

(No Model.)

4 Sheets—Sheet 1.

A. G. LAWRENCE.
AUTOMATIC RAILROAD SWITCH.

No. 590,948.

Patented Sept. 28, 1897.

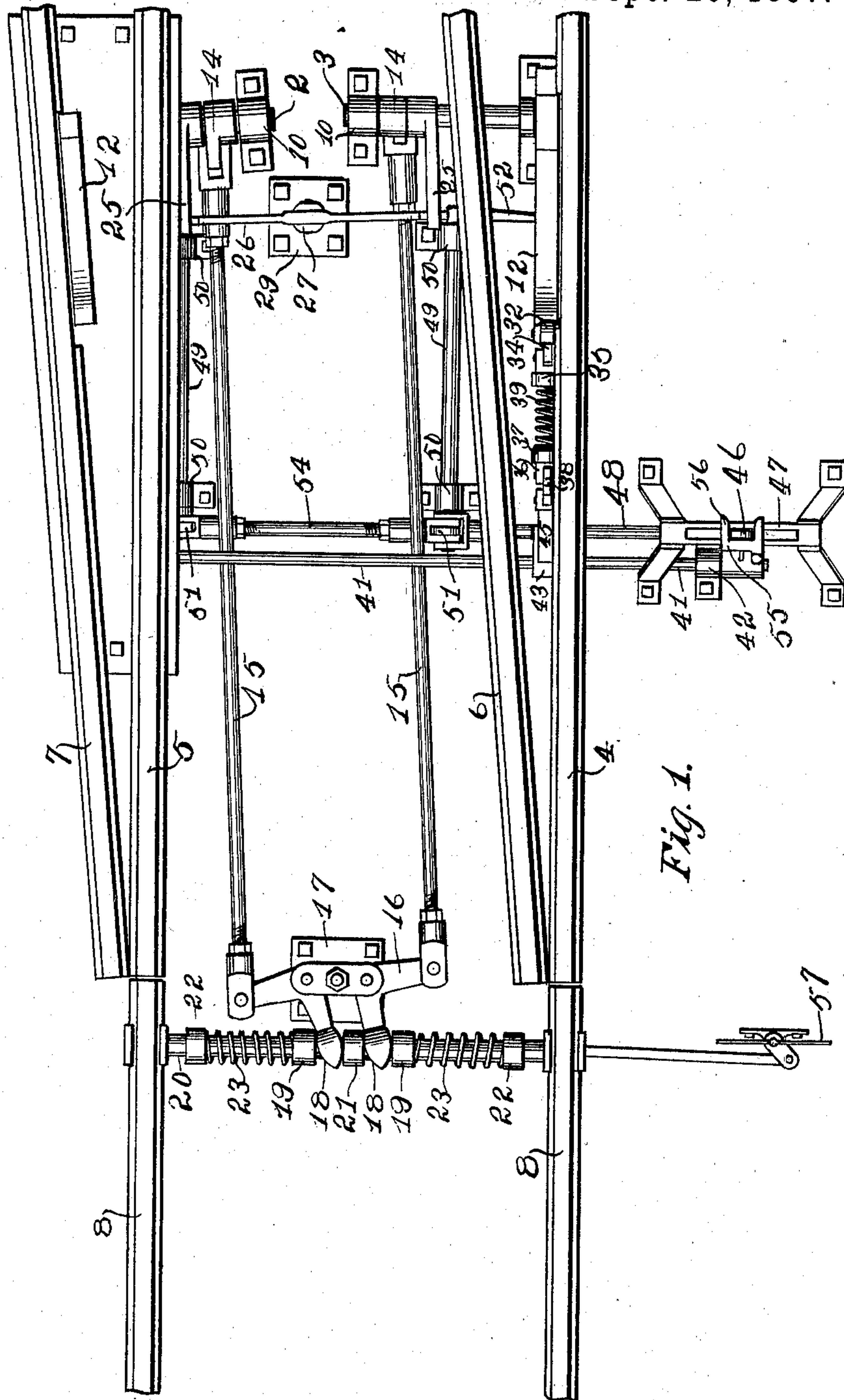


Fig. 1.

Witnesses
B. P. Shepherd
W. C. Gooley

Inventor
Adelbert G. Lawrence
By Paul H. Hawley
his attorneys.

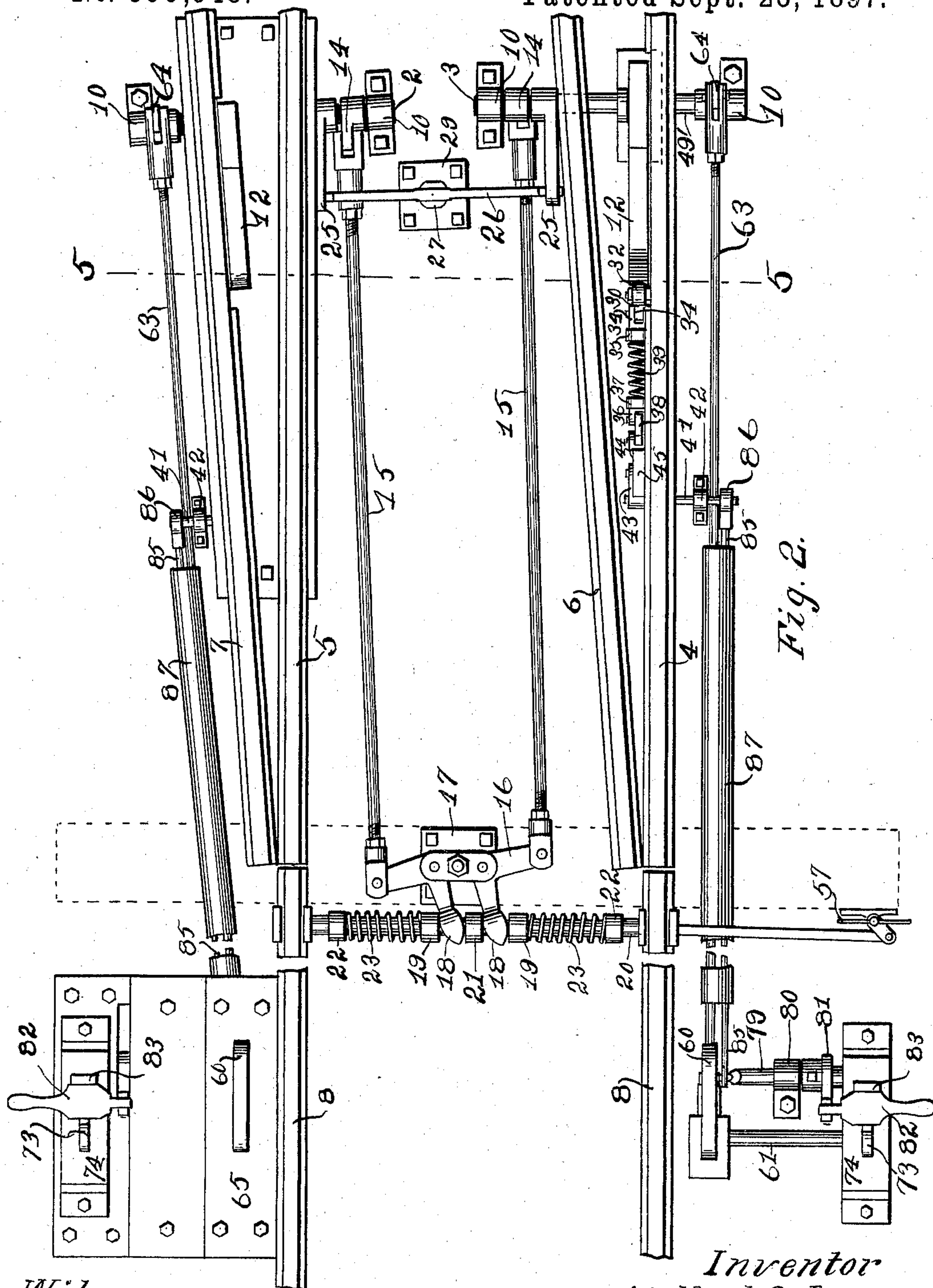
(No Model.)

4 Sheets—Sheet 2.


A. G. LAWRENCE.
AUTOMATIC RAILROAD SWITCH.

No. 590,948.

Patented Sept. 28, 1897.



Witnesses
B. P. Shephard.
W. E. Goolley.

 *Inventor*
Adelbert G. Lawrence
By Paul & Hawley
his attorneys.

(No Model.)

4 Sheets—Sheet 3.

A. G. LAWRENCE.
AUTOMATIC RAILROAD SWITCH.

No. 590,948.

Patented Sept. 28, 1897.

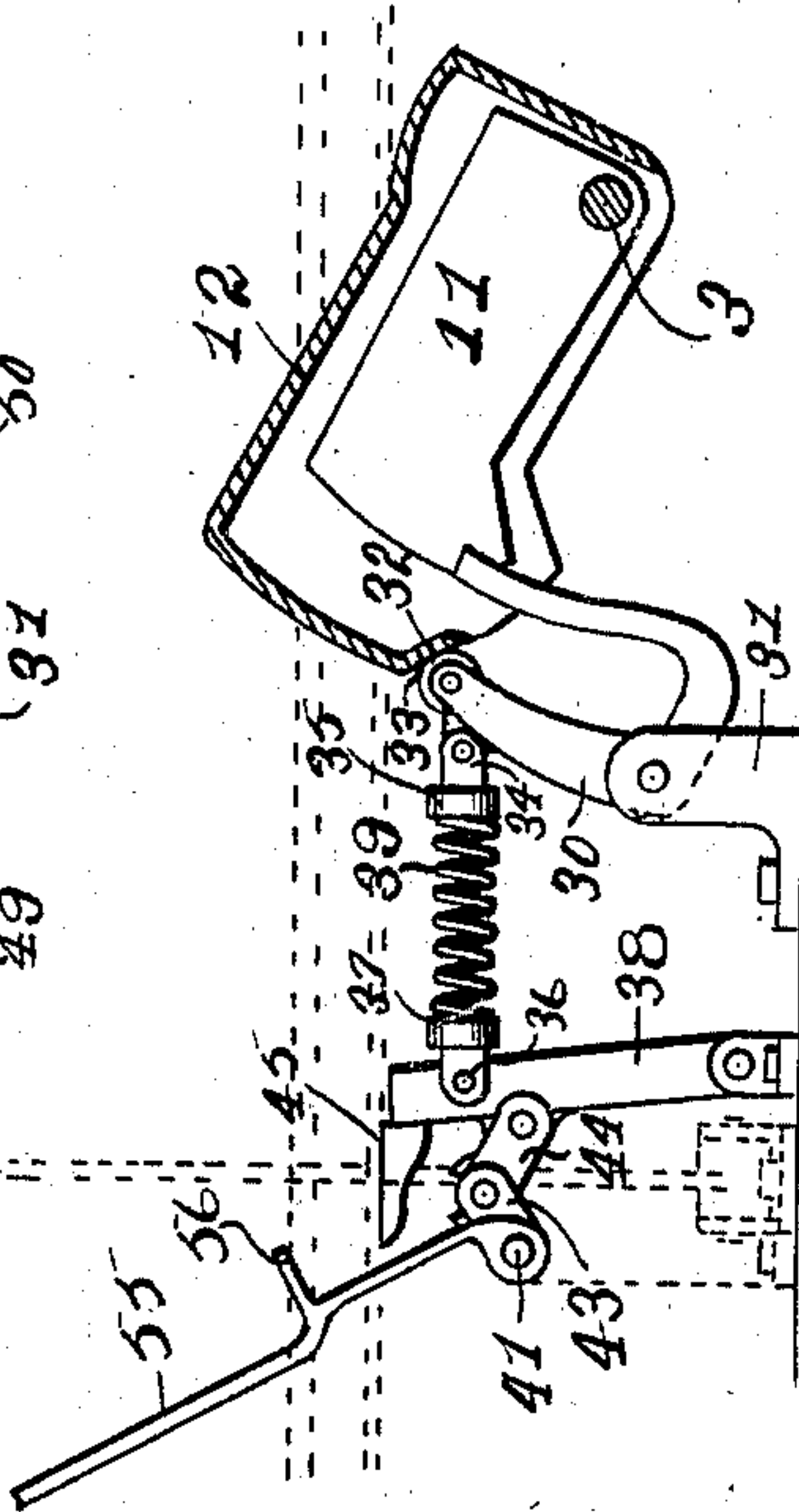
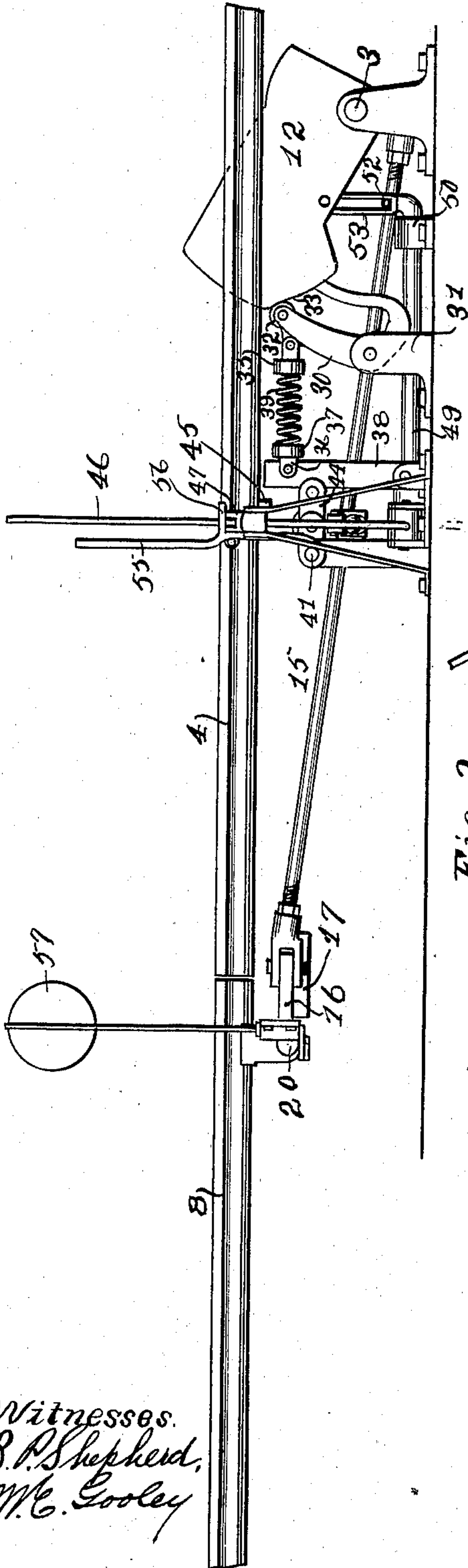


Fig. 7.

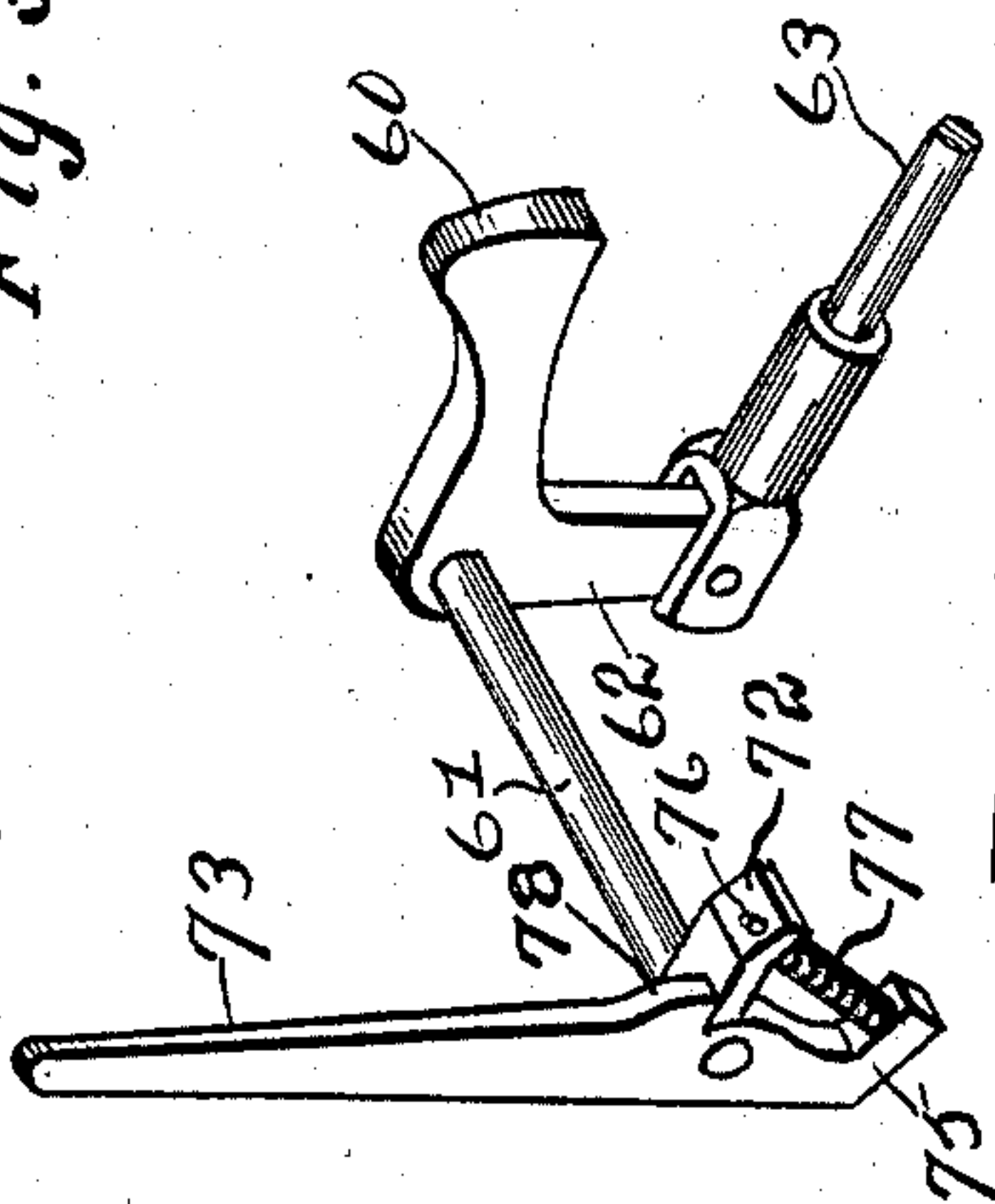


Fig. 8.

Witnesses.
B. P. Shepherd,
W. C. Cooley

Inventor
Adelbert G. Lawrence.
By Paul Hawley
his attorneys.

(No Model.)

4 Sheets—Sheet 4.

A. G. LAWRENCE.
AUTOMATIC RAILROAD SWITCH.

No. 590,948.

Patented Sept. 28, 1897.

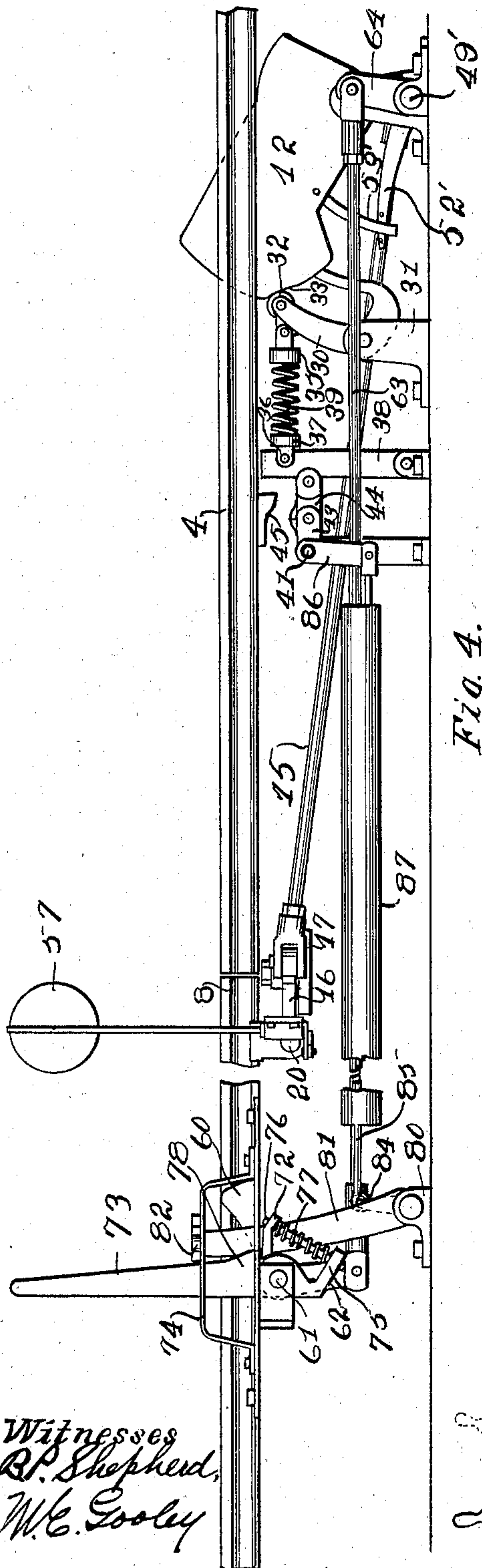


Fig. 4.

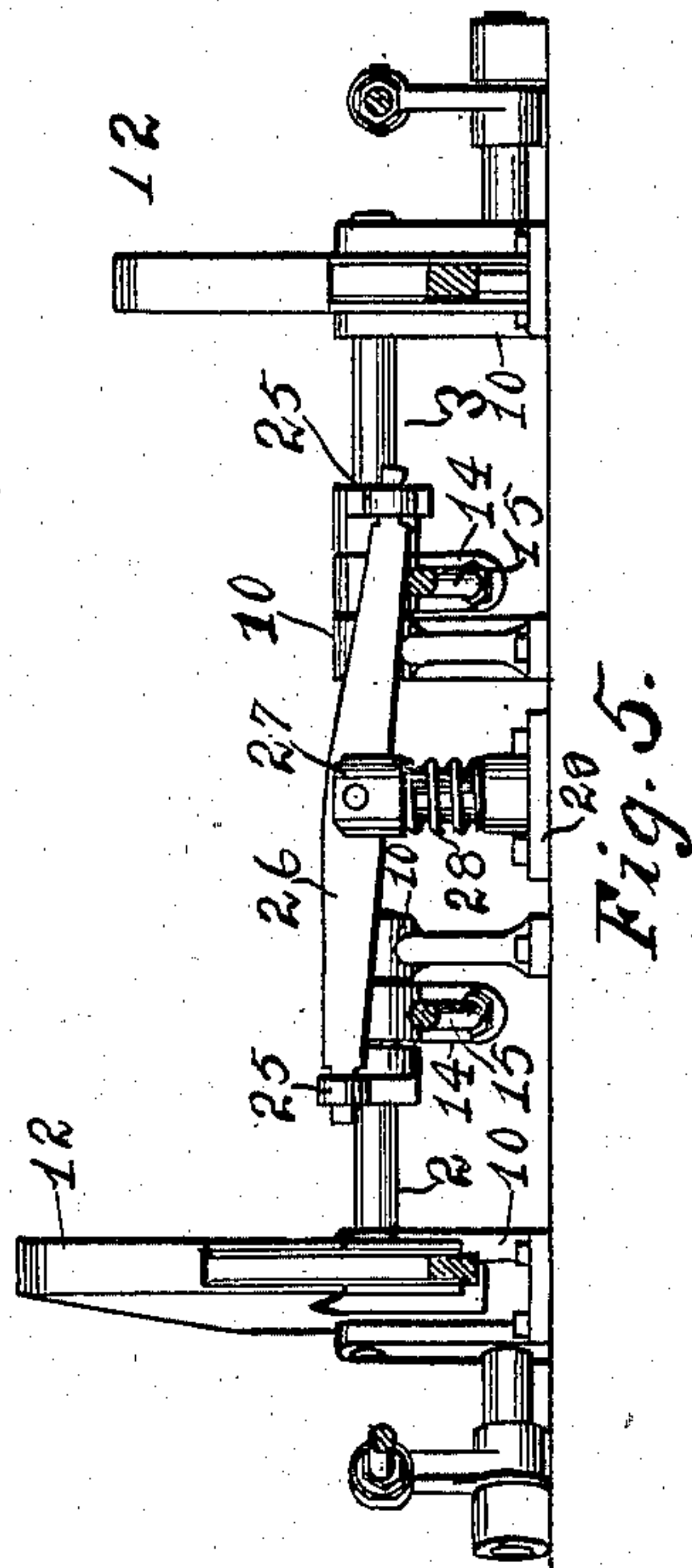


Fig. 5.

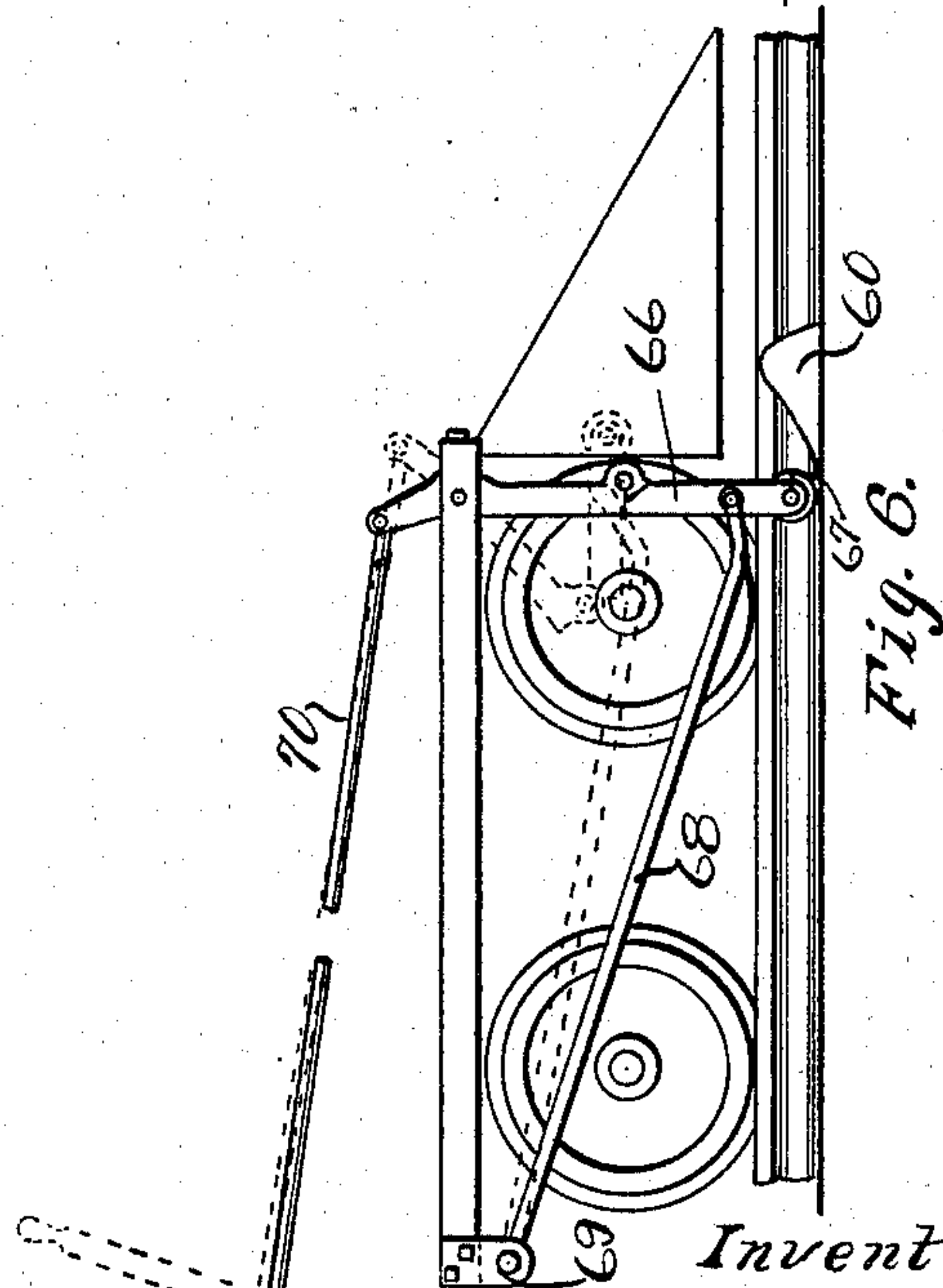


Fig. 6.

Witnesses
R. P. Shepherd,
W. E. Goolley

Inventor
Adelbert G. Lawrence.
By Paul Hawley
his attorneys

UNITED STATES PATENT OFFICE.

ADELBERT G. LAWRENCE, OF MOTLEY, MINNESOTA.

AUTOMATIC RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 590,948, dated September 28, 1897.

Application filed January 4, 1897. Serial No. 617,949. (No model.)

To all whom it may concern:

Be it known that I, ADELBERT G. LAWRENCE, of Motley, county of Morrison, State of Minnesota, have invented certain new and
5 useful Improvements in Automatic Railroad-Switches, of which the following is a specification.

This invention relates to improvements in automatic railroad-switches, the work of
10 throwing the switch being done by the locomotive or car passing over the same; and the invention relates particularly to improvements in the railroad-switches shown and described in Letters Patent issued to me on
15 the 30th day of April, 1889, No. 402,252, and in Letters Patent issued to me on the 3d day of December, 1895, No. 550,926.

My present invention consists generally in improved means for locking and releasing the
20 switch-operating levers; also, in improved means for controlling the movements of the shields that inclose the operating-levers; also, in means by which, when the switch is to be operated by hand, the tension of the devices
25 controlling the operating-levers may be relieved, so as to permit the switch to be easily operated by hand; and the invention consists, further, in improvements in the constructions and combinations of the various parts of the
30 switch.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a switch embodying my invention. Fig. 2 is a similar view showing the means
35 for operating the switch from an incoming train and showing also a hand operating device in connection therewith. Fig. 3 is a side elevation of the switch shown in Fig. 1. Fig. 4 is a side elevation of the construction shown in Fig. 2. Fig. 5 is a transverse section on line 5 5 of Fig. 2. Fig. 6 is a side
40 elevation showing the switch-operating mechanism arranged on the locomotive. Figs. 7 and 8 are detail views illustrating the operation of the mechanism.

In the drawings, 4 and 5 represent the rails of the main track, and 6 and 7 the rails of the siding, while 8 8 represent the movable switch points or rails. The short shafts 2 and 3 are
50 held in bearing-blocks 10 of any suitable construction, and near the outer end of each short shaft is an operating-lever 11, arranged

within a shield 12. The shield 12 is mounted upon the shafts 2 or 3 and is capable of turning freely thereon. Each of the shafts 2 and 3 is provided with a crank-arm 14, to which
55 is connected a rod 15, the opposite end of which is connected to the horizontal arm 16 of a pivoted bell-crank that is supported on a block 17. The other arm of each bell-crank
60 is provided with curved sides 18, that engage collars 19, provided on the rod 20, the ends of said rod 20 being connected to the movable rails 8. I prefer also to make the connection between said bell-crank levers and
65 the rod 20 yielding, the collars 19 being arranged loosely upon said rod 20 and a fixed collar being arranged between said bell-cranks. Collars 22 are also fixed upon the rod 20, and between said collars and the slid-
70 ing collars 19 I provide suitable springs 23. Secured to the shafts 2 and 3 are the projecting arms 25, which are connected by the walking bar or beam 26, pivoted in the head
27. I prefer to cushion the walking-bar by
75 providing a spring 28, through which the spindle or shank of the head 27 passes down into the guide sleeve or base 29. By this means the motion of one operating or shield
80 lever is transmitted to the other, and at the same time the positions of said levers and their shields are reversed. The operation of these parts of the device is substantially the same as that of the corresponding parts in
85 my patent of December 3, 1895, above referred to.

In connection with each shield and shield-lever I provide a two-armed latch-lever 30, pivotally supported upon a block 31 and arranged substantially below the forward or
90 free end of the shield 12 and shield-lever 11. (See Fig. 7.) The rear arm of the lever 30 is curved to correspond to the curved forward end of the shield-lever 11. Said shield-lever is provided with a notch or recess in its lower
95 corner, and when said lever is raised the end of the rear arm of the latch-lever 30 engages said recess and holds said shield-lever in its elevated position. The other arm of the shield-lever 30 carries a small roll or wheel
100 32, which is adapted to engage an incline 33 upon the lower forward part of the shield 12, as shown in Figs. 3, 4, and 7, and thereby to hold said shield in an elevated position. A

narrow space is left between the upper surface of the shield-lever 11 and the upper inner surface of the shield 12, as shown in Fig. 7, so that said shield is free to move a short distance before coming in contact with the said shield-lever. A lug 34 is pivoted to the forward part of the latch-lever 30, and said lug is provided with a cap 35. A similar lug 36, carrying a cap 37, is pivoted upon an upright pivoted arm 38, preferably arranged in the same vertical plane with the latch-lever 30. A spring 39 has its ends arranged in the caps 35 and 37, and when the arm 38 is in a vertical position, as shown in Figs. 3 and 4, the full force of said spring is exerted upon said latch-lever and tends to hold the roll 32 beneath the ends of the shield 12 and thereby to keep said shield in its elevated position. A short shaft 41 (see Fig. 2) is mounted in a suitable bearing 42 and is provided at its inner end with an arm 43, that is pivoted to a link 44, the opposite end of said link being pivotally connected to the upright 38. Said arm 43 and the link 44 form the two members of a toggle-joint, and when said parts are in substantial alinement, as shown in Figs. 3 and 4, the upright 38 is locked in a vertical position. When said parts are folded together, as shown in Fig. 7, the upright 38 is tipped back, as shown in Fig. 7, until its upper end comes in contact with the stop 45, which relieves the tension of the spring 39 upon the latch-lever 30. With the construction shown in Figs. 2 and 4 these parts are the same upon each side of the track. With the construction shown in Figs. 1 and 3 a single shaft 41 is employed, which extends beneath and across the track, so as to simultaneously operate both of the uprights 38.

In Figs. 1 and 3 I have shown a hand operating mechanism substantially similar to that shown in Figs. 9 and 10 of my said patent of December 3, 1895. As here shown, a switch-lever 46 is provided in connection with a switch stand or guide 47, and to said lever is connected a rod 48, that extends beneath the rails and is connected to an operating-lever 49. Said lever 49 consists of a shaft portion mounted in suitable bearings 50 and having an upright arm 51 and a substantially horizontal arm 52, whose end enters an opening in a link 53, that is connected to the lower part of the shield 12. A second lever 49 is arranged in connection with the other shield, and the upright ends 51 of the two levers are connected by a rod 54, so that said levers are operated simultaneously, and as the ends 52 of said levers extend in opposite directions said ends have a reverse movement—that is to say, while one is moved upward the other is moved downward. In this construction the shaft 41 is provided with an operating or hand lever 55, that carries a fork 56, adapted to straddle the switch-lever 46 and lock said lever in a vertical position, as shown in Figs. 1 and 3, so that before said switch-lever can be operated the hand-lever 55 must be thrown

back into the position shown in Fig. 7 for the purpose of releasing said switch-lever, and this movement, as before stated, throws back the upright 38 and relieves the latch-lever 30 from the tension of the spring 39.

The operation of this construction will be readily understood from the foregoing detailed description. The parts being in the position shown in Figs. 1 and 3, the full tension of the springs 39 will be exerted upon the latch-lever 30, and one of the shields 12 will be in the elevated position shown in Figs. 3 and 7. In this instance it will be the shield that is arranged next to the rail 7 of the side-track. As a train passes from the side-track the flange of the first wheel of the locomotive or car will depress the shield 12, the roll 32 will travel back over the incline 33, and the end of the latch-lever 30 will be withdrawn from beneath the lever 11, releasing said lever. A further movement of the shield 12 will depress the lever 11, turning the shaft to which it is secured and thereby, through the connecting-rod 15, the bell-crank, and the rod 20, moving the movable rails 8 into line with the rails 6 and 7 of the side-track. At the same time, through the walking-bar 26, the other shaft 3 will be turned in the opposite direction, and the lever 11 and the shields 12 connected with that shaft will be raised. When the shield 12 is raised far enough for the roll 32 to come opposite the upper part of the incline 33, the spring 39, acting upon the latch-lever 30, will force said roll along said incline, thereby raising the shield 12 a short distance above the lever 11, and the end of the other arm of the latch-lever 30 will engage the notch in the lever 11 and thereby lock said lever in its elevated position. The springs 39 will exert sufficient pressure upon the latch-levers 30 to prevent the shields 12 and levers 11 from being depressed by any ordinary means, so that said shields and levers cannot be accidentally operated and cannot be operated by a person stepping upon them or applying any ordinary pressure thereto. When it is desired to operate said switch by hand, the locking-lever 55 is thrown back into the position shown in Fig. 7, thereby relieving the pressure upon the latch-lever 30, and then by means of the switch-lever 46 said switch may be operated and the rails 8 be moved in either direction. A suitable target or signal 57 may be provided in connection with the movable rails for the purpose of indicating to which track the switch is set. When the switch-lever 46 is in a vertical position, in which position it may be locked by the hand-lever 55, as above stated, the ends 52 of the levers 49 will be in such position that they will not interfere with the free movement of the shields 12 and levers 11.

I prefer also to provide means which may be applied when desired for operating the switch from the locomotive of an incoming train. This device consists of a lever 60, se-

cured upon a short rotating shaft 61 at a point at some distance from the fixed rails of the switch. This lever is provided with a depending arm 62, to which is connected a rod 5 63, the opposite end of said rod being connected to an arm 64 upon shafts 49', provided with arms 52', that engage slotted links 53' on the shields 12. The levers 60 are arranged outside of the rails of the track but in close 10 proximity thereto, preferably projecting through a suitable plate 65, as shown in Fig. 2. In Fig. 6 I have shown means provided at the forward part of a locomotive for depressing the lever 60. This consists of a toggle-joint lever 66, pivoted upon the frame of 15 the engine and provided at its lower end with a roll 67. The rod 68 is pivoted to the lower end of the lever 66 and to a lug 69 upon the frame of the locomotive. To the upper end 20 of the lever 66 is connected a rod 70, extending to a hand-lever 71, preferably located in the cab of the locomotive. When the hand-lever 71 is in the position indicated by dotted lines in Fig. 6, the toggle-lever 66 will be 25 folded up into the position indicated by dotted lines in said figure. When the lever 71 is in the position shown by full lines in Fig. 6, the lever 66 will be straightened out and the roll 67 will be brought into the position to engage 30 the lever 60 and depress the same.

I also prefer to provide means located opposite the lever 60 for operating the switch by hand. In this instance the shaft 61 is provided with a short arm or lug 72, (see Figs. 35 4 and 8,) and a switch-lever 73 is mounted upon the shaft 61, so as to turn freely thereon, and said lever is arranged to pass through the slotted guide 74. The lower end of said lever is provided with a lug 75, and a rod 76 40 passes through said lug and through the lug 72 on the shaft 61. A spring 77 surrounds the rod 76 and its ends bear against the said lugs 72 and 75. A shoulder 78 is provided upon the lever 73, and said shoulder is arranged to engage the lug 72 upon a shaft 61 45 when said lever is operated. A short shaft 79 is arranged, preferably, beneath and parallel with the shaft 61, said shaft being mounted in a suitable bearing 80. A lever 81 is 50 connected to said shaft and extends up alongside of the guide 74. To the upper end of said lever is pivoted a short section 82, that forms a hand-grasp for said lever, said section being adapted to be turned down into a 55 horizontal position on top of the guide 74, where it comes between the lever 73 and a lug 83 upon the top of said guide. The shaft 79 is provided with a suitable crank-arm 84, and a rod 85 is connected to said crank-arm, and 60 its opposite end is connected to a crank-arm 86 on the shaft 41. The rods 85 and 63 are preferably inclosed and protected by suitable tubes 87.

With this construction when it is desired 65 to operate the switch by hand the locking-section 82 is first turned into a vertical position, and then the shaft 79 is rocked by means of

the lever 81, and through the rod 85 and shaft 41 the pressure of the spring upon the latch-lever 30 is relieved. The switch-lever 73 is 70 then turned by hand, and through the connecting-rod 63 the shaft 2 or 3 is rocked and the switch is moved. When the switch-lever 73 is moved back to its vertical position, the movement of the shaft 61 is reversed through 75 the spring connection between the hand-lever 73 and said shaft.

As shown in Figs. 1 and 2, the shields 12 are preferably arranged to project through a 80 suitable plate 90, that is arranged beneath the rails and extends over the space between said rails, so that the latch-levers, the springs connected therewith, and the means for operating said levers are entirely inclosed and 85 protected.

While I have shown the device connected with a stub-switch, it will be understood that it is equally applicable to a split or point switch.

I do not limit myself to the details of the 90 construction herein shown and described, as it is obvious that the same may be materially altered and modified without departing from my invention.

Having thus described my invention, I 95 claim as new and desire to secure by Letters Patent—

1. The combination, with the main and side tracks, of the switch points or rails, the shields 100 located between the pairs of rails of the main and side tracks, the shafts whereon they are journaled, the levers secured upon said shafts and arranged within said shields, the latch-lever 30 engaging said lever and said shield 105 and adapted to be disengaged from said lever by the initial movement of the shield, and means preventing the accidental operation of said latch-lever, for the purpose set forth.

2. The combination, with the shaft 3, of the lever 11 secured thereto, the shield 12 mounted 110 loosely upon said shaft and inclosing said lever, the latch-lever 30 arranged to engage and lock the lever 11 and adapted to be moved out of engagement with said lever by the initial movement of said shield, and means pre- 115 venting the accidental operation of said latch-lever.

3. The combination, with the shaft 3, of the lever 11 secured thereto, the shield 12 mounted 120 loosely upon said shaft and inclosing said lever, the latch-lever 30 arranged to engage and lock said lever and to be disengaged therefrom by the initial movement of said shield, a spring engaging said latch-lever, and means for relieving the tension of said 125 spring.

4. The combination, with the shaft 3 and means connected with said shaft for moving the switch-points, of the levers 11 secured to said shaft, one of said levers being arranged 130 to be raised as the other is depressed, shields 12 mounted loosely upon said shafts and inclosing said levers, latch-levers 30 arranged to engage and lock said levers in their ele-

vated positions, said latch-levers being arranged to be disengaged from said levers by the initial movements of the shields, and adjustable means for exerting pressure upon
5 said latch-levers, for the purpose set forth.

5. The combination, with the movable shield and the lever inclosed therein, of the latch-lever engaging said shield and lever, the spring 39 engaging said latch-lever, the
10 upright 38 engaging said spring, the shaft 41 and the toggle 43, 44 arranged between said shaft and said upright, whereby the tension of said spring and the pressure exerted by it upon said latch-lever may be increased or de-
15 creased at will, for the purpose set forth.

6. The combination, with the shields arranged between the rails of the main and side tracks, the levers inclosed by said shield, means connected with said levers for operat-
20 ing the switch-points, the latches for said levers, springs connected with said latches, means for relieving the tension of said springs upon said latches, and a hand operating means for moving the switch-points, for the
25 purpose set forth.

7. The combination, with the shields and operating-levers arranged between the rails of the main and side tracks, the latch-levers engaging said shields and levers, the springs
30 engaging said latch-levers, the shaft 41, and means connected with said shaft for relieving the tension of said springs, the locking-lever 55 arranged upon said shaft 41, the hand operating switch-lever 46, and means
35 connecting said lever with the switch-operating mechanism, said lever being arranged to be locked in position by the locking-lever 55, for the purpose set forth.

8. The combination, with the operating-
40 shafts 3 and means connecting said shafts with the movable switch-points, of the levers

mounted upon said shafts, the shields inclos- ing said levers, the latch-levers 30 engaging said shields and levers, the shafts 49' pro-
45 vided with arms 52' engaging slotted links upon said shields, crank-arms 64 upon the shaft 49', and means adapted to be operated by an incoming train for moving said crank- arms, for the purpose set forth.

9. The combination, with the operating- 50 levers and inclosing shields, of the shafts 49', arms upon said shafts engaging slotted links upon said shields, the depressible levers 60 arranged outside of the track in position to be operated by an incoming train, and means 55 connecting said levers with said shafts 49', for the purpose set forth.

10. The combination, with the operating- levers and the inclosing shields, of the latch- levers 30, adjustable springs connected with 60 said latch-levers, means for operating said shields and levers at a distant point either by hand or by an incoming train, and means connected with said hand operating mech-
65 anism for relieving the tension of said springs upon said latch-lever, for the purpose set forth.

11. The combination, with the switch-mov- ing mechanism of the depressible lever 60 connected therewith, the shaft 61 provided 70 with the lug 72, the operating-lever 73 provided with the lugs 78 and 75, the spring 77, and means for locking said lever, for the pur-
pose set forth.

In testimony whereof I have hereunto set 75 my hand this 22d day of December, A. D. 1896.

ADELBERT G. LAWRENCE.

In presence of—

A. C. PAUL,

M. E. GOOLEY.