H. SHEMWELL.

AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED JULY 22, 1910.

998,643.

Patented July 25, 1911.

2 SHEETS—SHEET 2.

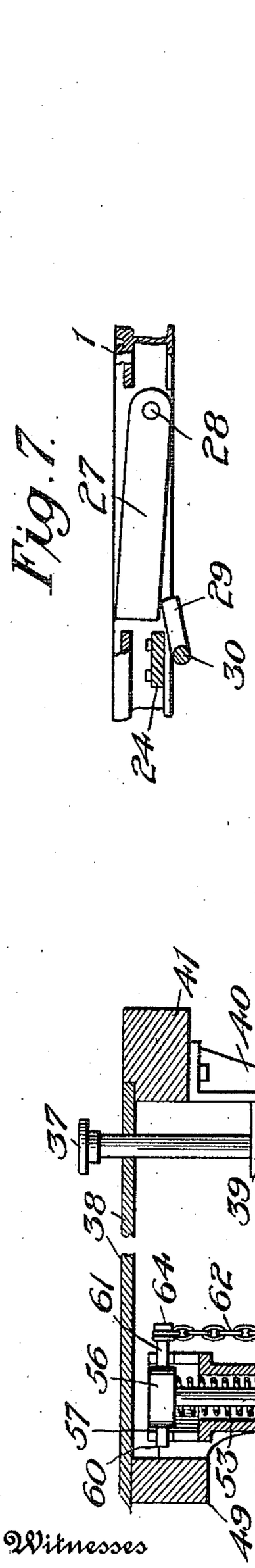

Fig. 7.

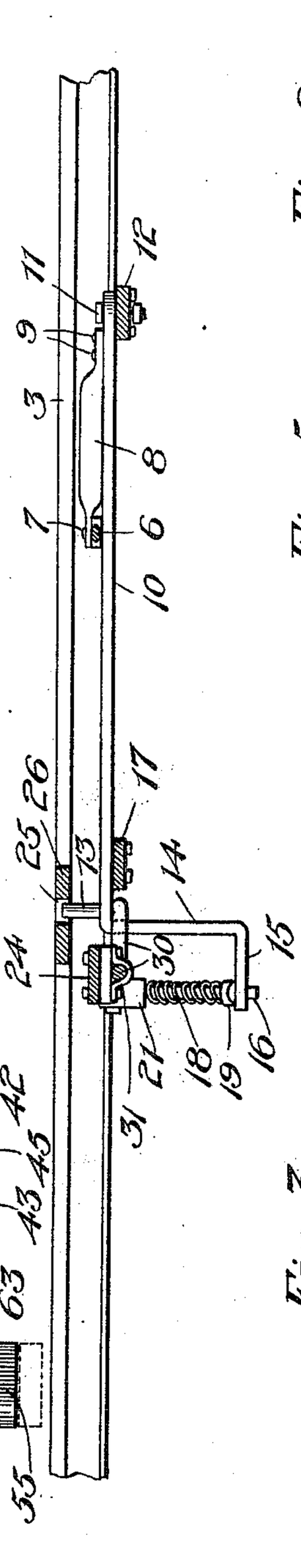

Fig. 2.

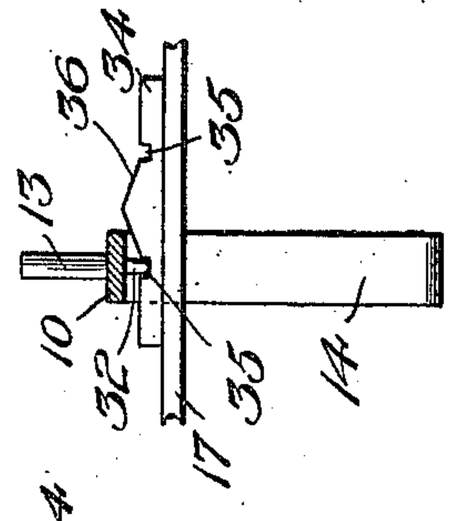

Fig. 6.

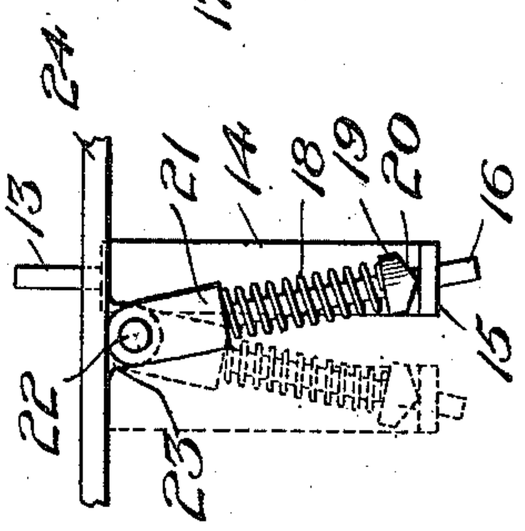

Fig. 5.

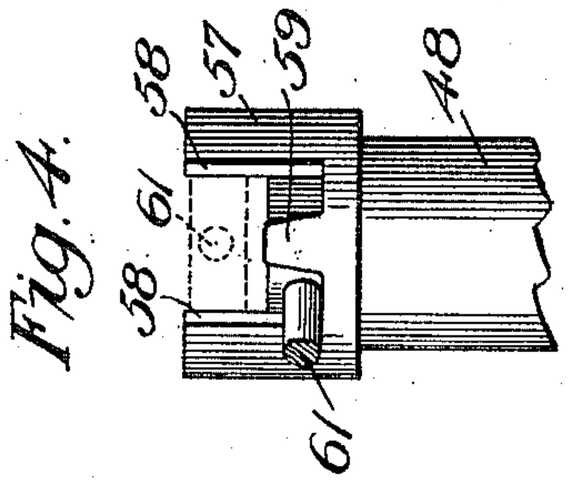

Fig. 4.

Fig. 2.

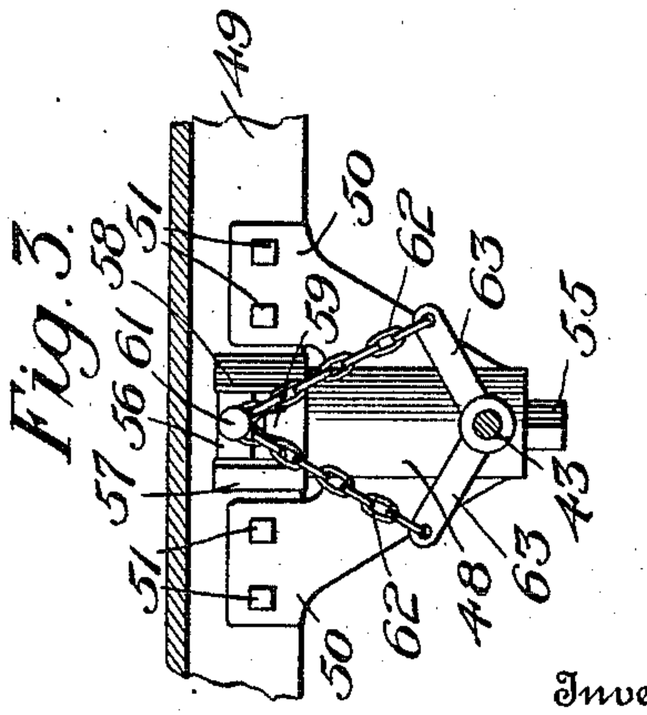

Fig. 3.

Witnesses

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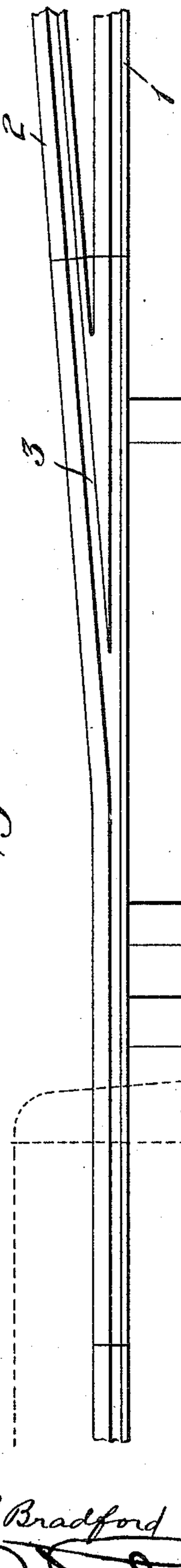

Fig. 1

Fig. 2.

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UNITED STATES PATENT OFFICE.

HAROLD SHEMWELL, OF BIRMINGHAM, ALABAMA, ASSIGNOR TO AMERICAN AUTOMATIC RAILWAY SWITCH COMPANY, OF BIRMINGHAM, ALABAMA, A CORPORATION OF ALABAMA.

AUTOMATIC RAILWAY-SWITCH.

998,643. Specification of Letters Patent. Patented July 25, 1911.

Application filed July 22, 1910. Serial No. 573,222.

To all whom it may concern:

Be it known that I, HAROLD SHEMWELL, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented a new and useful Improvement in Automatic Railway Switches, of which the following is a specification.

My invention relates to an improvement in mechanism for actuating track switches by devices mounted on a car or train and, without being limited thereto, my invention is more particularly adapted for use in connection with street car switches where it is desired to throw the switch in the desired direction without stopping the movement of the car.

The objects of my invention, generally are to produce an apparatus which is strong and durable, and possesses the minimum number of moving parts; to so arrange said parts that a minimum of friction and wear results; to attach the track portion of the mechanism to the rails so that all of its parts are supported free of the cross-ties and constitute a part of the track itself; to provide a novel and effective spring means to yieldingly lock the switch point, through its operating mechanism, in one or the other of its operating positions; to provide a positive lock with which said yielding means cooperates to positively prevent the possibility of split switches; and finally to adapt such improvements to that type of track mechanism, the operating parts of which are normally retracted below the pavement surface and therefore do not interfere with or become injured by the street traffic.

My invention further consists in the novel construction and arrangement of parts which I shall now more particularly describe, reference for this purpose being had to the accompanying drawings, in which:—

Figure 1 represents a plan view of the track mechanism and of a car platform which is broken away to show the mechanism on one end of the car in plan view. Fig. 2 is a longitudinal sectional view taken along the line *x*—*x* of Fig. 1. Fig. 3 is a front view of the trip mechanism on the car when in its raised position. Fig. 4 shows the trip mechanism depressed and locked in one of its operating positions. Fig. 5 is a detail view of the yielding lock for the switch throwing lever. Fig. 6 illustrates a modified form of the positive lock for the switch throwing lever. Fig. 7 is a detail view showing the mechanism actuated by the wheel flanges for lifting the switch throwing lever into position to be engaged by the trip mechanism on the car. Fig. 8 is a detail view showing my preferred form of positive lock for the switch throwing lever.

Similar reference numerals refer to similar parts throughout the drawings.

In the preferred embodiment of my invention, as adapted to street car service, the main tracks 1 and the switch tracks 2 are connected by the usual frog 3 and switch point 4. At an intermediate portion of the point 4 is a depending lug 5 (shown in dotted lines Fig. 1) to which an operating rod 6 is connected in any suitable manner preferably by having its end threaded and passed through an opening in the lug which is connected thereto by a pair of nuts which are screwed on the rod and hold the lug between them. This rod extends inwardly to a point near the center of the track where it is swivelly connected by a pin 7 to the free end of a leaf spring 8, the other end of which is fastened by screws 9 to the switch throwing lever 10. Preferably this spring 8 is provided with flattened ends while its intermediate portion has its greatest width in a vertical plane. The spring is fastened to the lever near the pivot point of the lever. The lever 10 is pivotally connected by pin 11 to a metal cross bar 12 which is attached to the rails and supported free of the cross ties. The pivotal connections for the lever are so arranged as to permit the free end of the lever to have both lateral and vertical play through limited angles. The forward end of the lever has fastened thereto a vertically disposed pin 13 and immediately beyond the pin the lever is bent downwardly to provide a vertical portion 14 and is then bent outwardly at right angles to form a horizontal portion 15, which latter is provided with a suitable opening to receive the lower end of a guide rod 16 for the spring locking means. The lever normally rests upon a metal cross bar 17 which is bolted or otherwise secured to the rails.

The yielding lock for the lever 10 consists essentially of a coil spring 18 which surrounds the guide rod 16, pressing its lower end against a washer 19 which is formed with a knife edge 20 that bears against the

portion 15 of the lever. At its upper end the spring bears against the shouldered portion 21 preferably formed integral with rod 16 and which is pivotally connected by a pin 22 to an ear 23 which depends from a cross bar 24 which is flanged at each end and rigidly connected by bolts or screws to the track rails. Where I have referred to the cross bars 12, 17 and 24, as attached to the rails, in practice they will usually be attached to the casting embodying the frog and switch portions and in manufacture these attachments for the automatic switch throwing mechanism can be made integral with or attached to the frog and switch casting before the latter is placed in position in the track.

I have referred to the lever 10 as being both vertically and laterally adjustable. To secure the vertical adjustment of the lever for the purpose of elevating its pin 13 through the slot 25 in a cover plate 26 (Fig. 2), thereby bringing the pin into position to be engaged and thrown by the mechanism on the car, I provide a tread lever 27 which projects through a slot in the groove of the rail and is pivotally attached to the rail at one end by a pin 28, the other end of the tread resting upon a crank 29 on the bell crank lever 30, which lever is pivotally supported in U-shaped lugs or ears 31 suitably bolted to the underside of the cross bar 24. The inner end of the lever, which is first bent longitudinally of the track and then crosswise of the track, passes under the lever 10 and between its portion 14 and cross bar 17. The arrangement is such that when the wheel flange depresses the lever 27, the latter engages the crank 29, rocks lever 30 and lifts the end thereof which is under the lever and thereby raises the lever. The crank 29 of the lever 30 may be formed integral therewith or rigidly attached thereto as may be desired. To positively hold the lever in one or the other of its operating positions and thereby prevent a split switch, the lever is provided with a depending lug or pin 32, which pin, in its preferred form, will drop into one or the other of the two sockets 33 formed in the bar 17.

In Fig. 6 I have illustrated a slightly different form of positive lock. Here a plate 34 is mounted upon bar 17 and is provided with a pair of notches 35 separated by a raised intermediate portion having inclined walls 36 which meet in an apex below the level to which the pin 32 is raised when the lever 10 is elevated by the mechanism hereinbefore described.

The car equipment, which forms no part of my present invention but which is illustrated herein as forming a part of the cooperating mechanism for shifting the switch point, comprises a pair of treadles 37 which pass down through openings in the platform 38 of the car and through guides 39 attached to or formed integral with a plate 40 which is bolted or secured to the front cross beam 41 of the platform and at its bottom end is provided with a bearing 42 which receives the forward end of the rock shaft 43. A double crank 44 is fixed at its center to the shaft 43 and has its ends bifurcated to loosely receive the reduced ends 45 of the treadles 37. This gives a detachable connection so that the treadles may readily be moved to transfer from front to rear ends of the car. The shoulders 46 on the treadles positively engage the ends 44 and rock the shaft 43 to the right or to the left, according to the treadle depressed by the foot of the motorman. The rear end of the rock shaft 43 is mounted in a bearing socket 47 which is connected to or formed integral with a tubular casing 48 which is rigidly and very strongly braced to the cross beam 49 of the car, being for this purpose provided with integral flange portions 50 which are secured to the beam 49 by a series of bolts 51. This casing 48 is formed with a cylinder 52 which is open at the top and receives a coil spring 53 which surrounds the stem 54 that passes through a suitable opening in the bottom of the casing and has connected to its lower end the foot piece 55 which is adapted when lowered to be in position to engage the pin 13 on the switch throwing lever 10. The spring 52 bears at its upper end against a cross head 56 which is rigidly attached to the upper end of the stem 54 and disposed in the enlarged upper end 57 of the casing. This upper end is cut away on opposite sides to form deep notches having parallel walls 58 and in the center of each notch and diametrically oppositely disposed I leave a short integral stud or projection 59. Attached to the cross head 56 or formed integral therewith are two oppositely disposed pins or projections 60 and 61, the former of which is disposed to the rear and works in the rear notch while the latter pin projects forward and beyond the front notch and is adapted to receive the upper links of a pair of chains 62 which extend downwardly and diagonally at each side to engage the outer ends of a double crank 63, which at its middle, is mounted fixedly upon the rock shaft 43. A head or shoulder 64 on the pin 61 prevents the disengagement therefrom of the connecting members of the chains. The notches in which the pins 60 and 61 swing serve as stops to limit the swinging movements of foot 55 and also the downward movement of the switch throwing member to bring foot 55 into position to engage pin 13 when the latter is elevated. The stud 59 forms with each adjacent wall 58 a pocket, and end 57 of the casing therefore has two pairs of oppo-

sitely disposed notches, situated at the bases of walls 58 and one of said pairs being adapted to receive the pins 60 and 61, when the foot piece 55 assumes either of its two operating positions, to effectively lock it against forces tending to swing it laterally. This foot piece 55 is provided with a long sharply pointed forward end and a short rear end, the stem 54 being connected to the longitudinal center thereof near the rear end. The width of the slots for the pins 60 and 61 is determined by the arc through which it is desirable for the forward pointed end of the foot piece to travel in moving from one operating position, when it will throw the pin 13 to the right, to its other operating position when it will throw the pin to the left.

The operation of my apparatus is as follows:—Assuming the car is moving to the right (Fig. 1), and it is desired to continue on the main track, the motorman will depress the right hand treadle 37 which will rock the shaft 43 to the left (Fig. 3) and through the crank 63 and the left hand chain 62, will pull the pin 61 downwardly to the left in an oblique direction and will force this pin to move downwardly against the left hand wall 58 and move downwardly along same until it enters the pocket formed between the stud 59 and said wall of the slot, or in other words, to the full line position shown in Fig. 4. When this takes place, the rear pin 60 will have dropped into the locking pocket formed between the rear stud 59 and the right hand wall 58 of the rear slot. These movements of the operating mechanism cause the foot piece 55 to drop to the dotted line position shown in Fig. 2, with its forward point turned so that it presents its left hand inclined side wall for engagement with the pin 13. The engagement of the front and rear pins 60 and 61 in the locking pockets will hold the foot piece rigidly against lateral strain when the pin is engaged and thrown to the left (Fig. 1), by reason of the fact that said pins are held firmly in position between the portions of the head 57. As the forward wheels of the car strike the treadle 27, they depress the latter and by means of lever 30, lift lever 10 against the action of spring 18 and bring its pin 13 above the track and into position to be engaged by the lowered foot 55. The lever reaches its raised position just before the foot piece 55 is ready to strike the pin 13 and treadle 27 holds the lever elevated until the foot piece has moved past the pin. When the lever is elevated, its locking pin 32 is lifted out of the notches 33 which lock it to the bar 17 or plate 34, hence the lever is free to be thrown to the left by the engagement of the inclined side of the foot piece with its pin. As the lever is forced to the left by the foot piece, it applies pressure through the spring 10 to the rod 6 and forces the switch point 4 to open the main track. As soon as the pin 13 disengages itself from the foot piece 55 and the car wheel passes off treadle 27, the lever is ready to drop down upon the bar 17 and bring its pin 32 back into positive locking engagement therewith. The movement of the lever from right to left has the effect, as shown in Fig. 5, of throwing the spring 18 from its oblique position to the right to a corresponding oblique position to the left and, in moving from one to the other position, the spring is brought under maximum compression due to the fact that the end portion 15 of the lever is lifted when the track treadle 27 is depressed. Further, as the spring moves from one to the other oblique position, its tension is materially increased when the portion 15 is in vertical alinement with the pivot pin 22 of the spring, as in this position the distance between the pivot pin and the portion 15 is shortest, and hence the spring is most compressed. As a result of this the spring 18 has a direct action in resisting any tendency of the lever 10 to move from one to the other of its operating positions, and further the spring exerts at all times a direct and effective pressure to hold the lever in whichever of its extreme operating positions it stands. This yielding means to lock the lever 10 against displacement and accordingly to hold the switch point in proper operating position, exists when the parts stand in normal position, as shown in Fig. 5, and its effect is increased when the switch throwing lever is about to be thrown and the switch changed, as the spring 18 acts to yieldingly oppose the elevation of lever 10 and prevents the pin being raised above the track by other means than the engagement of a wheel flange with treadle 27, thereby preventing the parts being elevated by the ordinary street vehicles. It will be noted that greater spring resistance exists when the lever is disengaged from its positive locking means and therefore in my preferred arrangement I have a double safety lock acting on the switch throwing lever to positively prevent movement under ordinary conditions or when the lever 10 is not elevated, and when the lever is elevated the spring lock is brought to its maximum effectiveness.

I have found in practice that the positive lock is not essential to the effective operation of my apparatus as the yielding or spring lock can be readily adjusted to positively hold the switch point against assuming a split switch position under ordinary operating conditions, and the effectiveness of this yielding lock is not limited to its use with a vertically adjustable switch throwing lever. Wherever the vertical ad-

justment is desired for the switch operating lever, the positive lock means can be used in conjunction with the spring lock since the elevation of the lever to an operating position will disengage the same from the lock in the manner described in the patent to Farmer No. 816,308. Should the switch point be blocked by some impediment against movement, the spring 8 will yield to prevent breakage of parts, but the strength of this spring 8 is such as to move the point against any ordinary obstruction. This spring acts in this yielding manner in both directions and holds the switch point in one or the other of its positions with spring pressure.

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

1. In a switch mechanism adapted to be operated by a car, the combination with a switch-point rail, of a normally depressed switch-throwing device connected to said rail, means for elevating said device, a yielding lock means, and a positive means forming part of the track mechanism which cooperates to automatically lock the switch in either thrown position.

2. In a switch mechanism, a car operated member for throwing the switch, stop means to positively lock said member in one or the other of its operating positions, and means connected to said member independent of said stop means to yieldingly oppose any movement thereof either to disengage itself from said stop means or to depart from one to the other of its operating positions.

3. In a switch mechanism, a vertically and laterally adjustable car operated member for throwing the switch, a positive lock means for said member, and spring means which engage said member and are so positioned as to urge it into engagement with said locking means, substantially as described.

4. In a switch mechanism, a car operated member for moving a switch point from one to the other of its operating positions, seats to receive and lock said member against lateral displacement, car actuated means to move said member to clear said seats, and spring means to yieldingly oppose the lateral movements of said member.

5. In a switch mechanism, a car operated member for throwing the switch from one operating position to another, a positive lock to hold said member in one or the other of its operating positions, car actuated means to release the member from said lock, and a spring means to resist said releasing movement and yieldingly lock the member in its same operating position until thrown by the car.

6. In a switch mechanism, a member operatively connected to the switch point, car operated devices to first lift and then laterally shift said member to throw the switch point, and a coiled spring supported substantially equi-distantly from the thrown positions of said member and connected thereto in a manner to resist all lifting and lateral movements of said member, and positive means to lock said member against lateral displacement when lowered.

7. In a switch mechanism, the combination with a movable rail, of a car actuated member, a spring mounted on said member and movable therewith, and a member attached to the free end of said spring and to said movable rail for actuating the latter with a yielding action, substantially as described.

8. In a railway switch, the combination with a switch point, a pivoted car actuated member, a spring mounted on said member and disposed longitudinally thereof, and a link swivelly connecting the outer end of said spring to said switch point, substantially as and for the purposes described.

9. In a railway switch, the combination with a switch point, of car actuated mechanism to throw said point comprising a lever disposed longitudinally of the track and pivoted at one end and at its free end having means whereby it is laterally adjusted by the moving car, a flat spring attached to said lever near its pivot end, and a link connected to the free end of said spring and to the switch point, as and for the purposes described.

10. The combination of a frog, a switch comprising a movable point, transverse members connecting said switch and frog to form a unitary structure, switch actuating mechanism connected to said transverse members and comprising a car actuated member, means to lock said member in its operating positions, and means to yieldingly connect said member to the switch point, substantially as described.

11. As an article of manufacture, a track section comprising sections of main and siding rails, a frog and switch, cross bars secured to the frog and switch sections, and car actuated mechanism supported by said bars independently of the cross ties for throwing and locking said switch point in one or the other of its operating positions.

12. In a switch, a frog, switch rails and a movable point coöperating therewith, a plurality of cross bars connected to the frog and switch rails, a car actuated member pivoted to one cross bar, spring means to yieldingly lock said bar in one of its operating positions which is supported by another of said cross bars, and means to connect said member to said switch point, substantially as described.

13. In a switch mechanism, in combination with a vertically and laterally adjustable member, car actuating means to lift and

laterally adjust said member, a projection depending from said member, and a pair of sockets to receive said projection when said member is in lowered position.

14. In a switch mechanism, in combination with a vertically and laterally adjustable member, car actuating means to lift and laterally adjust said member, a projection depending from said member, and a recessed plate which receives said projection when the member is lowered and locks it against lateral displacement.

15. In a switch mechanism, a switch operating member adapted to be thrown by a moving car, a stud on said member, a fixed member having a pair of sockets adapted to receive said stud and lock said member, and car operated means to disengage the stud from a socket and shift the lever to throw the switch and bring the stud into position to engage in the other socket, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HAROLD SHEMWELL.

Witnesses:
FRANK O. PARKER,
J. FRED KELLEY.