P. F. KIEFER.

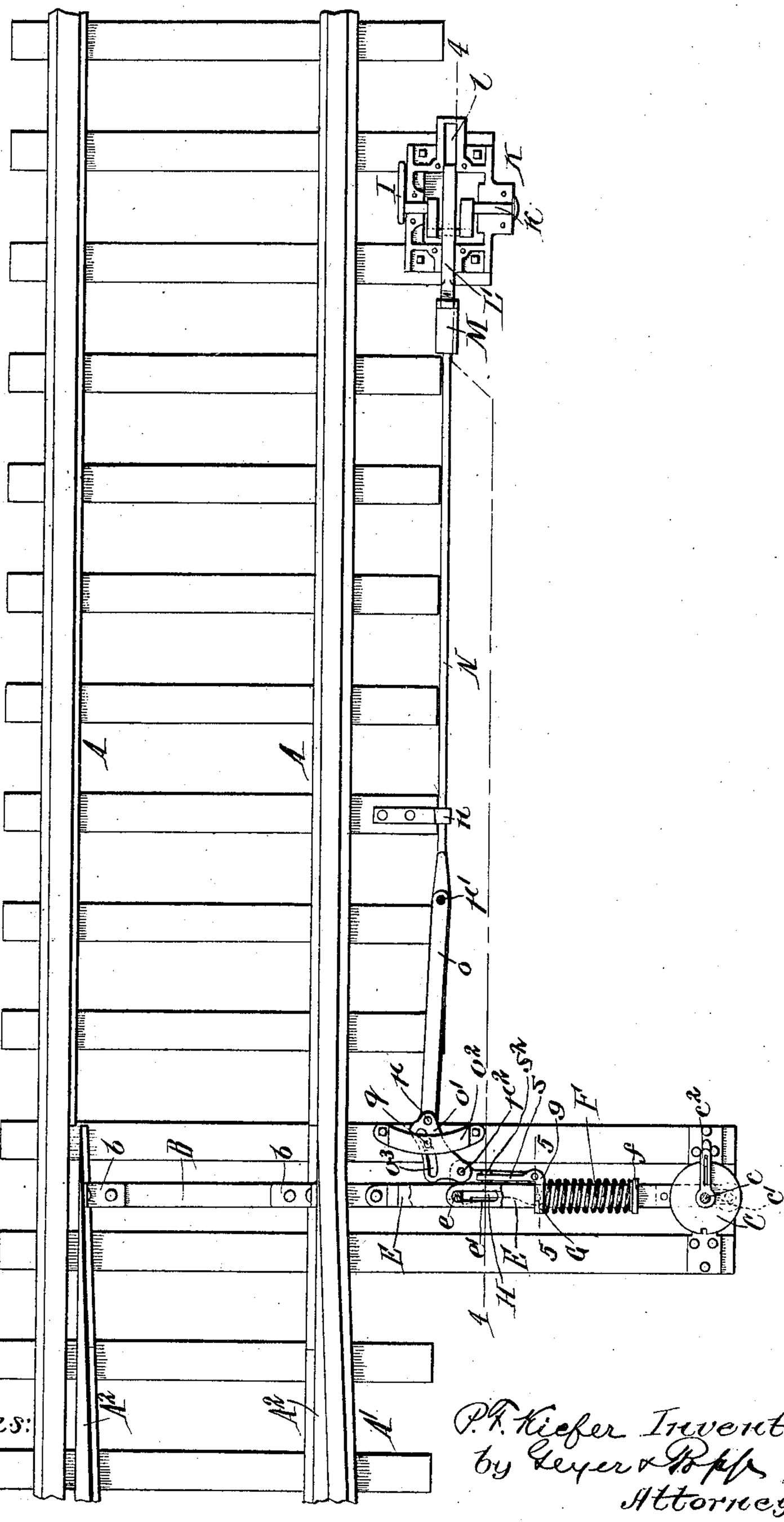
AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED JULY 8, 1907.

903,480. Patented Nov. 10, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



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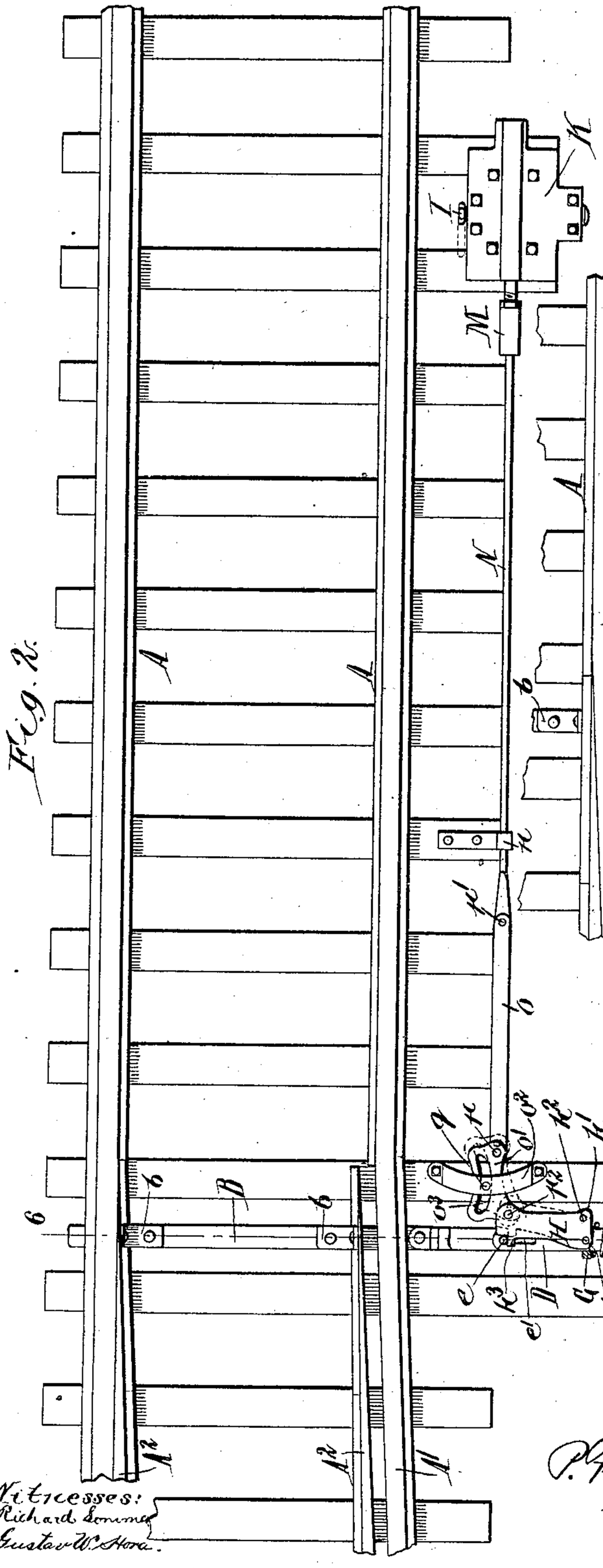

Fig. 2.

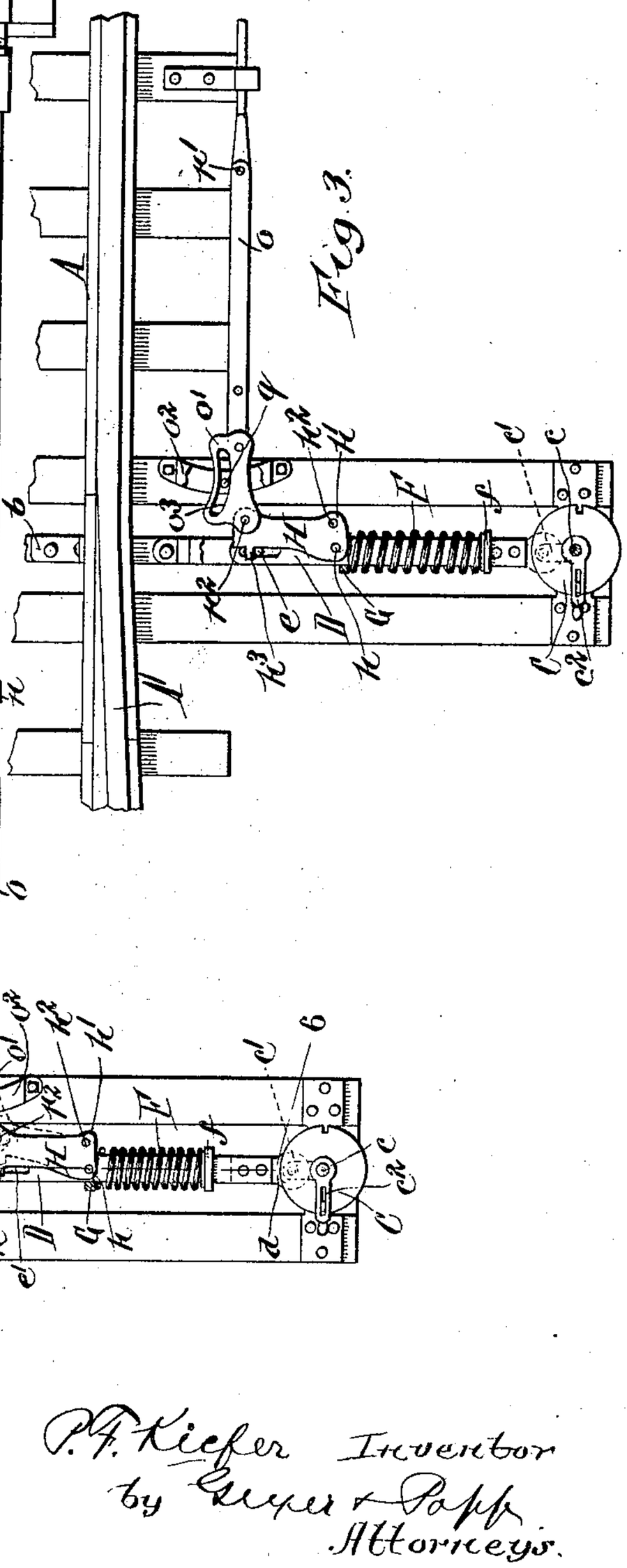

Fig. 3.

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3 SHEETS—SHEET 3.

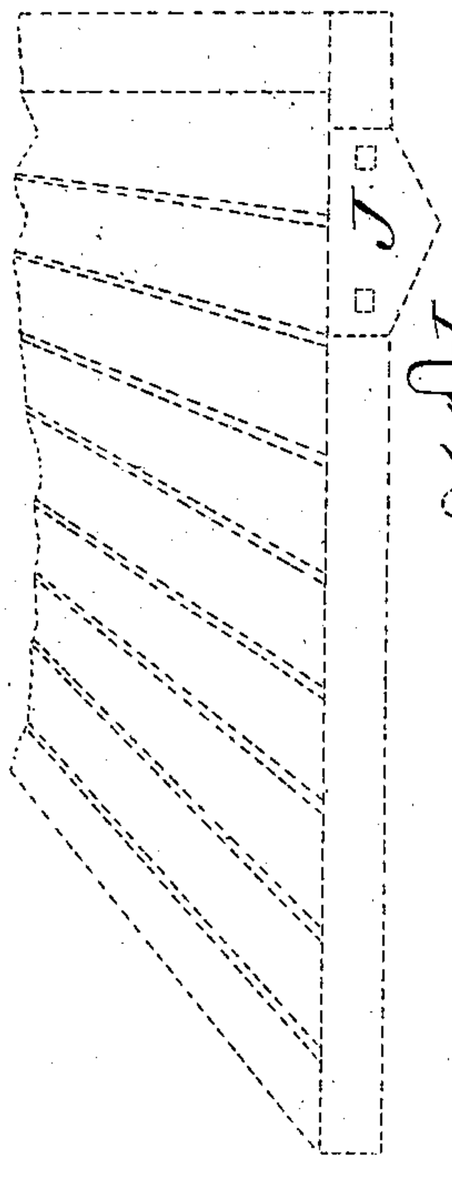


Fig. 4.

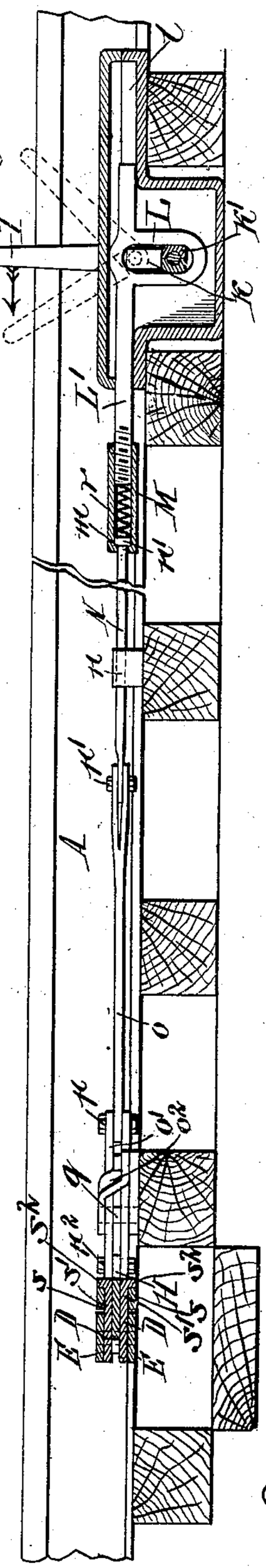


Fig. 5.

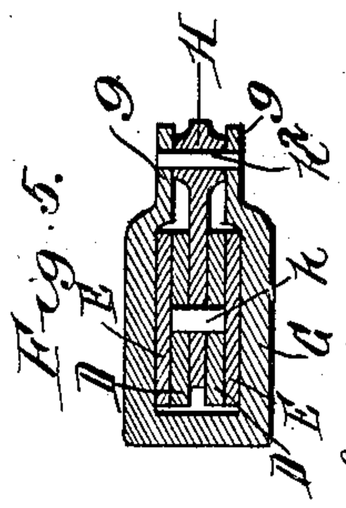
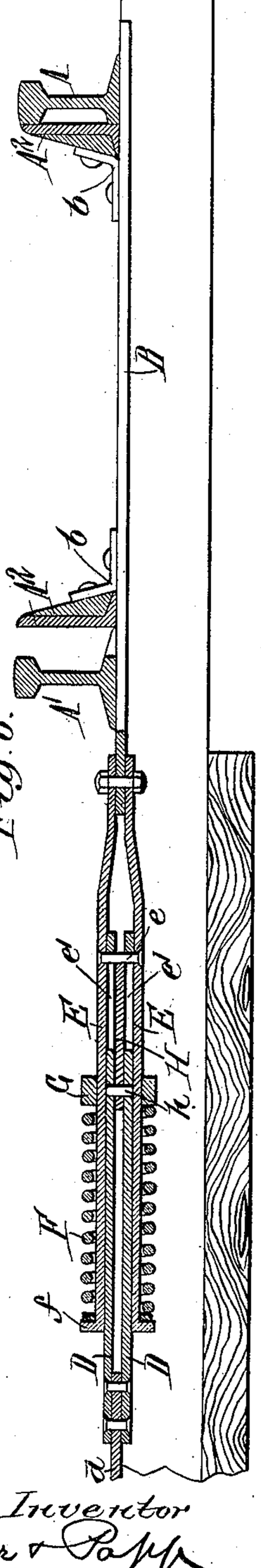


Fig. 6.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC RAILWAY-SWITCH.

No. 903,480. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed July 8, 1907. Serial No. 382,634.

To all whom it may concern:

Be it known that I, PETER F. KIEFER, a citizen of the United States, residing at Silver Creek, in the county of Chautauqua and State of New York, have invented a new and useful Improvement in Automatic Railway-Switches, of which the following is a specification.

This invention relates to that class of safety railway switches having a closing spring which is under the control of a trigger or releasing device arranged to be tripped by an approaching train, so that in case the switch should be opened by mistake or by unauthorized persons, it will be automatically closed by the train, thus guarding against derailing or wrecking of the same which might otherwise occur.

The object of my invention is the production of a switch of this character which is prompt, positive and reliable in action, simple in construction and not liable to get out of order.

In the accompanying drawings consisting of 3 sheets: Figure 1 is a top plan view, partly in section, of a switch embodying the invention, showing the same in its closed position. Fig. 2 is a similar view showing the switch open. Fig. 3 is a fragmentary top plan view, partly in section, showing the position of the parts after the trigger has been tripped and the switch automatically moved to its closed position. Fig. 4 is a longitudinal section, on an enlarged scale, in line 4—4, Fig. 1. Fig. 5 is an enlarged section in line 5—5, Fig. 1. Fig. 6 is a transverse section in line 6—6, Fig. 2.

Similar letters of reference indicate corresponding parts throughout the several views.

A indicates the rails of the main track, A^1 one of the rails of the siding, and A^2 the switch points or rails which are connected by angle irons *b* with a head rod or tie-bar B, so as to move in unison in the usual manner. This tie bar passes under the rails and extends beyond the same on the side at which the switch-stand or manual shifting device C is located. The stand shown in the drawings has the customary upright shaft *c* provided at its lower end with a crank c^1 indicated by dotted lines, and at its upper end with a hand lever c^2 for turning it.

Between the crank of the shaft *c* and the tie-bar B of the switch rails is a telescopic connection preferably consisting of a pair of inner metallic bars or straps D having their outer ends connected with said crank by a bar or link *d*, and a pair of outer bars or straps E arranged on the upper and lower sides of the straps D and having their inner ends bolted or otherwise secured to the tie bar B, as best shown in Fig. 6. Near their inner ends these outer straps are connected by a cross-pin *e* which passes through longitudinal slots e^1 formed in the inner straps D.

F indicates a spring surrounding the straps D and E between abutments or shoulders *f* at the outer ends of the outer straps E and a collar or abutment G capable of sliding on the straps. The two pairs of straps constituting the two main members of said telescopic connection are detachably locked against movement on each other by a suitable coupling or lock H preferably consisting of a latch pivoted by a transverse pin *h* to the inner straps D, so as to take part in the longitudinal movement of the latter. The latch is provided on the rear side of its pivot with a heel h^1 which is pivoted to lateral lugs *g* of the collar G by a pin h^2, as best shown in Figs. 2 and 5. By this construction, the latch forms a connecting link between the collar and the inner straps D which compels the collar to move toward and from the switch stand with said straps. The nose h^3 of the latch is adapted to interlock with the cross pin *e* of the outer straps E, the latch engaging the outer side of said pin in the normal condition of the telescopic connection, as shown in Fig. 2, and engaging the inner side of the pin when the switch is automatically moved from its open to its closed position, as shown in Fig. 3.

I indicates a trigger or trip device which operates the latch H and which is arranged adjacent to the main track at a suitable distance in advance of the switch and adapted to be tripped by a shoe or tappet J mounted on the pilot of a locomotive, as shown by dotted lines in Fig. 4. The trigger shown in the drawings consists of a vertically swinging arm arranged beside the track in the path of the shoe J and carried by a transverse crank shaft *k* journaled in a casing K having a removable-cover. Upon the crank of this shaft is journaled a block k^1 which slides in a vertical loop or yoke L movable parallel with the main track-rails and carried by a sliding rod L^1. The front end of this rod passes through an opening in the casing K, while

its rear end is guided in a groove *l* formed in the casing. The longitudinal movement of the sliding rod L^1 causes the trigger to be raised or lowered in an obvious manner. This rod is connected by a sleeve M with a longitudinal rod N sliding in a suitable guide or guides *n*, while the rod N is connected with the latch H by toggle bars or links *o*, o^1, which latter are pivoted together by a vertical pin *p* and are pivoted to the rod N and the latch respectively by vertical pins p^1, p^2. The toggle link o^1 is arranged between horizontal plates or straps o^2 bolted to the adjacent railway tie or other support, and is provided with a longitudinal slot o^3 through which passes a vertical pin *q* carried by the plates o^2. This pin forms a guide for retaining the toggle-links in position and also acts as a fulcrum on which the short link o^1 swings, as will be hereinafter more fully described.

In order to permit the projected trigger to be tripped backwardly by a locomotive backing on the main track, without affecting the latch H, the sleeve M is arranged to move idly on the rod N toward the switch rails. For this purpose the sleeve has a screw threaded or other rigid connection with the sliding rod, as shown in Fig. 4, while at its opposite end it is provided with an internal shoulder *m* with which engages a head n^1 at the rear end of the rod N, a spring *r* being arranged in the sleeve between said head and the adjacent end of the sliding rod L^1. By this connection, when the trigger is tripped in the direction of the arrow in Fig. 4, the shoulder of the sleeve M engages the head of the rod N and compels the latter to move with the sleeve, while when the trigger is tripped in the opposite direction by a backing locomotive, the sleeve slides idly on the rod N, compressing the spring *r* which restores the sleeve and the trigger to their former position, as soon as the tappet J of the locomotive clears the trigger.

The operation of the switch is as follows: In the normal closed position of the switch, shown in Fig. 1, the trigger I is in its lowered or retracted position, out of reach of the tappet of a passing locomotive. The collar or abutment G is in its outermost position and the spring F is compressed between it and the abutments *f* of the outer straps E, the collar being held in that position by the latch H which engages against the outer side of the pin *e*, as shown in Fig. 1. In this position of the parts, the switch can be opened or closed by means of the switch stand lever c^2 like an ordinary switch, but cannot be opened without raising the trigger I to its operative position and although the spring F is compressed ready for action, if offers no resistance to such manual throwing of the switch.

When the switch is opened, the latch H moves inwardly with the straps D and E, straightening the toggle links *o* and o^1 to the position shown in Fig. 2, pushing the yoke L rearwardly or away from the switch rails and turning the crank shaft *k* in the proper direction to raise the trigger I. Assuming now that the switch is left open by mistake and locked in that position by the usual locking devices of the switch-stand, the tappet J of a train approaching on the main track will strike the trigger and swing it toward the switch rails, thereby withdrawing the latch H out of engagement with the pin *e* through the medium of the rod N and links *o*, o^1, as shown by dotted lines in Fig. 2. The compressed spring F acting on the abutment *f* of the straps E now shifts the latter outwardly on the inner straps D, thus automatically closing the switch before the locomotive reaches the switch rails and averting an accident. As the collar or abutment G is connected with the inner straps D through the medium of the latch H, and as said straps are held against longitudinal displacement by the usual locked lever of the switch stand under the above conditions, the collar acts as a fixed abutment for the spring during the closing movement of the switch. By this movement of the outer straps E, the pin *e* is carried outward to the outer side of the nose of the latch H which latter swings forwardly and again interlocks with said pin immediately after being retracted by the tripping of the trigger, as shown in Fig. 3, thus locking the straps E against inward movement on the straps D and locking the switch rails in their closed position. This forward or return movement of the latch is effected automatically by the pressure of the spring F against the collar G, which latter, by being pivoted to the heel of the latch on one side of the latch-pivot *h* tends to swing the latch inwardly under the stress of the spring. The parts are so arranged and the spring is of such a length that the latter remains under partial compression after having closed the switch.

In order to restore the tension of the spring and prepare the automatic switch-actuating mechanism for the next operation, an attendant swings the trigger in the direction of the arrow in Fig. 4, to withdraw the latch I from the pin *e*, and the switchman then turns the switch-stand lever c^2 to the position shown in Fig. 1, and locks it, thus moving the collar G and the latch toward the switch-stand and compressing the spring. As soon as the nose of the latch arrives on the outer side of the pin *e* it swings inwardly behind the latter, under the action of the spring, as before described.

Owing to the fact that the collar G is pivoted at one side to the heel of the latch, the compressed spring has a tendency to twist or turn the collar into an oblique position and cause it to bind on the straps. In order to

overcome this and insure a smooth action of the collar, the latter is provided with a pair of forwardly-extending arms *s* arranged parallel with the straps D, E and straddling a pair of laterally projecting lugs s^1 carried by the inner straps D. These lugs are provided with guide-lips or shoulders s^2 against the inner sides of which the arms *s* bear, as shown in Figs. 1 and 4, thereby resisting tilting or twisting of the collar and allowing it to slide freely on the straps.

During the movement of the switch rails from their closed to their open position, the short link o^1 acts not only as a toggle-link but swings lever-like upon the pin *q* as a fulcrum, thus amplifying or multiplying the throw of the toggle-connection *o*, o^1, and obtaining the requisite rotary movement of the crank shaft *k* to project or retract the trigger I.

Aside from the advantage of permitting the switch rails to be shifted by hand without resistance from the automatic closing spring F, this improvement combines simplicity of construction with reliability of action, while its cost is relatively small.

I claim as my invention:—

1. The combination of the main track, the switch rails, means for automatically closing the switch rails, a manual shifting device for the switch rails, means for detachably connecting the switch rails with said shifting device, a trip-device near the switch adapted to be engaged by an approaching train, and a toggle connection between said trip device and said connecting means, substantially as set forth.

2. The combination of the main track, the switch rails, means for automatically closing the switch rails, a manual shifting device for the switch rails, means for detachably connecting the switch rails with said shifting device, a trip-device near the switch adapted to be engaged by an approaching train, and a toggle connection between said trip device and said connecting means, one member of which consists of a lever capable of sliding lengthwise on its fulcrum, substantially as set forth.

3. The combination of the main track, the switch rails, means for automatically closing the switch rails, a manual shifting device for the switch rails, means for detachably connecting the switch rails with said shifting device, a trip-device near the switch adapted to be engaged by an approaching train, and a connection between said trip device and said connecting means, including a slotted link engaging said connecting means and a fixed pivot on which said link swings, substantially as set forth.

4. The combination of the main track, the switch rails, means for automatically closing the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, means for locking the members of said connection against longitudinal movement on each other, a trip device arranged to be engaged by an approaching train, and a toggle connection between said trip device and said locking means, substantially as set forth.

5. The combination of the main track, the switch rails, means for automatically closing the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, means for locking the members of said connection against longitudinal movement on each other, a trip device arranged to be engaged by an approaching train, and a toggle connection including a lever connected with said locking means and capable of sliding lengthwise on its fulcrum and a link connecting said lever with said trip device, substantially as set forth.

6. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, the members of said connection having abutments, a spring interposed between said abutments, a latch pivoted to one of said members and interlocking with the other member, a trip device adjacent to the main track, a slotted link connected at one end with said latch, a fulcrum-pin passing through said slot, and a link connecting the other end of said slotted link with said trip-device, substantially as set forth.

7. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, the members of said connection having abutments, a spring interposed between said abutments, a latch carried by one of said members and adapted to interlock with the other member, a trip device adjacent to the main track, and a toggle-connection between said latch and said trip-device, substantially as set forth.

8. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, the members of said connection having abutments, a spring interposed between said abutments, a latch pivoted to one of said members and the corresponding abutment and adapted to interlock with the other member, a trip device adjacent to the main track, and a connection between said latch and said trip-device, substantially as set forth.

9. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, the members of said connection having abutments, a spring interposed between said abutments, a latch pivoted to one of said

members and adapted to interlock with the other member, a pivotal connection between said latch and the adjacent abutment located on one side of the latch-pivot, a trip device adjacent to the main track, and connecting means between said latch and said trip-device, substantially as set forth.

10. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, the members of said connection having abutments and one of the same having a locking pin, a latch pivoted to the other member and constructed to engage opposite sides of said pin in different positions of the switch-rails, a spring interposed between said abutments, a trip device adjacent to the main track, and a connection between said latch and said trip device, substantially as set forth.

11. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, each member of said connection having an abutment slidable on the other member, guiding means for maintaining said inner abutment in a parallel position with the member on which it slides, a spring interposed between said abutments, a latch pivotally connected to said inner abutment and to the telescopic member on which the latter slides and adapted to interlock with the other member, and a trip device connected with said latch, substantially as set forth.

12. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, each member of said connection having an abutment slidable on the other member, the inner abutment having a guide-arm and the member on which it slides having a guide coöperating with said arm, a spring interposed between said abutments, a latch pivoted to said inner abutment and the telescopic member connected with said shifting device, a trip device adjacent to the track, and a connection between said latch and said trip device, substantially as set forth.

13. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device, the members of said connection having abutments and the member connected with said shifting device having a laterally extending lug provided with a shoulder, the inner abutment having a guide-arm arranged parallel with the telescopic connection and bearing against the inner side of said shoulder, a spring interposed between said abutments, a latch pivotally connected to said inner abutment and to the member on which the latter slides and adapted to interlock with the other member, and a trip device connected with said latch, substantially as set forth.

14. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device comprising a pair of inner straps connected with said shifting device and a pair of outer straps connected with the switch-rails and carrying a cross pin, each pair of straps being provided at its inner end with an abutment slidable on the other pair of straps, a spring surrounding the straps between said abutments, a latch pivoted to said inner straps and adapted to interlock with said cross-pin, and a trip device connected with said latch, substantially as set forth.

15. The combination of the main track, the switch rails, a manual shifting device for the switch rails, a telescopic connection between the switch rails and said shifting device comprising a pair of inner straps connected with said shifting device and having longitudinal slots and a pair of outer straps connected with the switch rails and carrying a cross pin passing through said slots, each pair of straps being provided with an abutment slidable on the other pair of straps, a spring surrounding the straps between said abutments, a latch pivoted to said inner straps and adapted to interlock with said cross-pin, and a trip device connected with said latch, substantially as set forth.

16. In an automatic railway switch, the combination of the switch rails, a spring for automatically closing said rails, locking means for holding the spring under compression, a trip device adjacent to the main track, and a connection between said locking means and said trip-device including a sleeve having an internal shoulder, a pair of rods, one rigidly secured to one end of the sleeve and the other having a headed end loosely arranged in the sleeve, and a spring arranged in the sleeve and bearing against said headed rod, substantially as set forth.

Witness my hand this 22d day of June, 1907.

PETER F. KIEFER.

Witnesses:
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C. F. GEYER.