B. SETTECASE.

AUTOMATIC PILOT SWITCH.

APPLICATION FILED NOV. 5, 1909.

953,238.

Patented Mar. 29, 1910.

3 SHEETS—SHEET 1.

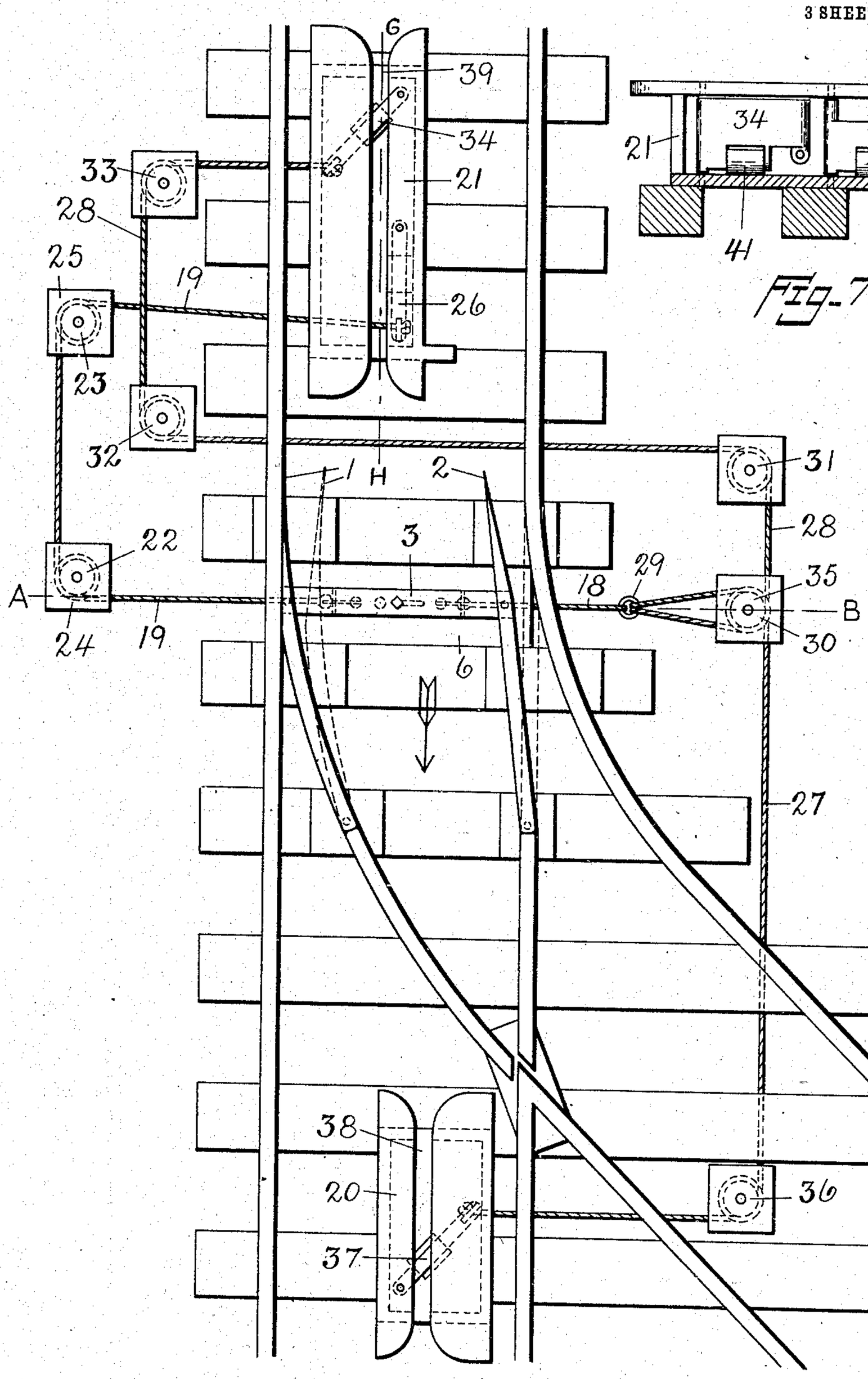

FIG. 1.

FIG. 7.

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3 SHEETS—SHEET 2.

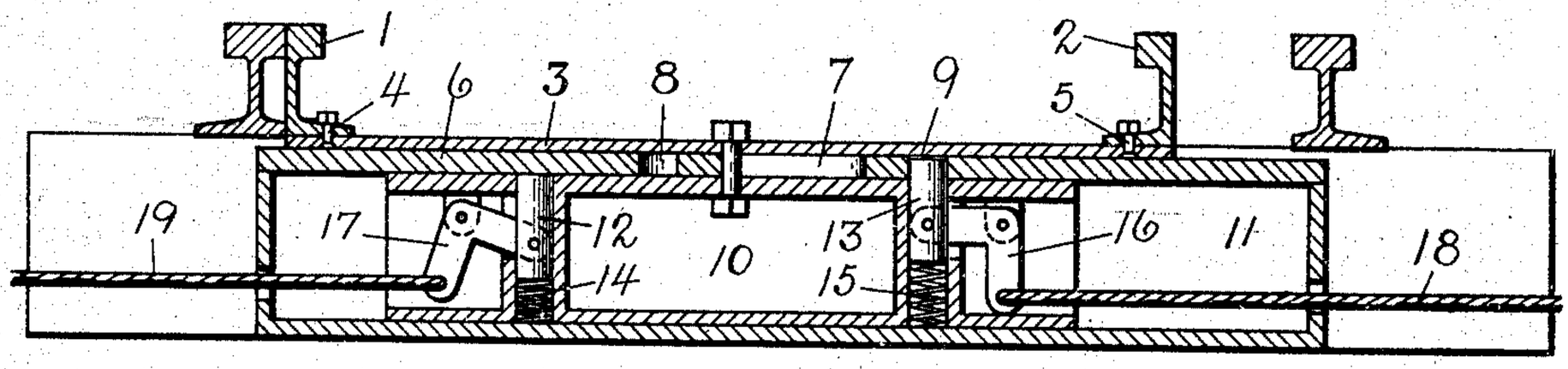

Fig-2-

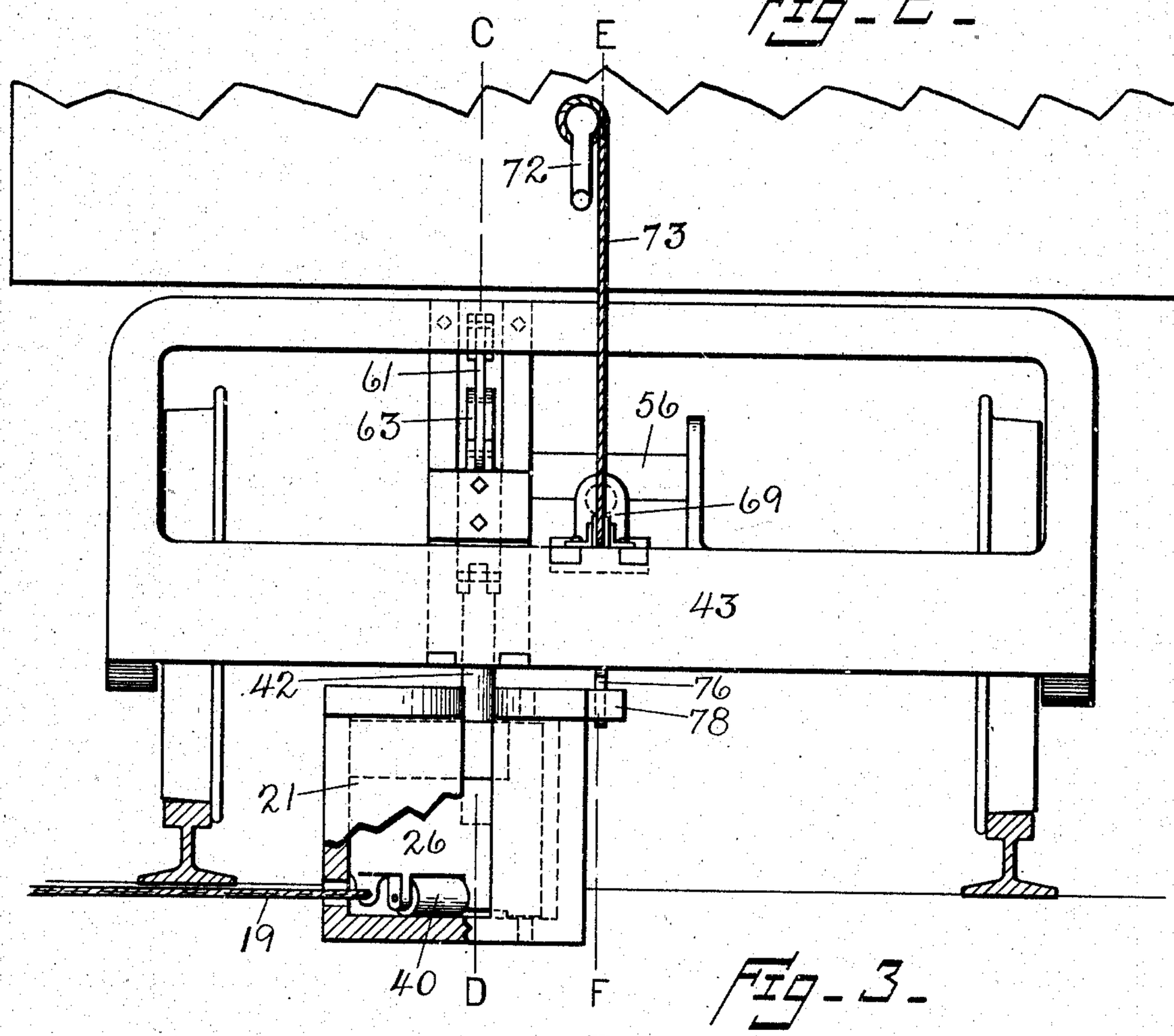

Fig-3-

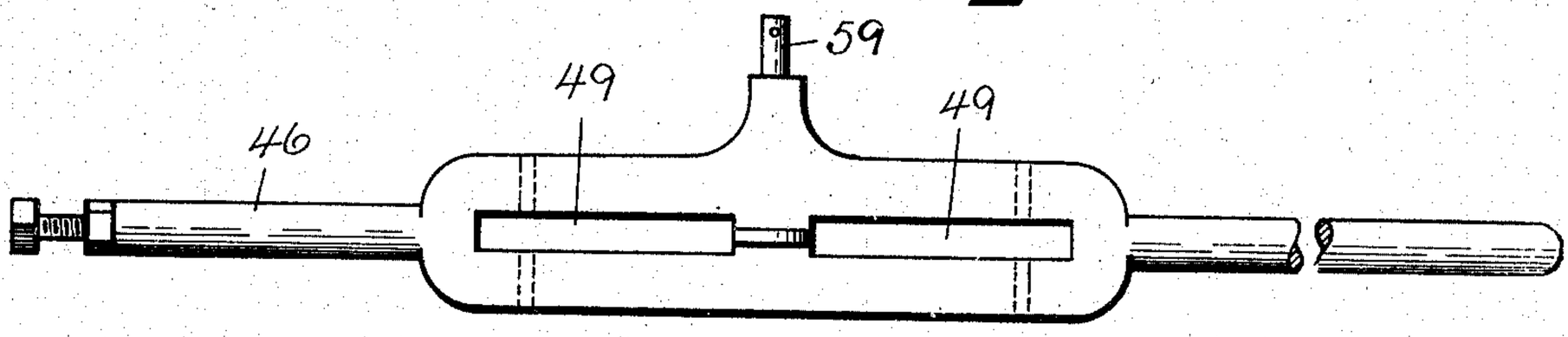

Fig-6-

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3 SHEETS—SHEET 3.

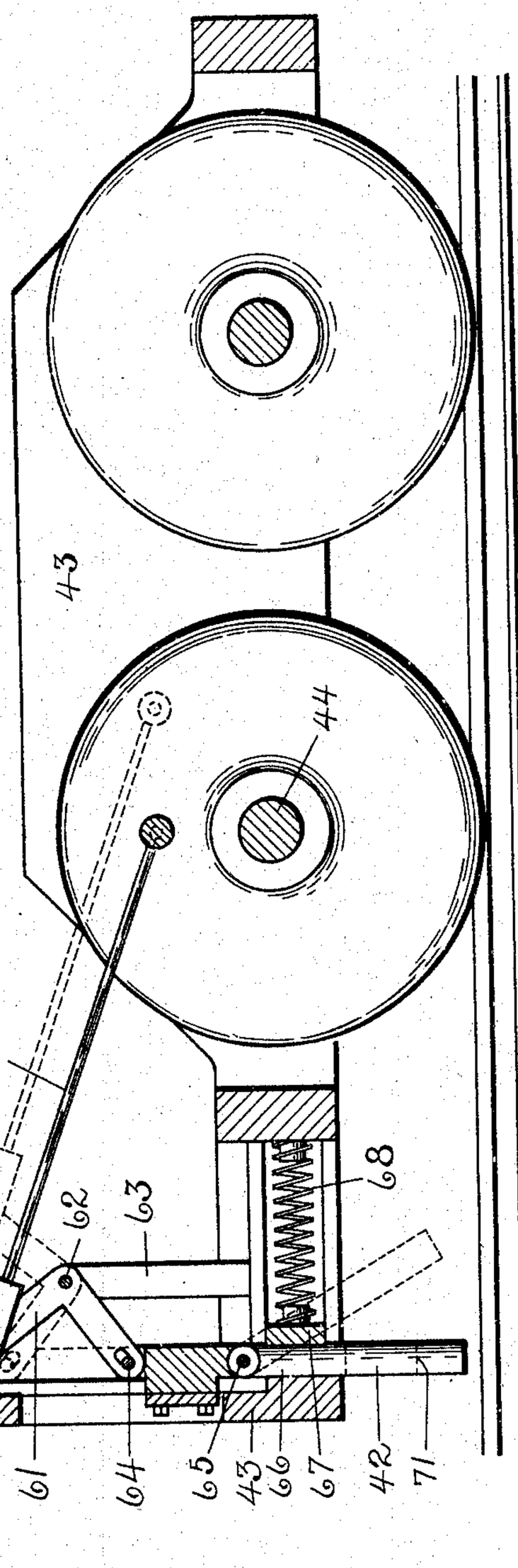

FIG. 4.

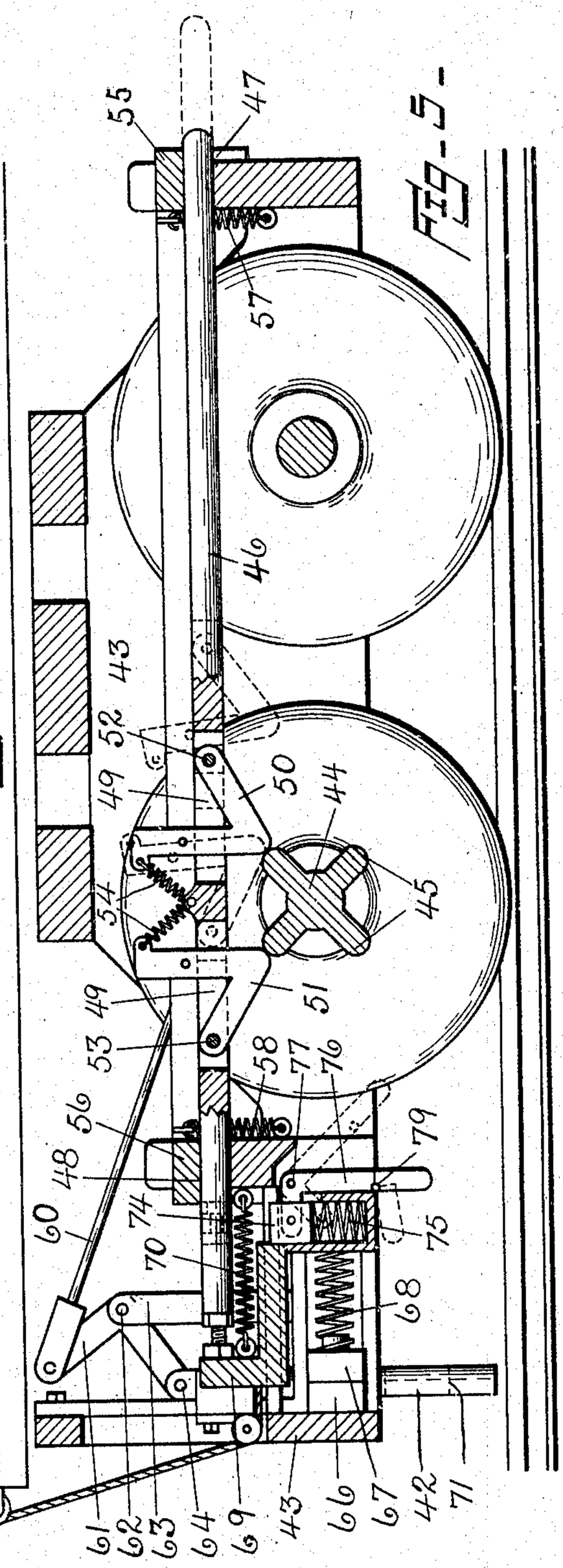

FIG. 5.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC PILOT-SWITCH.

953,238. Specification of Letters Patent. **Patented Mar. 29, 1910.**

Application filed November 5, 1909. Serial No. 526,326.

To all whom it may concern:

Be it known that I, BIAGIO SETTECASE, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Improvement in Automatic Pilot-Switches, of which the following is a specification.

This invention relates to railroad switches, and particularly to switches which are controlled automatically by means of pilot apparatus mounted on a car, and the objects of my improvement are, to provide a switch which is opened or closed automatically and does not require a brakeman to leave the car to throw the switch, to provide switch mechanism which locks the switch automatically, in the open or closed position, hence safety against casualties, and saving of labor. These objects I attain by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a railroad switch embodying my invention; Fig. 2, a vertical sectional view of the switch-locking mechanism on the line A—B of Fig. 1; Fig. 3, a detail end elevation of the switch-throwing mechanism; Fig. 4, a vertical longitudinal sectional view of a car-truck illustrating the mechanism for operating the pilot-bolt and taken on the line C—D of Fig. 3; Fig. 5, a vertical longitudinal sectional view of a car-truck on line E—F of Fig. 3; Fig. 6, a detail top plan view of the pilot-shifting bar; and, Fig. 7 is a longitudinal vertical sectional view of the pilot-casing, on the line G—H of Fig. 1.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

The switch-tongues, 1 and 2, are joined together so as to operate in unison, by a bar, 3, and pivot-bolts, 4 and 5, or similar suitable fastenings (Figs. 1 and 2). Underneath bar 1 is placed a cover-plate, 6, provided with a longitudinal slot, 7, and keepers in the form of holes, 8 and 9. The cover-plate 6 is rigidly secured in the track and bar 3 is adapted to slide longitudinally over it. Underneath cover-plate 6 is slidably mounted a switch-throwing frame, 10, in a stationary casing, 11. The frame 10 is connected with bar 3 by a bolt, 12, or similar connecting means which passes through and is adapted to move in slot 7, thus providing that when frame 10 is moved, bar 3 and switch-tongues 1 and 2 are moved with it. Locking-bolts, 12 and 13, are mounted in frame 10 and are normally pressed upward by springs, 14 and 15. The locking-bolts 12 and 13 are so positioned in frame 10 relative to keepers 8 and 9 in plate 6 that they are adapted to enter the keepers alternately when they are brought into register therewith. The bolts 12 and 13 are depressed against the action of springs 14 and 15 by means of bell-crank levers, 16 and 17, which are fulcrumed in frame 10 and have one of their arms pivoted on the bolts and their opposite arms connected with cables, 18 and 19, respectively. The cables 18 and 19 are connected with levers mounted in pilot-casings, 20 and 21, which will presently be described.

It will be observed that when cable 18 is drawn, bolt 13 is depressed, through the instrumentality of bell-crank 16, and the bolt is thus withdrawn from keeper 9. Frame 10 is then at liberty to slide (Fig. 2) toward the right as cable 18 continues to be drawn, until bolt 12 is brought into register with keeper 8. When bolt 12 enters the keeper, the frame 10 is stopped thereby and locked in that position. This locks the switch-tongues 1 and 2, so that the main track is continuous, as represented by dotted lines in Fig. 1. When cable 19 is drawn, bolt 12 is withdrawn from keeper 8 in a similar manner as just described with reference to bolt 13, and the switch-tongues will be locked in the position shown in Fig. 2, where the siding is ready for a car to be switched thereon. It will thus be seen that the switch is not only thrown by the cables 18 and 19, but automatically locked in position, so that no casualties can occur.

Cable 19 passes to pilot-casing 21 over pulleys, 22 and 23, which are mounted in protecting boxes, 24 and 25, and is connected with a switch-operating lever, 26, mounted in casing 21 in a vertical plane. The cable 18 is divided into two branches, 27 and 28, at 29. Branch 28 passes over pulleys 30, 31, 32 and 33, and is finally connected with a switch-operating lever, 34, vertically mounted in casing 21. The other branch, 27, of cable 18 passes over a pulley, 35, mounted on the same pivot-shaft with pulley 30, but adapted to turn in the opposite direction from pulley 30, then passes over a pulley, 36,

and is finally connected with a switch-operating lever, 37, which is vertically fulcrumed in casing 20.

The casings 20 and 21 are provided with longitudinal slots, 38 and 39, respectively, adapted to receive depending pilot-bolts mounted upon the cars. It will be observed that casings 20 and 21 are respectively arranged to the right and to the left of the center of the track, so that the same pilot-bolt does not enter both slots 38 and 39, while the car is traveling in one direction.

By reference to Fig. 7 it will be seen that levers 26 and 34 are not only vertically fulcrumed in the casing, but are also provided with antifriction bearing-rollers, 40 and 41, to support them and cause them to swing easily. It will also be observed that the upper edge of lever 26 is in a lower plane than the upper edge of lever 34, so that a pilot-bolt that will operate lever 34 may still be sufficiently high to pass over lever 26 without operating it, but if sufficiently depressed, and if the car is passing in the direction of the arrow shown in Fig. 1, the pilot-bolt will operate levers 24 and 36 successively by means hereinafter described. The pilot-bolt on the car is automatically lowered sufficiently to operate lever 34 or lever 37, according to the direction in which the car is going. If the switch is open, as shown in Fig. 1, lever 34 is in a position across slot 39 and in the path of the pilot-bolt. The pilot-bolt on the advancing car therefore engages lever 34, throws it into parallel alinement with slot 39, draws cables 28 and 18, unlocks the switch by depressing bolt 13 and throws the switch-tongues into position to close the main track. If the main track is already closed, lever 26 will be thrown across slot 39 and lever 34 will be out of the path of the pilot-bolt, so that the pilot-bolt will not operate it. The end of the pilot-bolt in this instance is not sufficiently low to reach lever 26, and therefore the pilot-bolt passes through slot 39 without engaging either lever 34 or 26. If the car is moving in a direction opposite that indicated by the arrow, the pilot-bolt will engage lever 37 as it passes through slot 38 of casing 20 and close the main track, if the switch is open. If the main track is already closed, lever 37 will be out of the path of the pilot-bolt or will not operate the switch. It will thus be seen that with this apparatus, the main track cannot be left open, but will be kept closed automatically by the car itself. If it is desired to run the car on the siding, manual means is provided on the car, which will presently be described, for lowering the pilot-bolt to such a depth that it will engage lever 26. In this instance cable 19 will be drawn by the lever, bolt 12 will be depressed, the switch unlocked and the tongues thrown to the position shown in full lines in Fig. 1. The next car that passes over the main track will automatically close the switch by operating lever 34, and it is therefore not necessary for the switchman of the car on the siding to go back and close the switch.

The pilot-bolt, 42 (Figs. 3, 4, 5) is mounted to slide vertically in the front end of the car truck, 43. There is one of these pilot-bolts placed at each end of the car, and located to one side of the median line. These pilot-bolts are connected through operating mechanism with one of the axles, 44, in each truck, in such a manner that the pilot-bolt which is in front of the moving car is lowered into operative position, while the one at the rear of the moving car is automatically drawn up out of operative position. This is accomplished through the following instrumentalities. On axle 44 are mounted pinion-teeth, 45. Above the axles is mounted a slide-bar, 46. The slide-bar 46 is mounted in the truck 43 in bearings, 47 and 48, at each end, in which it is adapted to slide longitudinally. It is provided with slots, 49, in which are fulcrumed elbow-levers, 50 and 51, fulcrumed at 52 and 53 respectively. The elbows of levers 50 and 51 are arranged in suitable position to be engaged by the teeth 45, on the axle. The free ends of the levers are provided with receptacles for one end of springs, 54, which in turn are secured at their opposite ends to slide-bar 46, so that the elbows of the levers 50 and 51 act like gear teeth in a rack, to shift bar 46, according to the direction in which the axle 44 is turning. When bar 46 has been thrown backward, for instance, the levers 50 and 51 take the position shown by dotted lines, wherein lever 50 is entirely out of engagement with the teeth 45, and lever 51 then vibrates over the moving pinion-teeth, but is ready to engage the teeth when the direction of rotation is reversed, so that bar 46 will be thrown forward. It is represented as thus thrown forward in Fig. 5. The bearings 47 and 48 are divided and their caps, 55 and 56, are drawn downward by springs, 57 and 58, so that the caps 55 and 56, and hence bar 46, are held down yieldingly, in order that if levers 50 and 51 should become deranged, bar 46 may be lifted bodily by teeth 45 and thus breaking the mechanism be prevented. Bar 46 is provided with a stud, 59, upon which is pivotally mounted a connecting rod, 60, at one end. The opposite end of connecting-rod 60 is pivoted on a bell-crank lever, 61, which in turn is fulcrumed at 62 in a post, 63, and connected with the upper end of pilot-bolt 42 at 64. Through these instrumentalities, when bar 46 is slid backward, pilot-bolt 42 is raised out of operative position, whereas when bar 46 is slid forward, the pilot-bolt is lowered into operative position.

Pilot-bolt 42 is articulated at 65, and its bearing, 66, is divided. The rear block, 67, of this bearing is slidably mounted in the car truck and yieldingly pressed forward by a spring, 68. By this means, when pilot-bolt 42 meets an irresistible obstruction it may fold backward, as shown in the dotted lines in Fig. 4, and thus pass over the obstruction and then swing forward and resume its normal operative position.

In order to hold bar 46 in the rearward relation, so that pilot-bolt 42 is kept raised out of operative position when the car is going backward relative to that particular pilot-bolt, a slide, 69, is provided, which is mounted in the truck, underneath the forward end of bar 46, and has an upward extension adapted to engage the forward end of the bar. A tension spring, 70, is connected with the forward end of slide 69, so as normally to draw the slide backward and carry bar 46 backward with it, to the position shown in dotted lines in Fig. 5. The normal operative depth of pilot-bolt 42 is shown by the dotted line, 71, in Figs. 4 and 5, whereas the full lines represent the pilot-bolt lowered to its full depth or in operative position to engage lever 26 and open the siding. The pilot-bolt is lowered to this position by means of manual apparatus comprising a crank, 72, or similar means and a cable, 73, connected with slide 69, by means of which the slide is drawn forward to its full limit, allowing pinion teeth 45 on the axle to throw bar 46 fully forward. In order to hold slide 69 in the forward position when once drawn to that position by the crank 72, a block, 74, is mounted in truck 43 and adapted to be pressed upward by a compression-spring, 75. When slide 69 is in the rearward position, block 74 merely presses upward against the bottom of the slide, but when slide 69 is drawn to the forward limit, block 74 springs upward, engages the rear end of the slide, and prevents its backward movement. By these means it is not necessary for the operator to hold crank 72, but merely to turn it so as to draw slide 69 to its forward limit when the switch is to be thrown to open the siding.

Means are provided for releasing blocks 74 and slide 69 so as to raise bolt 42 to its normal position, as soon as the switch has been thrown. These means comprise a bell-crank lever, 76, fulcrumed at 77, in truck 43, having one of its arms extending downward below the truck and its opposite arm engaging block 74. The depending arm of lever 76 is arranged in such a position on the truck that it is in proper alinement to engage a trip, 78, (Fig. 3) extending from the side of the front end of pilot-casing 21. Lever 76 is so arranged, also, at such a distance to the rear of pilot-bolt 42, that when lever 76 engages trip 78 the pilot-bolt has accomplished its work of throwing the switch and may then be raised to the normal operative position. Lever 76 is articulated at 79, so that when the car is moved backward the lower end of the lever may fold forward when it engages trip 78 or any similar obstruction and not be broken.

Having thus described my invention, so that any one skilled in the art pertaining thereto may understand its construction and use, I claim—

1. In automatic switch mechanism, a bar joining the switch-tongues, a casing, said bar slidably mounted over said casing, a frame slidably mounted in said casing operatively connected with said bar and provided with locking means adapted to lock said bar at each end of its movement, a pilot-casing between the railroad rails before and beyond the switch, said pilot-casing provided with a slot arranged in parallel relation with the railroad rails and adapted to receive a pilot-bolt, switch-throwing mechanism in said pilot-casing, cables operatively connecting said switch-throwing mechanism with said frame, a vertically movable pilot-bolt for operating said switch-throwing mechanism mounted at the front end and at the rear end of the car, and means for automatically throwing said pilot-bolt into and out of operative alinement with said switch-throwing mechanism mounted on the trucks of the car and adapted to be actuated by the car axle.

2. In automatic railroad switch mechanism, an automatically reversing pilot-bolt mounted on the car operatively connected with the car axle, switch-throwing mechanism located on the track before and beyond the switch in alinement with said pilot-bolt, a bar for shifting the switch-tongues mounted in a casing in the track, cables operatively connecting said switch-throwing mechanism with said bar for shifting the switch-tongues, locking means mounted in said bar comprising bolts adapted to engage keepers formed in said casing, said bolts being operatively connected with said cables.

3. In automatic railroad switch mechanism, a pilot-casing arranged between the railroad tracks, switch-throwing mechanism mounted in said pilot-casing comprising a lever for closing the switch and a lever for opening the switch, said lever for closing the switch being in a higher plane than said lever for opening the switch, means for shifting the switch-tongues, cables operatively connecting said switch-throwing mechanism and said means for shifting the switch tongues, and automatically reversing pilot-bolts on the car adapted to operate said switch-throwing mechanism.

4. In automatic switch-operating mechanism, switch-throwing mechanism mounted in a casing and arranged on the railroad

track, a pilot-bolt for operating said switch-throwing mechanism mounted on the car, means for reversing said pilot-bolt connected with the car axle and comprising a slide-bar, L-shaped levers yieldingly pivoted in said slide-bar, pinion teeth on the car axle adapted to engage said L-shaped levers, a bell-crank lever fulcrumed on the car and connected with said pilot-bolt, and connecting-means between said slide-bar and said bell-crank lever.

5. In automatic switch-operating mechanism, switch-throwing mechanism mounted in a casing and arranged on the railroad track, a pilot-bolt for operating said switch-throwing mechanism on the car, means for reversing said pilot-bolt connected with the car axle and comprising a slide-bar, L-shaped levers yieldingly pivoted in said slide-bar, pinion teeth on the car axle adapted to engage said L-shaped levers, a bell-crank lever fulcrumed on the car and connected with said pilot-bolt, and connecting-means between said slide-bar and said bell-crank lever, manually operated means on the car for dropping said pilot-bolt to the lower plane for operating the switch, a latch for holding said pilot-bolt in the lower position, a latch-lever connected with said latch, and a strike mounted on said casing.

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