

No. 891,269.

PATENTED JUNE 23, 1908.

A. R. LEVY.

AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED SEPT. 28, 1907.

3 SHEETS—SHEET 1.

FIG. VII.

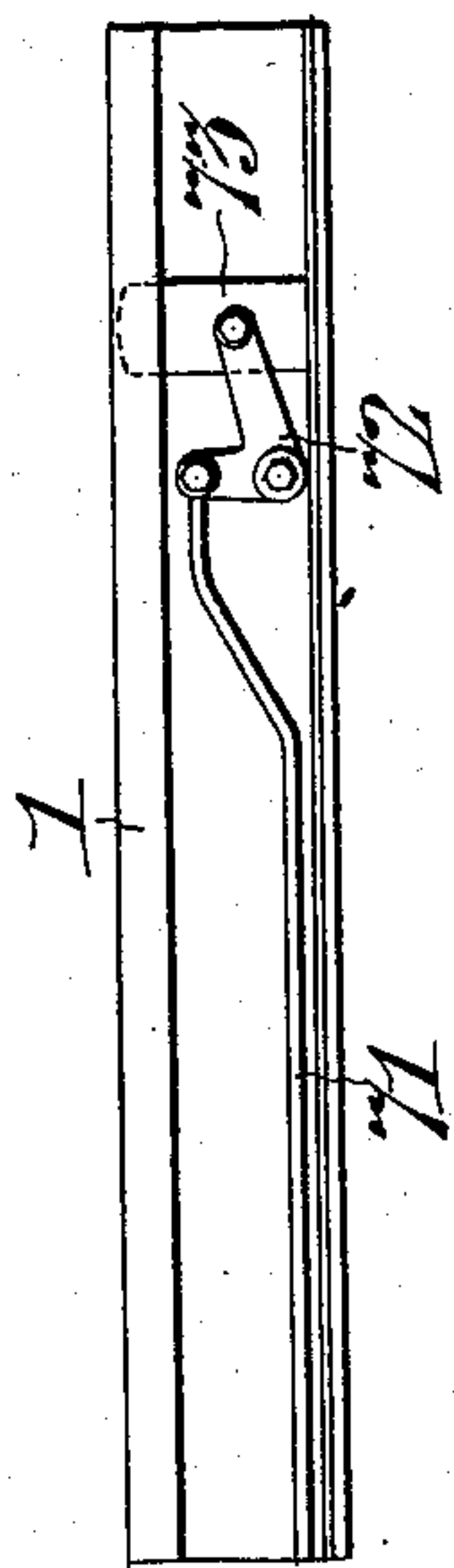
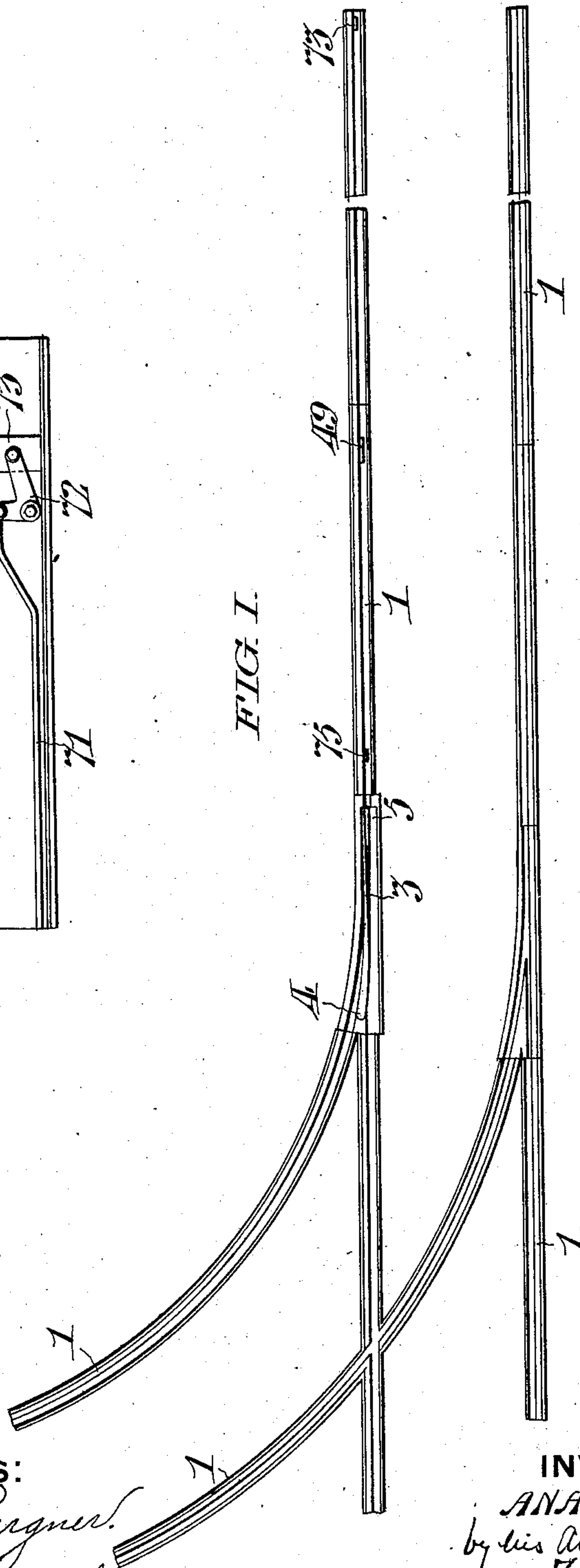


FIG. I.



WITNESSES:

John C. Bergner.
Wm. J. Spurl.

INVENTOR:

ANATOLE R. LEVY,
by his Attorneys
Foley & Paul.

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3 SHEETS—SHEET 2.

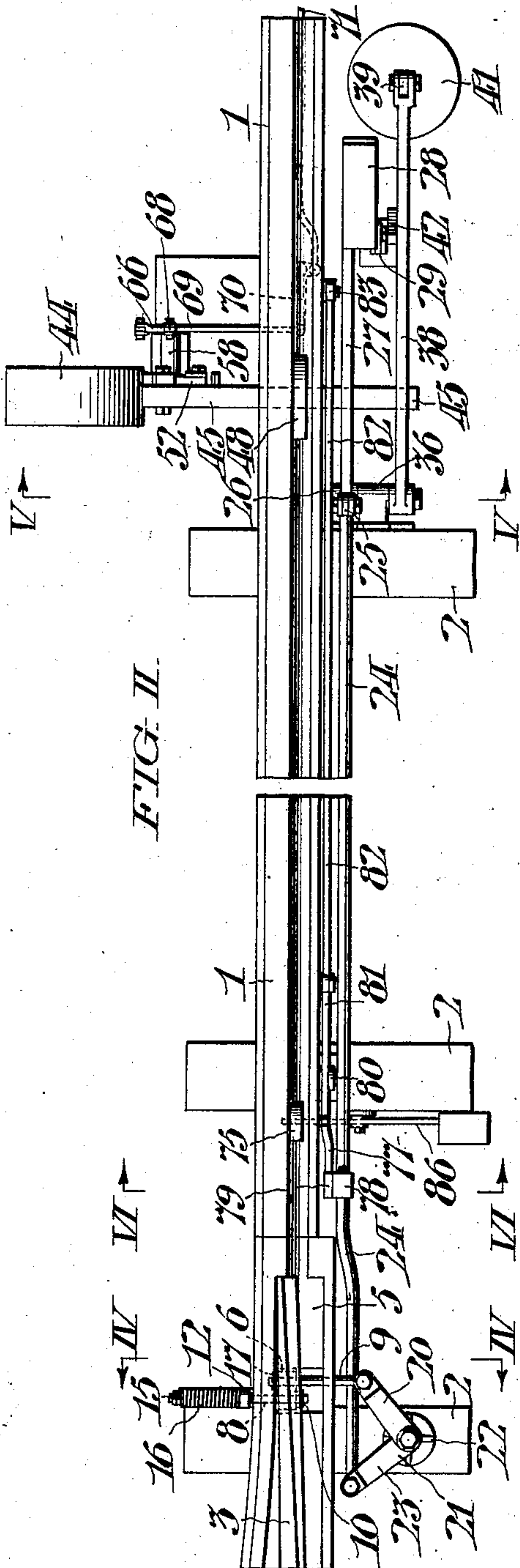


FIG. II.

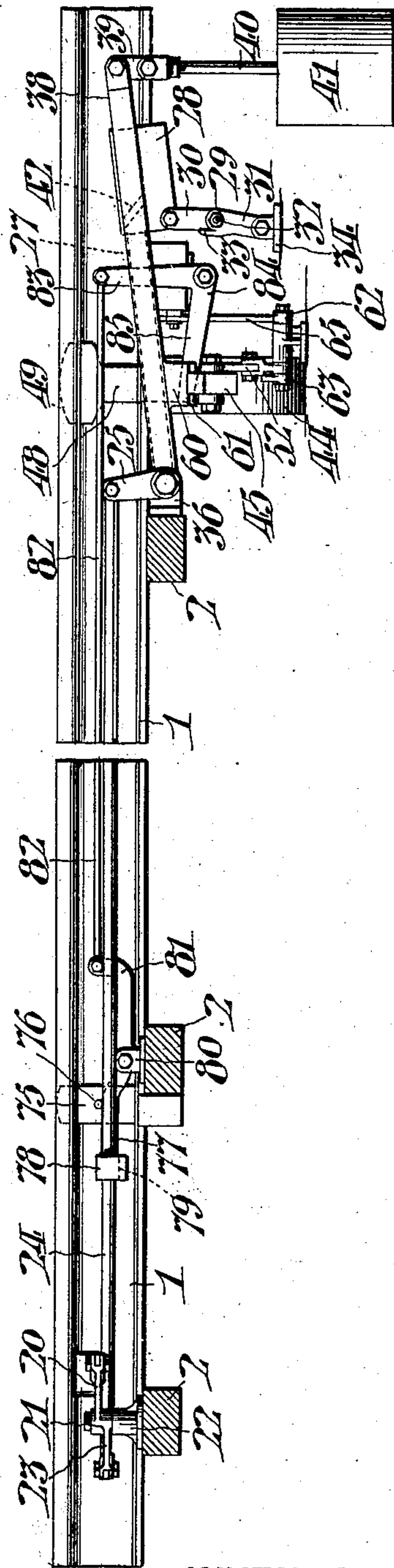


FIG. III.

WITNESSES:

John C. Bergner.
Wm. J. Spier.

INVENTOR:

ANATOLE R. LEVY,
by his Attorneys
Julius + Paul

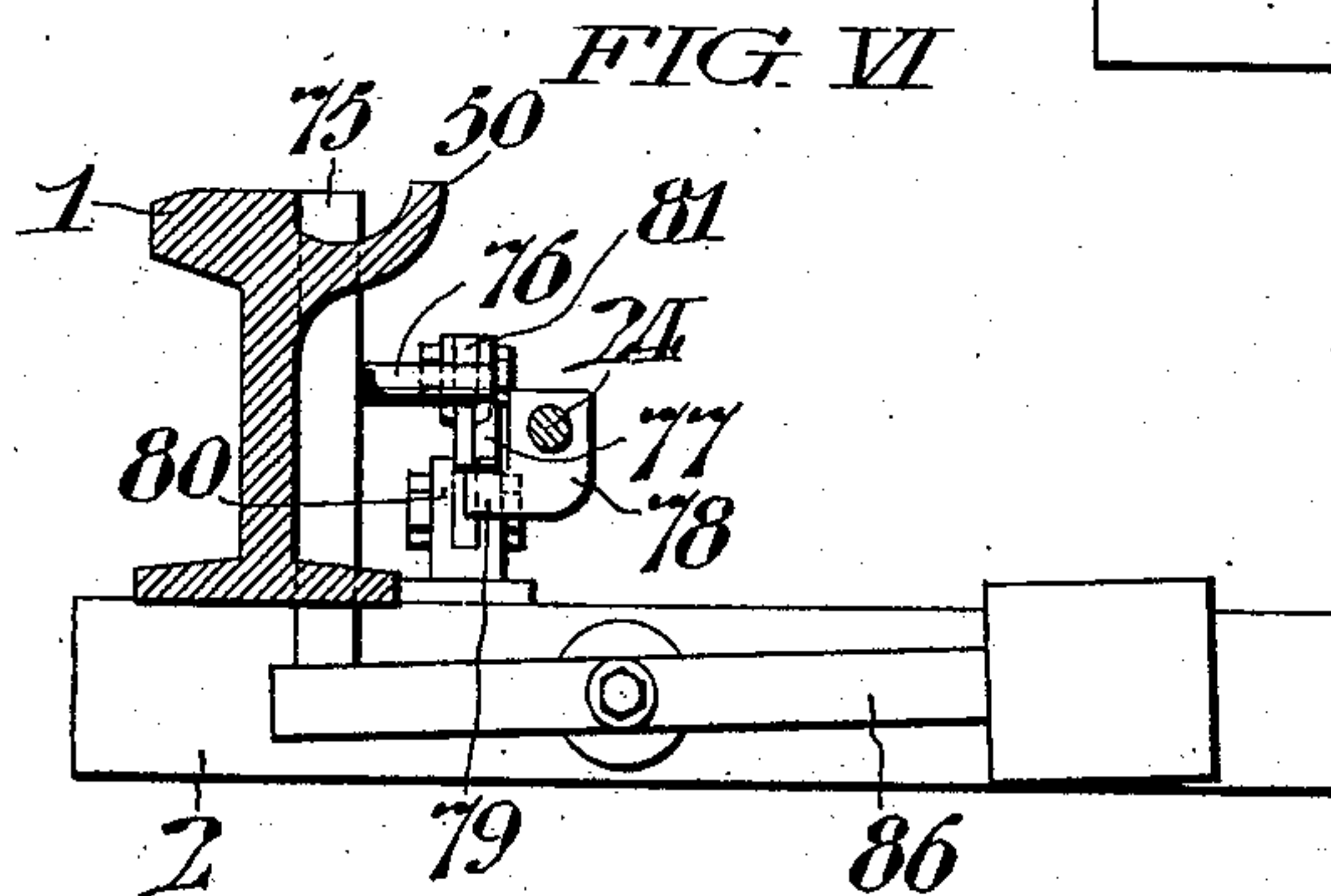
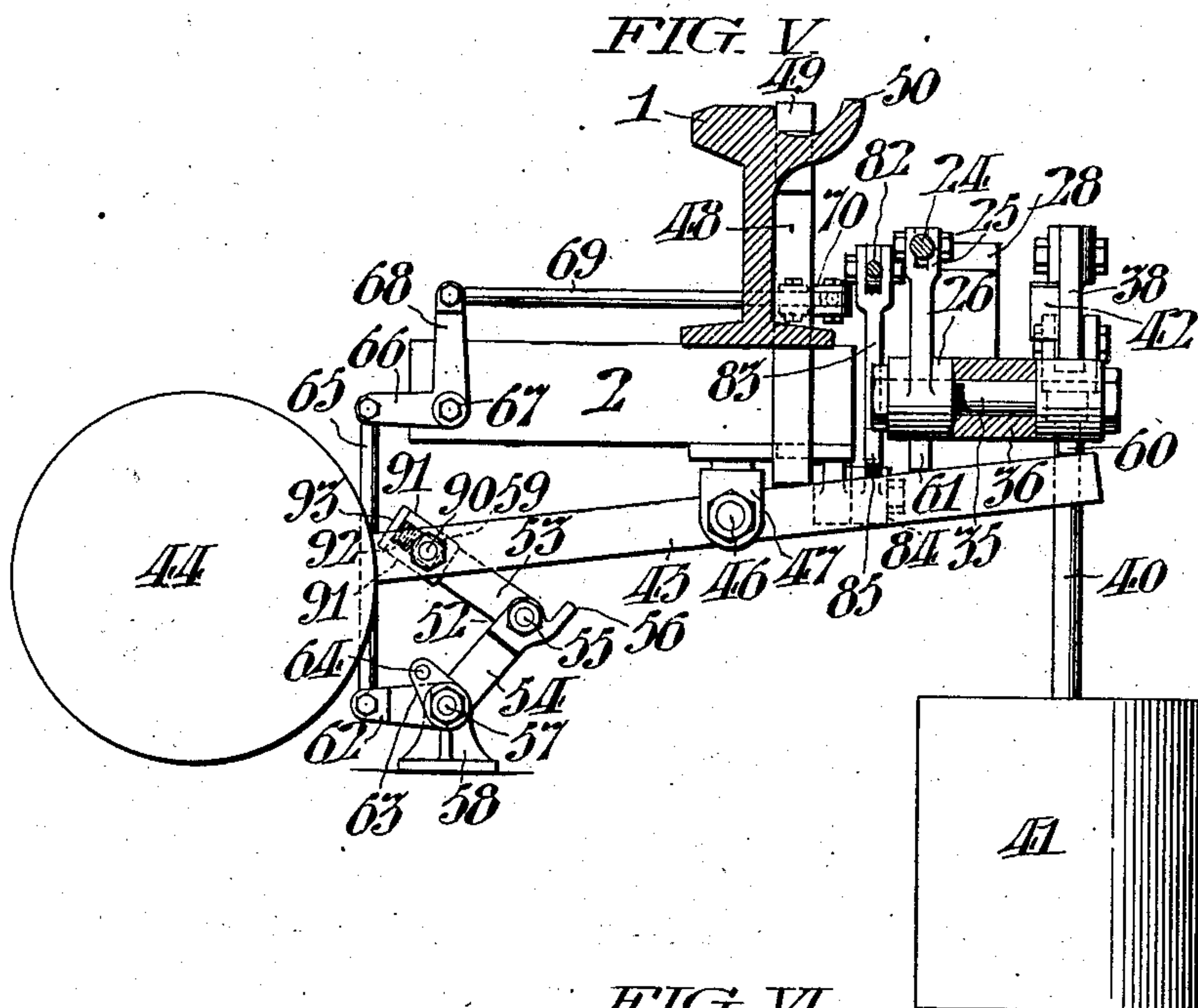
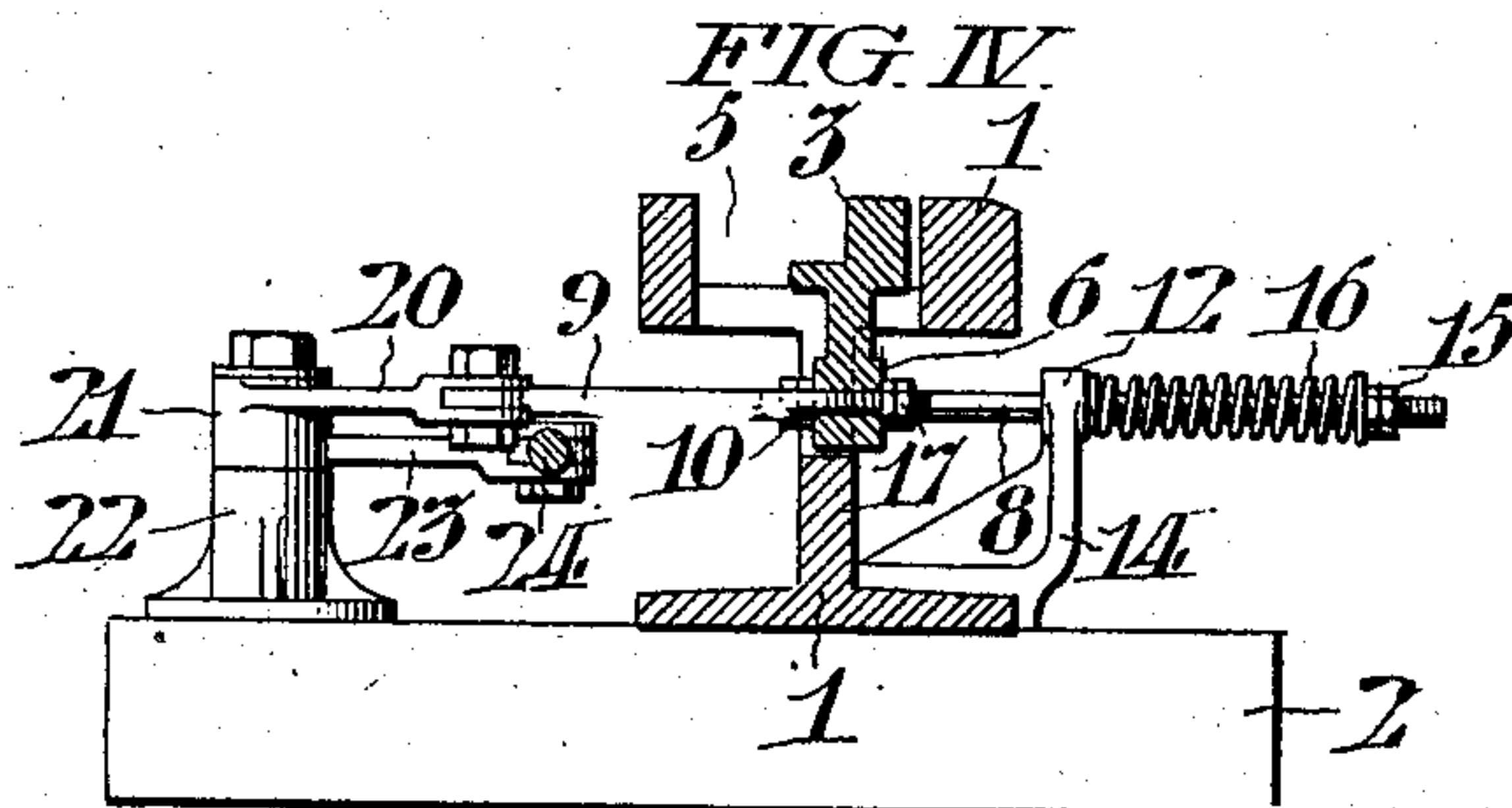
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3 SHEETS—SHEET 3.



WITNESSES:

John C. Bergner.
Wm. J. Perl.

INVENTOR:

ANATOLE R. LEVY,
by his Attorneys
Miley & Paul

UNITED STATES PATENT OFFICE.

ANATOLE R. LEVY, OF OAK LANE, PENNSYLVANIA.

AUTOMATIC RAILWAY-SWITCH.

No. 891,269.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed September 28, 1907. Serial No. 394,940.

To all whom it may concern:

Be it known that I, ANATOLE R. LEVY, of Oak Lane, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Railway-Switches, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to mechanism for automatically controlling the operation of switches used on railways, as for example electric railways.

The object of my invention is to provide means for automatically operating a railway switch a definite interval of time after a car has passed a given point.

A further object of my invention is to so time the automatic mechanism that the movement of the switch is within the control of the person operating the car; the speed with which the car is running determining whether or not said switch shall have moved before the car reaches it.

Another object is to lock the mechanism which operates the switch tongue while the car is passing over it so that the wheels of the forward truck will not pass along one track and the wheels of the rear truck take the other track.

A further object is to provide means for automatically restoring said switch operating means to its normal position.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified and claimed.

In the accompanying drawings, Figure I, is a plan view of a section of track showing a switch and the location of the various plungers for controlling the switch mechanism. Fig. II, is a detail plan view of the switch and its operating mechanism. Fig. III, is a side elevation of the same with the supporting ties in section. Fig. IV, is a vertical section on the line IV, IV, in Fig. II. Fig. V, is a vertical section on the line V, V, in Fig. II. Fig. VI, is a vertical section on the line VI, VI, in Fig. II. Fig. VII, is a detail view showing the plunger and bell crank which coöperate with the mechanism for locking the switch against automatic operation.

In said drawings,—1, 1, are the car rails mounted on the ties 2. The switch tongue 3, is pivoted in the usual manner at 4, to

slide back and forth in the recess 5, formed in the top of the rail. Upon the under side of the switch tongue 3, is the lug 6, provided with two holes for the reception of the rods 8, and 9. The rod 8, is provided on one end with a nut 10, and passes through the boss 12, on the bracket 14, supported upon the foot of the rail. Surrounding this rod 8, and held between the boss 12, and nuts 15, upon said rod, is a spiral spring 16. The object of this spring is to normally keep the switch tongue 3, in the position shown in Fig. II, to allow the car to pass straight ahead.

The rod 9, slidably mounted in the lug 6, is provided on one end with the nut 17, and is connected at its other end to one arm 20, of the bell crank lever 21, which is pivotally mounted upon the bracket 22, supported upon the tie 2. The arm 23, of said bell crank lever 21, is connected with the rod 24, and the right hand end of the rod 24, is pivotally connected to the arm 25, of the bell crank lever 26, having the other arm 27, provided with a weight 28, for throwing the switch tongue 3. Said weight 28, is maintained in its elevated position as shown in Fig. III, by the toggle 29, comprising the links 30, and 31. These links are pivotally connected by means of the pin 32, which projects beyond one side of the toggle. The link 31, has a projection 33, near its upper end which engages the link 30, and allows the toggle to be overset without collapsing. The lower end of the link 31, is pivotally connected to the support 34, which is suitably mounted.

The bell crank lever 26, is pivoted upon one end of the stud 35, which is supported in the bracket 36, attached to the side of a tie 2. Upon the other end of said stud 35, is pivoted the arm 38, connected at its right hand end with the link 39. Said link is connected to the upper end of the piston 40, of the dash pot 41. Said dash pot may contain air or any suitable liquid. Upon the side of the arm 38, above the pin 32, of the toggle 29, is a diagonal plate 42, which engages said pin 32, when said arm 38, descends and causes said toggle to collapse and thus allow the weight 28, to descend and throw the switch tongue 3.

The weight 44, is mounted upon one end of the lever 45, which is pivoted upon the stud 46, in a support 47, suitably mounted in position. In order to raise said weight

44, the plunger 48, is provided which slides in suitable guides in the rail 1, and rests upon the lever 45. The upper end of the plunger 48, is provided with a shoe 49, adapted to be engaged by the flange of a car wheel as it passes along the track. In order to protect said shoe 49, from wear and contact with wagon wheels the inner edge 50, of the rail 1, may be made higher than the tread as clearly shown in Fig. V.

In order to maintain the weight 44, in its raised position the toggle 52, is provided having the links 53, and 54, pivotally connected at 55. The link 54, is provided at its upper end with a projection 56, adapted to engage the link 53, and allow the toggle to be over-set without collapsing. The lower end of the link 54, is pivotally supported upon the shaft 57, rotatably mounted in the bracket 58. The upper end of the link 53, has a flexible connection with the lever 45, which is automatically adjustable and allows for variations in the movement of said lever caused by car wheel flanges of varying size which press down the shoe 49. This flexible connection comprises a block 59, carrying the pivot pin 90, which passes through the lever 45. Said block 59, slides between guides 91, formed on the upper end of link 53, and is pressed by the coiled spring 92, held against the plate 93, which joins the outer end of the guides 91. The spring 92, takes up the varying thrusts caused by the car flanges of different depth.

Upon the under side of arms 27, and 38, respectively are the lugs 60, and 61, which are adapted to engage the lever 45, when the weight 44, is lowered.

Fastened to the shaft 57, are the crank arms 62, and 63, the latter being provided with a pin 64, for engaging the link 54, to cause the toggle 52, to collapse. The free end of the crank arm 62, is connected to the link 65, which is pivoted to the arm 66, of the bell crank 67, pivoted to a suitable support. The arm 68, of the bell crank 67, is connected to a link 69, which is connected to one arm of the bell crank lever 70, pivotally mounted above the base of the rail 1. The other arm of the bell crank lever 70, is connected with one end of the link 71, shown in Figs. II, and VII. The other end of the link 71, is connected to one arm, of the bell crank lever 72. The other arm of said bell crank lever 72, is connected to the plunger 73, which slides in suitable guides in the rail 1, and projects into the groove of said rail for engagement by the car wheel flanges.

For the purpose of locking the switch against automatic operation, the plunger 75, is slidably mounted in the rail 1, and provided with a pin 76, which engages the lever 77, and forces it downwardly into the path of projection 79, on the collar 78, on the switch operating rod 24. Said lever 77, is pivotally

mounted in the bracket 80, and provided on one end with an upwardly extending arm 81, connected by a link 82, with one arm 83, of the bell crank lever 84. The other arm 85, of said bell crank lever 80, extends into the path of the lever 45, and is raised thereby when the weight 44, is lowered, thus releasing the switch operating rod 24.

In order to return the plunger 75, to its uppermost position, the weighted lever 86, is provided which engages the lower end of said plunger.

The operation of the mechanism is as follows:—Under normal conditions the mechanism is in the position shown in the drawings. The switch throwing weight 28, is in its raised position, and the restoring weight 44, is in its lowered position. The arm 38, is supported by the lever 45, and the switch tongue is set so that the car may pass along the straight track. Suppose a car to be running from right to left over the rails 1, in Fig. I. When the car wheel flange engages the shoe 49, said shoe and the plunger 48, are depressed, the right hand end of the lever 45, descends and the left hand end of said lever and the weight 44, ascend. Said weight 44, is maintained in its raised position by the toggle 52. The arm 38, thereupon descends under the retarding action of the dash pot 41, and when the diagonal plate 42, engages the pin 32, the toggle 29, collapses and the switch throwing weight 28, falls thereby throwing the switch tongue 3, to allow the car to pass around the curve.

It is to be noted that some convenient interval of time, determined by experiment, is allowed to elapse before the switch tongue is moved, after the first wheel of the car engages the shoe 49. This may be adjusted by the retarding mechanism, conveniently shown as a dash pot in this instance but obviously not limited thereto.

If the operator of the car desires to run his car straight ahead, he proceeds with sufficient speed to enable the first wheel of the car to engage the locking plunger 75, before the weight 28, has dropped to move the switch tongue 3. Such engagement of said locking plunger causes it to move the lever 77, into locking position with relation to the switch operating rod 24, and thereby prevent said switch tongue from being thrown automatically. It will be noted that said switch tongue 3, is spring pressed into the position shown in Fig. II. If it should be found desirable to move said tongue manually it may be done by prying against the outer end of the rod 8, by means of a switch stick or any other available implement.

If the operator of the car desires to switch the car to the curve, he reduces the speed of the car or stops after having passed the shoe 49, and before reaching the locking plunger 75. This allows the switch to be thrown by

the weight 28, after the toggle 29, has collapsed under the action of the retarded arm 38.

In order to restore the apparatus to its normal condition the plunger 73, is depressed, usually by a car following the one above considered. The descent of said plunger and the coöperation of the connected members causes the crank arm 63, to move its pin 64, to break the toggle 52, thereby allowing the weight 44, to drop. The other end of the lever 45, is raised, and with it the arms 27, 38, and 85. Thus the weight 28, is raised ready for another operation of the switch, and the piston of the dash pot is also raised. By raising the arm 85, of the bell crank lever 84, the outer end of the lever 77, is raised to free it from the ledge 79, of the collar 78, thus releasing the switch operating lever 24, and the entire mechanism is in condition for another operation when said second car progresses along the track, as described above.

It will be observed therefore that I have devised coöperating groups of mechanism having the following functions:—1st. Mechanism whereby the passage of a car over a point in advance of a switch automatically operates said switch after a definite interval of time, the amount of retardation being subject to regulation. 2nd. Mechanism whereby the passage of the car over a point nearer the switch prevents the operation of the first mentioned group of mechanism, provided it has not already operated; and 3rd. Mechanism whereby the passage of a car over still another point, preferably further in advance of the switch than the first mentioned group of mechanism, affects the automatic restoration of the switch operating means to its normal position.

I have claimed broadly in this application the idea of coördinating such groups of mechanism or some of them. It will be readily understood that many different plans may be devised by which a similar result can be obtained, and I desire it to be understood that my invention includes the idea of combining such mechanism to the end which I have described, irrespective of the particular form of mechanism employed. I would further point out that it is a peculiarity of the device which I have described that it prevents a possibility which is present in most automatic switch throwing devices, of a car wheel running against the switch as it passes from one extreme position to the other, striking it end on, and thereby either injuring the mechanism or derailing the car. It is also impossible for the switch point to be locked by the locking mechanism in any such intermediate and therefore dangerous position; for unless the locking mechanism is operated before the switch has commenced to move, no locking effect will occur, and the motion of the switch must be completed before the car

wheel which has actuated the locking mechanism can reach the switch.

Having thus described my invention, I claim:

1. In an automatic switch operating mechanism, the combination of a movable switch tongue; means whereby it may be automatically operated by an approaching car, said operation being dependent upon the rate of speed at which the car approaches the switch; and means for preventing the automatic completion of the operation of said switch tongue.

2. In an automatic railway switch, the combination with means for operating the switch; of means set into operation by the passage of a car past a given point for controlling the movement of said switch operating means; retarding mechanism connected with said controlling means; and means for preventing the automatic operation of said switch.

3. In an automatic railway switch, the combination with means for operating the switch; means set into operation by the passage of a car past a given point, for controlling the movement of said switch operating means; retarding mechanism connected with said controlling mechanism; and means for returning said switch and controlling means to their normal position.

4. In an automatic railway switch, the combination with means for operating the switch; of means set into operation by the passage of a car past a given point, for controlling the movement of said switch operating means; means for preventing the automatic throwing of the switch; and retarding mechanism so timed that the car may prevent the switch from being automatically thrown under predetermined conditions.

5. In an automatic railway switch, the combination with means for operating the switch; of means set into operation by the passage of a car past a given point, for controlling the movement of said switch operating means; retarding mechanism operatively connected to said controlling means; means for preventing the automatic operation of said switch, and means for releasing said switch from said preventive means.

6. In an automatic railway switch, the combination of a weight operatively connected to throw the switch; means normally preventing said weight from throwing the switch; mechanism set into operation by the passage of a car past a given point, for releasing said weight; retarding mechanism operatively connected with said weight; and means for returning said switch to its normal position.

7. In an automatic railway switch, the combination of a weight operatively connected to throw the switch; means normally preventing said weight from throwing the

switch; mechanism set into operation by the passage of a car past a given point, for releasing said weight; retarding means operatively connected with said weight; means
5 for preventing the automatic operation of said switch; and means for releasing said switch from said preventive means.

8. In an automatic railway switch, the combination of a weight operatively connected to throw the switch; means normally preventing said weight from throwing said switch; mechanism for releasing said weight; retarding means operatively connected with said weight; means for preventing the automatic operation of said switch; means for releasing the switch from said preventive means; and means for returning said switch operating means to normal position.

9. In an automatic railway switch, the combination of means for operating the switch; means set into operation by the passage of a car past a given point for controlling the movement of said switch operating means; means for preventing the automatic
25 operation of said switch; and means controlled by a second car for returning said switch operating means to normal position.

10. In an automatic railway switch, the combination of retarded means for throwing the switch; means for preventing the automatic operation of said switch; and means for releasing the switch operating means from said preventive means.

11. In an automatic railway switch, the combination of retarded means for throwing the switch; means for preventing the automatic operation of said switch but permitting manual operation thereof; and means for releasing the switch operating means
40 from said preventive means.

12. In an automatic railway switch, the combination of means for throwing the switch; means for preventing the automatic operation of said switch but permitting manual operation thereof; means for releasing the switch operating means from said preventive means; and means for returning said switch operating means to normal position.

13. In an automatic railway switch, the combination of means for throwing the switch; means for preventing the automatic operation of said switch but permitting manual operation thereof; means for releasing the switch operating means from said pre-

ventive means; and means set into operation
55 by a car for releasing said switch operating means from said preventive means and also returning said operating means to normal position.

14. In an automatic railway switch, the combination of retarded means for operating the switch set into operation by a car passing a given point; and means set into operation by a second car for returning the switch operating mechanism to normal position.

15. In an automatic railway switch, the combination of retarded means for operating the switch set into operation by a car passing a given point; and means for preventing the completion of the automatic operation of said switch depending for its operation upon the speed of the car after passing said given point.

16. In an automatic railway switch, the combination of a switch point; means in advance of said point whereby the car automatically sets in operation a retarded switch throwing mechanism; and means, nearer to said point, whereby the car automatically prevents further operation of said switch throwing mechanism, such means cooperating in such manner that the switching of the car is dependent upon the speed with which the car traverses the space between said means.

17. In an automatic railway switch, the combination of a switch point; means in advance of said point whereby the car automatically sets in operation a retarded switch throwing mechanism; means, nearer to said point, whereby the car automatically prevents further operation of said switch throwing mechanism, such means cooperating in such manner that the switching of the car is dependent upon the speed with which the car traverses the space between said means; and means in advance of said first mentioned means for returning the switch operating mechanism to normal position.

In testimony whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this twenty-sixth day of September 1907.

ANATOLE R. LEVY.

Witnesses:

JAMES H. BELL,
E. L. FULLERTON.