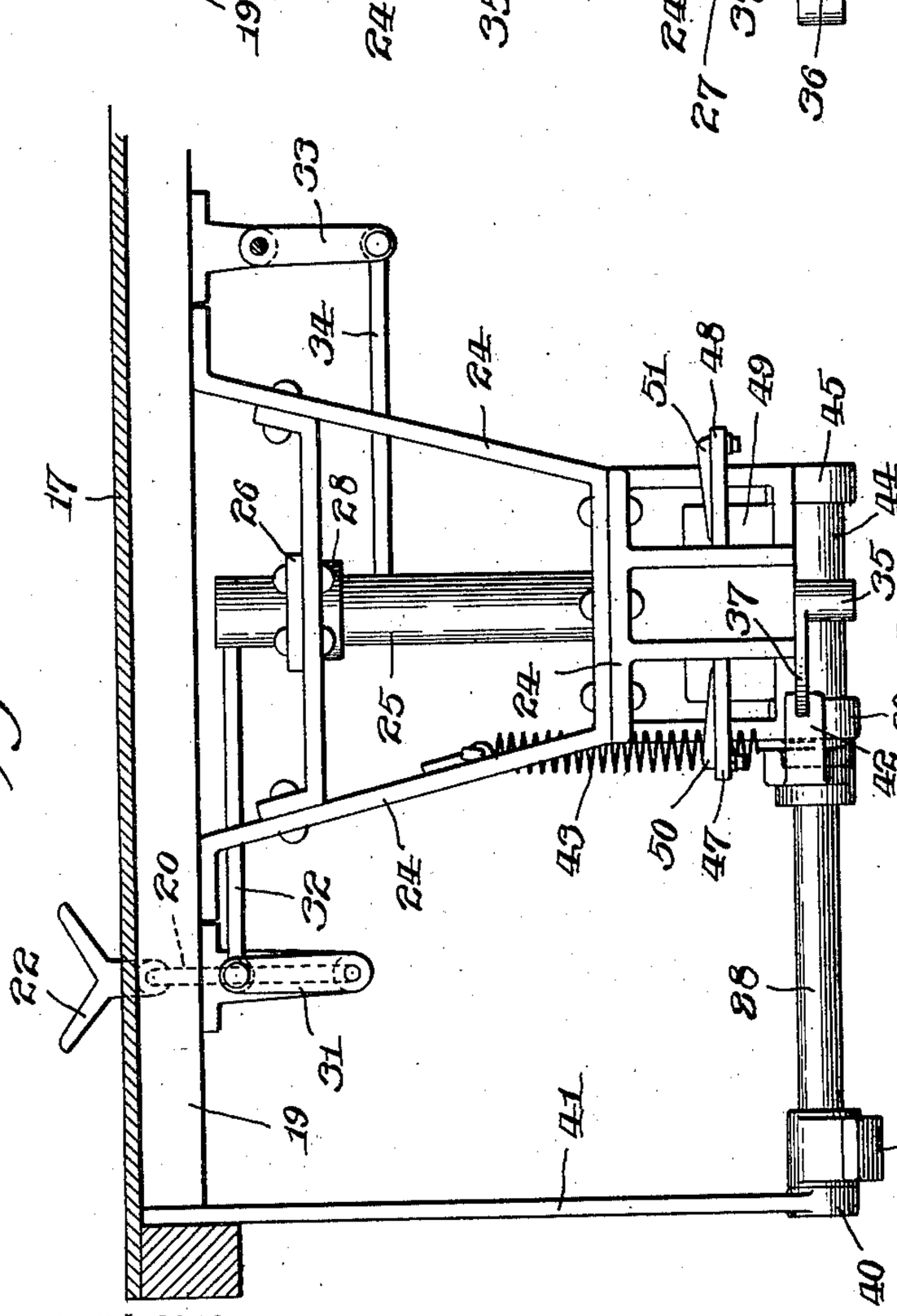
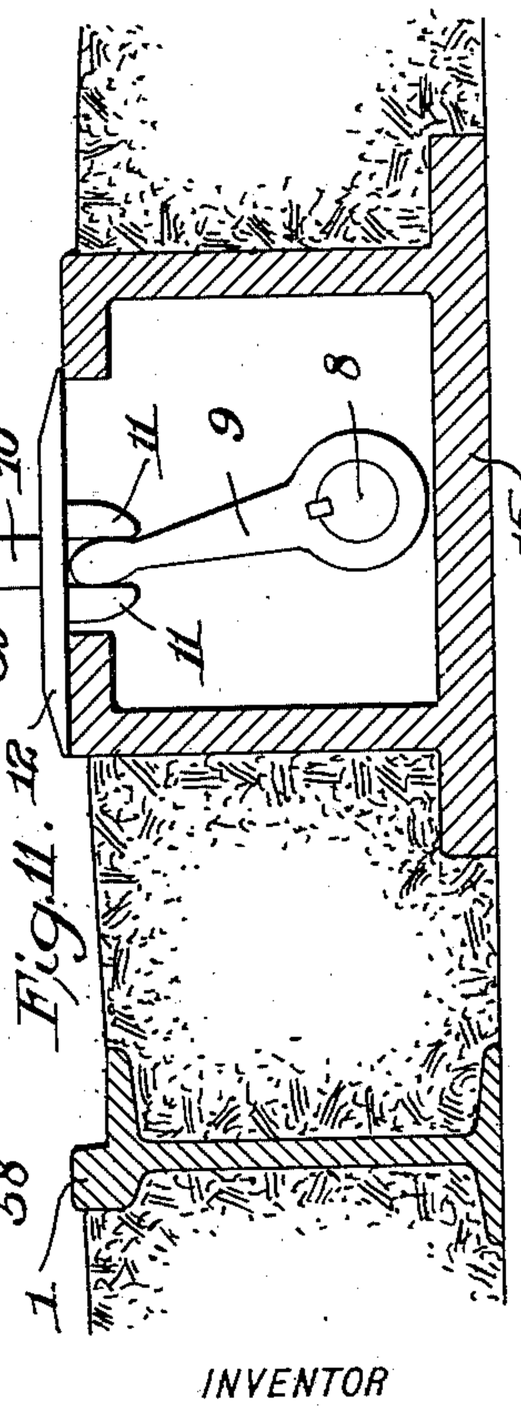


Fig. 11.



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AUTOMATIC SWITCH CONTROLLER.

(Application filed July 26, 1901.)

(No Model.) 4 Sheets—Sheet 4.

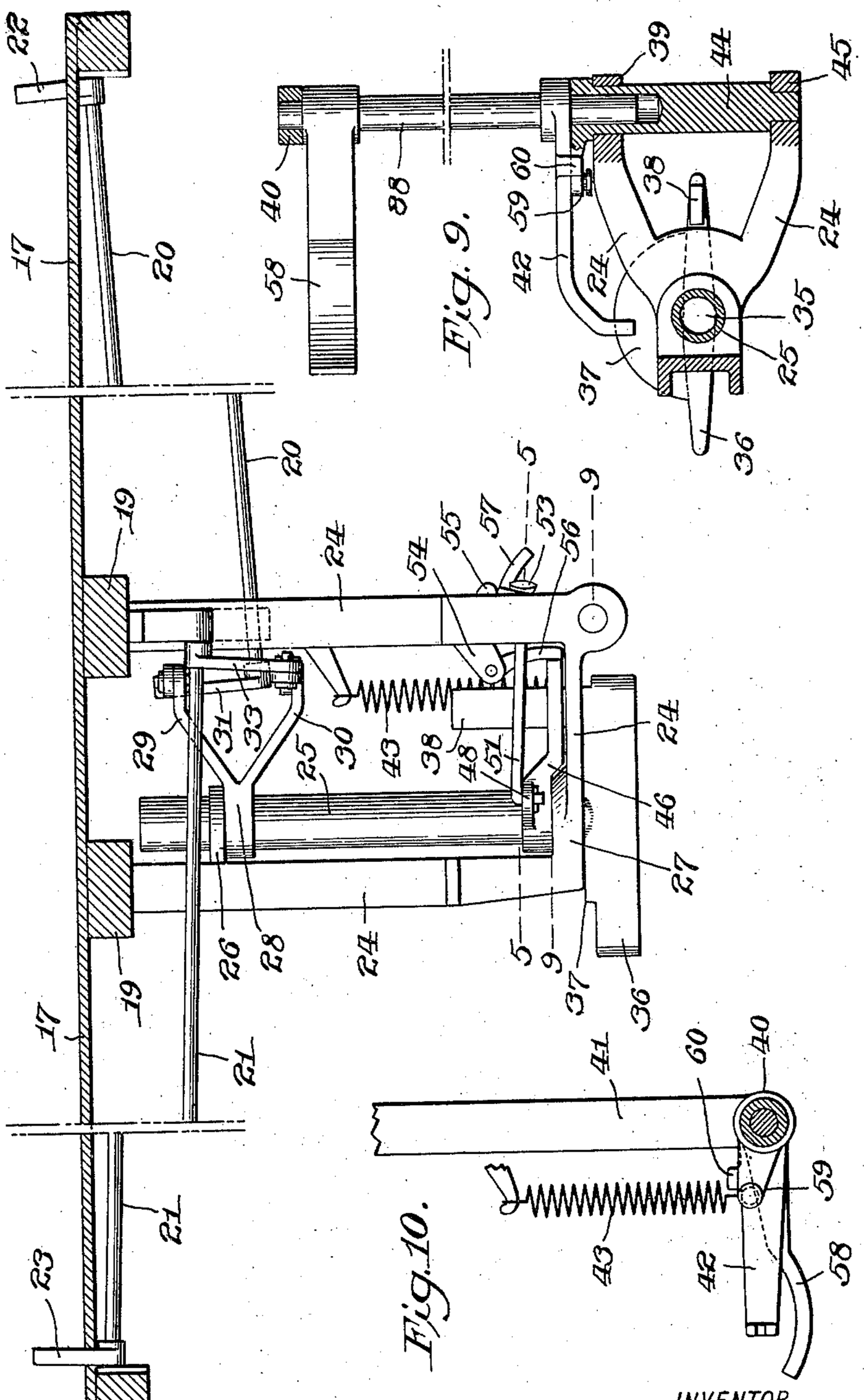

Fig. 8.

Fig. 9.

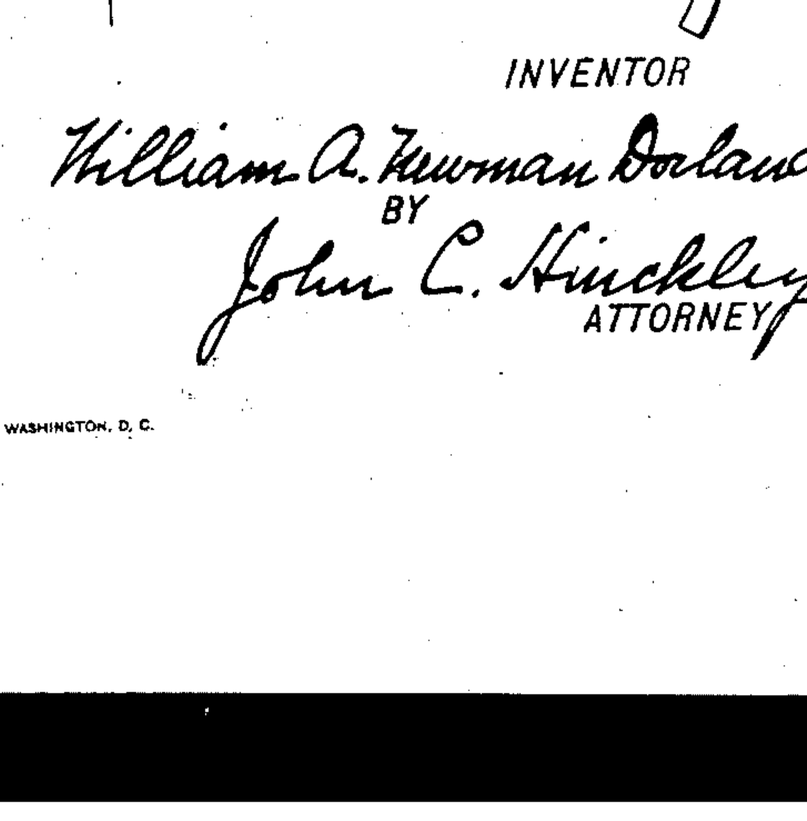

Fig. 10.

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WILLIAM A. NEWMAN DORLAND, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC SWITCH-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 692,050, dated January 28, 1902.

Application filed July 26, 1901. Serial No. 69,785. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. NEWMAN DORLAND, a citizen of the United States, residing at No. 120 South Seventeenth street, in the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Automatic Switch-Controllers, of which the following is a specification.

My invention relates to railway-switches, being designed primarily for use in connection with street-railway service, although I do not restrict myself to such use; and my object is to provide a means whereby the desired opening or closing of the switch may be effected from the car without slackening speed in approaching or passing the switch. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of a main and branch lines of track and of such portion of the switch-operating mechanism as is located in the road-bed. Fig. 2 is a sectional detail thereof, as on the line 2 2 of Fig. 1. Fig. 3 is a floor plan of a car equipped with my invention. Fig. 4 is a plan of the switch-operating mechanism as detached from the car. Fig. 5 is a sectional plan thereof, as on the line 5 5 of Fig. 8. Fig. 6 is a transverse section, as on the line 6 6 of Fig. 3, including a section of the road-bed, as on the line 6 6 of Fig. 1. Fig. 7 is a longitudinal section, as on the line 7 7 of Fig. 3, including a section of the road-bed, as on the line 7 7 of Fig. 1. Fig. 8 is a longitudinal section, as on the line 8 8 of Fig. 3. Fig. 9 is a horizontal section, as on the line 9 9 of Fig. 8. Fig. 10 is a detail of the spring-actuated arm. Fig. 11 is a vertical section on the line 6 6 of Fig. 1. Fig. 12 is a vertical section on the line 7 7 of Fig. 1. Figs. 1, 2, 11, and 12 embody the switch mechanism located in the road-bed. Figs. 4 to 10, inclusive, embody the switch-actuating mechanism attached to the car-body, Figs. 4, 6, 7, and 8 being general views of said mechanism, and Figs. 5, 9, and 10 being details of the same.

In Fig. 1, 1 is a main line of track, from which branch the lines 2 and 3. The switch-points 4 and 5, actuated as hereinafter described, control admission to the branch lines 2 and 3. The switch-point 4 is attached to the arm 6, which is pivotally joined by the short lever-arm 7 to one end of the rod 8. Upon the opposite end of the rod 8 is mounted the lever-arm 9. (Shown in Fig. 11.) The lever-arm 9 is adapted to be actuated by the block 10 by means of the claw 11, attached to the lower side of the plate 12, whereon said block is mounted.

In Fig. 2 the parts connecting one end of the rod 8′ with the switch-point 5 are shown in detail, 13′ being any suitable protective casing for said parts, and 14 a plate or base beneath the rail, whereon the end of the arm 6′ slides in actuating the switch-point 5.

In Figs. 11 and 12 the parts connecting the end of the rod 8 with the block 10 are shown in detail, 15 being any suitable protective casing for said parts, and 16 being a bearing wherein the end of the rod 8 rotates.

In Fig. 3, 17 is a car-body of any suitable form mounted upon the trucks 18. In the middle of said car-body is located a transverse supporting-frame 19, adapted to carry the switch-actuating mechanism hereinafter described. The brake-rods 20 and 21 are connected at one end with the switch-actuating mechanism and at the other with the levers 22 and 23, whereby the motorman or operator controls said mechanism.

In Figs. 6, 7, and 8, 17 is the car-body, and 19 the transverse supports hereinabove referred to. To the supports 19 is attached the frame 24, which carries the operative parts of the switch-actuating mechanism. The hollow rock-shaft 25, Fig. 8, is vertically mounted in the bearings 26 and 27, carried by the frame 24, and is rotated by means of the collar 28. The collar 28 is provided with the Y-shaped arms 29 and 30, (shown in Figs. 7 and 8,) said arms being pivotally connected by the lever-arms 31, 32, 33, and 34, Figs. 6 and 8, to the ends of the brake-rods 20 and 21. Thus the hollow rock-shaft 25 can be rotated from right to left, or vice versa, by rotating either of the brake-rods 20 or 21 by means of their levers 22 and 23.

In Fig. 7, 35 is a stem adapted to rotate and to be raised or lowered in the hollow rock-shaft 25 in the manner hereinafter described. To the lower end of the stem 35 is attached what I term the "block-adjuster" 36, Figs. 7 and 8.

The upper surface of said block-adjuster is furnished with a semicircular flange 37, Fig. 6, and the vertical pin 38, Figs. 7 and 8.

In Fig. 6 the shaft 88 is horizontally rotatable in the bearing 40, carried in the end of the hanger 41, and in a bearing in the end of the shaft 44, as hereinafter described, the hanger 41 being rigidly connected to the framework 17 of the car. Upon the shaft 88 is mounted the claw-lever 42, integral therewith, Figs. 6 and 9. This claw-lever actuates the rotation of the shaft 88 and engages the semicircular flange 37, operating to elevate or depress said flange, and with it the block-adjuster 36, in the manner hereinafter more particularly described. One end of the spring 43 is attached to the frame 24, and the other end of said spring is attached to the short arm 59, Fig. 9, in such manner as to raise said arm when the latter has been depressed by the rotation of the shaft 44, Fig. 7, as hereinafter more fully described.

In Fig. 9 the shaft 44 is rotatable in the bearings 39 and 45, located in the frame 24, as shown also in Fig. 6. Fig. 9 shows the shaft 88 as having a bearing within the shaft 44; but the shafts 88 and 44 are independently rotatable.

In Fig. 5 the lower end of the hollow rock-shaft 25 carries the three-arm member, consisting of the arms 47 and 48 and the cam-arm 46. The cam-arm 46 is furnished with an opening, through which passes the vertical pin 38, attached to one end of the block-adjuster 36, as shown also in Figs. 7 and 8. The shaft 44 is furnished with the wing 49, (shown also in Fig. 6,) pierced to admit the rods 50 and 51. The rods 50 and 51 are pivotally connected to the arms 47 and 48 and are provided with the heads 52 and 53, whereby the rotation of the three-arm member admits of a pull being exerted by the rod 50 upon the wing 49, while simultaneously the rod 51 passes freely through its opening in the wing 49, or vice versa.

In Fig. 7, 54 is a projection secured to and extending from the frame 24 and carrying the latch 55 and trigger 56, said latch being adapted to engage the catch 57, attached to the shaft 44, as hereinafter more fully described.

In Figs. 7 and 9, 58 is a shoe attached to and actuated by the shaft 88.

The operation of my automatic switch-controller is as follows: Referring in the first instance to that portion of the mechanism located in the road-bed—viz., that shown in Figs. 1, 2, 11, and 12—we will take position at the left-hand end of the track in Fig. 1, facing down the main or straight line of rail. The block 10 and plate 12, on which said block is mounted, has been moved over toward the left. (See Fig. 11.) The claw 11, attached to the under side of the plate 12, has drawn over the lever-arm 9, thus rotating the rod 8 from right to left. This movement has carried the arm 6 at the switch and the switch-point 4, pivoted upon said arm, over to the left into the position shown in Fig. 1. In other words, a movement of block 10 to the left moves switch-point 4 to the left, and vice versa, and the same is true of block 10′ and switch-point 5. Fig. 2, which is a sectional view on the line 2 2, Fig. 1, shows the position of the working parts at switch-point 5 as the switch is set in Fig. 1. Of the entire mechanism above described the only elements designed to be above the surface of the road-bed are the blocks 10 and 10′, the dimensions whereof may be such as to offer no obstruction to travel where my invention is employed in connection with street-railway service.

The claw 11, Fig. 12, is furnished with a groove fitting one edge of the slot in the top of the casing 15, adapted to prevent the block 10 and its plate 12 from being displaced by passing vehicles.

Referring next to that portion of the mechanism carried by the car-body, the purpose of this mechanism is to actuate and control the movement and position of the block-adjuster 36. This block-adjuster has two movements—a vertical movement through the rise and fall of its stem 35 in the hollow rock-shaft 25 and a horizontal semirotation upon its stem, both movements being simultaneous.

The vertical rise and fall of the block-adjuster 36 is accomplished in the following manner: In Figs. 8 and 5 a movement of the brake-lever 23, Fig. 8, rotates the brake-rod 21. The latter is connected by the lever-arms 33 and 34 (the arm 34 cannot be seen in Fig. 8) to the Y-arm 30 of the collar 28. The collar 28 being attached to the hollow rock-shaft 25, it is apparent that a movement of the brake-lever 23 in one direction causes a semirotation of the hollow rock-shaft 25 from left to right, while a movement of the brake-lever 23 in the opposite direction causes a semirotation of the hollow rock-shaft from right to left. The three-arm member 46 47 48 (shown in plan in Fig. 5) is attached to the base of the hollow rock-shaft 25 and rotates therewith. Referring to Fig. 5, it will be seen that a rotation of the hollow rock-shaft 25 from right to left causes the arm 47 to actuate the wing 49 by means of the rod 50. The arm 48 pushes its rod 51 freely through its opening in the wing 49. Thus the shaft 44, upon which the wing 49 is mounted, is rotated by any rotation of the hollow rock-shaft 25 either to left or right. The above-described rotation of the shaft 44, Fig. 5, is opposed by the action of the spring 43, Fig. 8, one end of which is attached to the frame 24 above said shaft and the other to the end of the short arm 59, Figs. 5 and 9, tending to rotate the shaft 44 back into its normal position, as hereinafter more fully explained.

The block-adjuster 36, Fig. 8, is carried by the stem 35, Fig. 7, rotating freely in the hollow rock-shaft 25. To the block-adjuster 36 is attached the semicircular flange 37, which is engaged by the claw-lever 42, as shown in

Figs. 5, 6, and 9. The claw-lever 42 is furnished with the projection 60, Figs. 5 and 9, which overlaps the short arm 59. The tension of the spring 43, Fig. 8, attached to the end of the short arm 59, Fig. 5, causes an upward pressure against the projection 60, attached to the claw-lever 42, which enables the claw-lever 42 to hold the block-adjuster by its semicircular flange 37 firmly up in position against the under surface of the frame 24, which is the position of the block-adjuster when not in action. If the hollow rock-shaft 25 be rotated, thereby rotating the shaft 44 in the manner above described, the arm 59, integral with the shaft 44, is depressed, allowing the claw-lever 42, with the flange 37 and block-adjuster 36, to drop down into a position where the latter can engage the blocks 10 10′ in the manner hereinafter more particularly described. The downward movement of these parts rotates the shaft 88, Fig. 9, with which the claw-lever 42 is integral, and causes the shoe 58 to lower until it comes into contact with the track-rail, along which it slides until the block-adjuster is again raised. The shoe 58 can thus be readily adjusted so as to limit the descent of the block-adjuster in any well-known manner.

Having stated the means whereby the vertical rise and fall of the block-adjuster 36 is accomplished, it remains to describe the manner in which the semirotary movement of the block-adjuster is secured.

In Fig. 5 the cam-arm 46 of the three-arm member is furnished with a slot or opening which engages the pin 38, mounted vertically on and integral with one end of the block-adjuster 36. It is therefore apparent that a rotation of the three-arm member lowers the block-adjuster and simultaneously causes it to turn pivotally upon its stem 35 either to the right or left, according as the hollow rock-shaft 25 is rotated to the right or left. It is thus apparent that any rotation of the hollow rock-shaft 25 causes the block-adjuster 36 to descend and to rotate to the right or left as it does so upon its stem 35.

Having described the means whereby the block-adjuster is brought into position to engage the block 10, I will now describe the cooperation between the block-adjuster 36 and the block 10 in Fig. 1.

The position of switch-point 4, Fig. 1, being as therein shown, we will suppose that the car approaching said switch-point is to turn out upon the curve of track controlled thereby. By means of either of the switch-levers 22 or 23, Fig. 8, the block-adjuster 36 is lowered and its forward end turned toward the left-hand rail. As the car passes over the block 10 the block-adjuster engages the block 10 on the left side of said block 10 and by a sliding leverage due to the angle at which the block-adjuster is fixed and its forward motion the block 10 is pushed over toward the right-hand rail of the track. This movement of block 10 causes a corresponding right movement of switch-point 4 by the means hereinabove described and the trucks pass off upon the curved line of track. If, switch-point 4 being in this latter position, it is desired to continue on the main or straight track, the block-adjuster is lowered and its forward point turned toward the right-hand rail. This engages the block 10 on its right side, pushing it over to the left, moving the switch-point 4 to the left and opening the main line. The same mode of operation is applicable in the case of block 10′ and switch-point 5.

My invention embraces, further, a means whereby the contact between the block and block-adjuster operates after the switch has been actuated thereby to automatically raise the block-adjuster to its normal position when not in action—viz., parallel with the rails.

In Fig. 7, 55 is a latch furnished with the trigger 56 and adapted to engage the catch 57. The latch and trigger are mounted over the shaft 44 midway between the bearings 39 and 45 in Fig. 5. The catch 57 is mounted upon and integral with the shaft 44 and is located beneath the latch 55. A semirotation of the three-arm member 46 47 48, Fig. 5, rotates the shaft 44 and with it the catch 57, Fig. 7, which engages the latch 55 and holds the block-adjnster 36 in position to engage the block 10, Fig. 1. The block-adjuster meets the block at an angle; but by the time the forward half of the block-adjuster has passed the block the latter has been fully moved over, and consequently operates to thrust the rear half of the block-adjuster around into a position parallel with the rails. This induces a corresponding movement in the cam-arm 46, Fig. 5, engaged by the pin 38 of the block-adjuster, and as the cam-arm 46 moves into a position parallel with the rails it comes into contact with the trigger 56, Fig. 7, raising the latch 55 and permitting the escape of the catch 57, whereupon the spring 43 raises the block-adjuster to its normal position.

The block and block-adjuster may be of any suitable form. I have here shown what I consider a preferable form for both—a somewhat elongated double-ended oval—as this form assists the leverage action hereinabove described and enables the block-adjuster to actuate the block whether the car be running forward or backward.

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

1. In combination in an automatic switch-controlling mechanism, means for actuating the switch consisting of a movable block, a lever-arm actuated by said block, a shaft actuated by said lever-arm, a switch-point and means such as the lever-arms 6′ and 7′ connecting said shaft and switch-point, whereby a displacement of said block actuates said switch-point, and means for displacing said block consisting of a block-adjuster carried beneath the car, adapted to be raised or lowered and rotated horizontally substantially as described.

2. In combination in an automatic switch-controlling mechanism, a switch-actuating mechanism consisting of a laterally-displaceable block adapted to actuate the switch-point by means of a claw, a lever-arm, a shaft, a short lever-arm and a switch-point arm, and a block-actuating mechanism consisting of a vertical hollow rock-shaft, a three-arm member rotated thereby, a block-adjuster mounted therein, a pin integral with one end of said block-adjuster and engaged by said three-arm member, a shaft horizontally rotatable by said three-arm member, a spring-actuated arm integral with said shaft, a claw-lever controlling said block-adjuster and adapted to be elevated by said spring-actuated arm, and means for rotating said hollow rock-shaft, substantially as described.

3. In combination in an automatic switch-controlling mechanism, means for actuating the switch consisting of a movable block, a switch-point, a shaft, a lever-arm attached to said shaft and actuated by said block, an arm carrying said switch-point and a lever-arm attached to said shaft and actuating said switch-point arm, and means for displacing said block consisting of a block-adjuster carried beneath the car-body and provided with a stem and a pin, a hollow rock-shaft in which said stem is adapted to be raised or lowered, a cam-lever actuated by said hollow rock-shaft and engaging the pin of said block-adjuster, a claw-lever mounted upon and integral with the shaft 88 and controlling the vertical position of said block-adjuster, the shaft 44, means such as the arms 47 and 48, rods 50 and 51 and wing 49 for rotating the shaft 44, a lever-arm integral with said shaft 44 and a spring actuating said lever-arm, said spring and lever-arm being adapted to elevate said claw-lever substantially as described.

4. In combination in an automatic switch-controlling mechanism, a laterally-movable block, a switch-point, connecting means between said block and switch-point, consisting of a claw, a lever-arm, a shaft, a short lever-arm and a switch-point arm, a block-adjuster furnished with a stem and pin, a hollow rock-shaft wherein said block-adjuster stem is mounted, a three-arm member actuated by said hollow rock-shaft, the middle arm of said member engaging the block-adjuster pin, the shaft 44 with its lever-arm 59, said shaft being adapted to be rotated in one direction by said three-arm member and in the opposite direction by a spring attached to said lever-arm 59 and a claw-lever integral with the shaft 88 and engaging the block-adjuster 36, substantially as described.

5. In combination in an automatic switch-controlling mechanism, a movable block, a switch-point, connecting actuating means between said block and switch-point, consisting of a claw, a lever-arm, a shaft, a short lever-arm and a switch-point arm, a block-adjuster furnished with a stem and pin, a hollow rock-shaft wherein said block-adjuster stem is mounted, a three-arm member actuated by said hollow rock-shaft, one arm of said member engaging the block-adjuster pin, the shaft 44 furnished with a lever-arm 59, said shaft being adapted to be rotated in one direction by said three-arm member, a spring attached to said lever-arm, 59 and adapted to rotate said shaft 44 in the opposite direction, a claw-lever engaging the block-adjuster 36 and adapted to be elevated by said lever-arm 59, the shaft 88 integral with said claw-lever, a brake-rod and means for actuating said hollow rock-shaft by the rotation of said brake-rod, substantially as described.

6. In combination in an automatic switch-controlling mechanism, a movable block, a switch-point, connecting actuating means between said block and switch-point, consisting of a lever-arm, a shaft, a short lever-arm and a switch-point arm, a block-adjuster furnished with a stem and pin, a hollow rock-shaft wherein said block-adjuster stem is mounted, a three-arm member actuated by said hollow rock-shaft and engaging said block-adjuster pin, the shaft 44 carrying the lever-arm 59, said shaft being adapted to be rotated downward by said three-arm member, means such as the spring 43 for elevating said lever-arm 59, a claw-lever engaging the block-adjuster and adapted to be elevated by said lever-arm 59, the shaft 88, a latch and trigger actuated by said three-arm member, a catch mounted upon the shaft 44 and adapted to be engaged by said latch, a brake-rod and means for actuating said hollow rock-shaft by the movement of said brake-rod, substantially as described.

7. In combination in a block-actuating mechanism, a block-adjuster, a hollow rock-shaft wherein said block-adjuster is mounted, a three-arm member actuated by said hollow rock-shaft and engaging said block-adjuster by means of a projection integral with the latter, the shaft 44 carrying a lever-arm, connecting means between said three-arm member and said shaft 44 whereby the latter may be rotated by the former, a spring adapted to raise said lever-arm, a claw-lever integral with the shaft 88 and engaging the block-adjuster, adapted to be elevated by said spring and lever-arm, and means for causing a semirotation of said hollow rock-shaft, substantially as described.

8. In combination in a block-actuating mechanism a hollow rock-shaft, a block-adjuster mounted therein adapted to rise and fall and to rotate upon its axis, a three-arm member actuated by said hollow rock-shaft and engaging said block-adjuster by means of a projection integral with the latter, the shaft 44 carrying a lever-arm, connecting means such as the rods 50 and 51 and wing 49 whereby the shaft 44 may be rotated by said three-arm member, a spring adapted to raise said lever-arm, a claw-lever integral with the shaft 88 and adapted to raise or lower said block-adjuster through the action of

said spring and lever-arm, a brake-rod and means such as the lever-arms 29, 32 and 31 for actuating said hollow rock-shaft thereby, substantially as described.

9. In combination in a block-actuating mechanism, a hollow rock-shaft, a block-adjuster mounted therein adapted to rise and fall and to rotate horizontally, a three-arm member actuated by said hollow rock-shaft and engaging said block-adjuster, the shaft 44 carrying a lever-arm, connecting means such as the rods 50 and 51 and wing 49 whereby the shaft 44 may be rotated by said three-arm member, a spring, a claw-lever engaged by said lever-arm and governing the rise and fall of said block-adjuster, the shaft 88 actuated by said claw-lever, a brake-rod and means such as the lever-arms 29, 32 and 31 for actuating said hollow rock-shaft thereby, substantially as described.

10. In combination, a hollow rock-shaft a block-adjuster mounted therein and having a vertical and horizontal adjustment, a three-arm member actuated by said hollow rock-shaft and engaging said block-adjuster, the shaft 44 carrying a lever-arm, connecting means such as the rods 50 and 51 and wing 49 whereby the shaft 44 may be rotated by said three-arm member, a spring, a claw-lever engaged by said lever-arm, and governing the rise and fall of said block-adjuster, the shaft 88 actuated by said claw-lever, a shoe mounted on and actuated by said shaft, a latch and trigger adapted to be actuated by said three-arm member, a catch integral with the shaft 44 and adapted to be engaged by said latch, a brake-rod and means such as the lever-arms 29, 32 and 31 for actuating said hollow rock-shaft thereby, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM A. NEWMAN DORLAND.

Witnesses:
ROBERT H. HINCKLEY,
H. BOVEE SCHERMERHORN.