No. 872,997. PATENTED DEC. 3, 1907.

C. L. HOUGHTON.

RAILWAY SWITCH.

APPLICATION FILED JUNE 7, 1907.

4 SHEETS—SHEET 1.

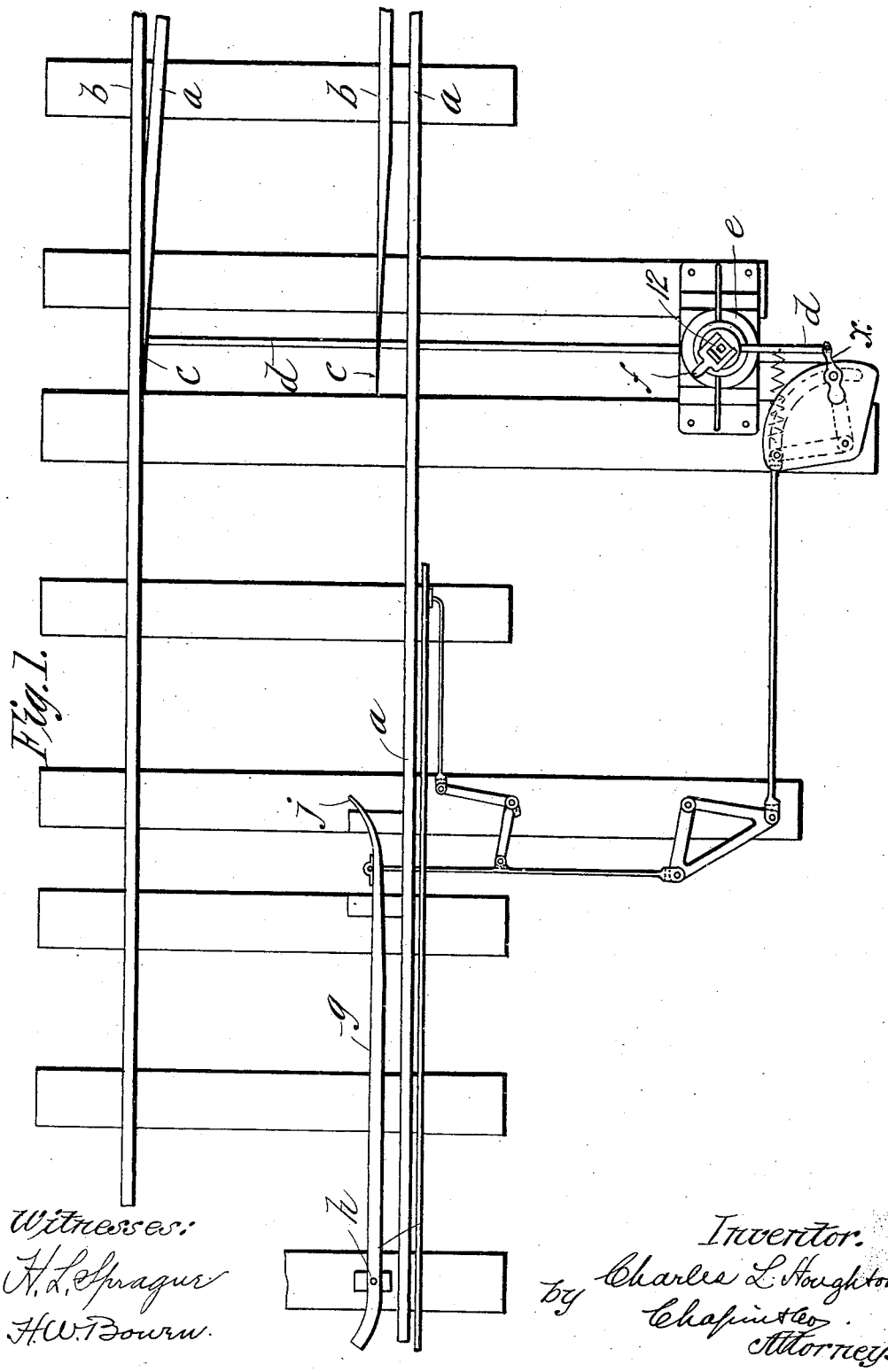

Fig. 1.

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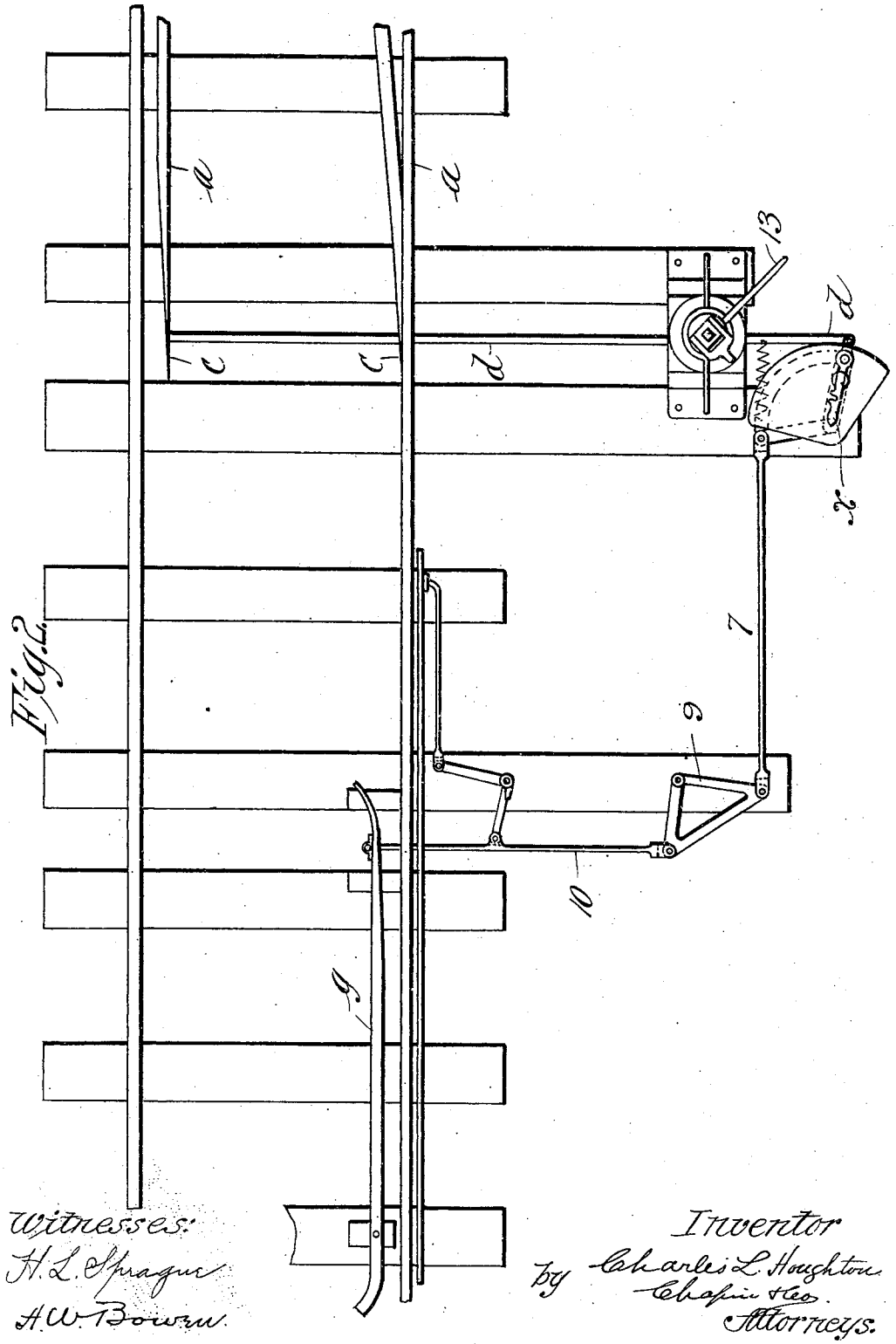

Fig. 2.

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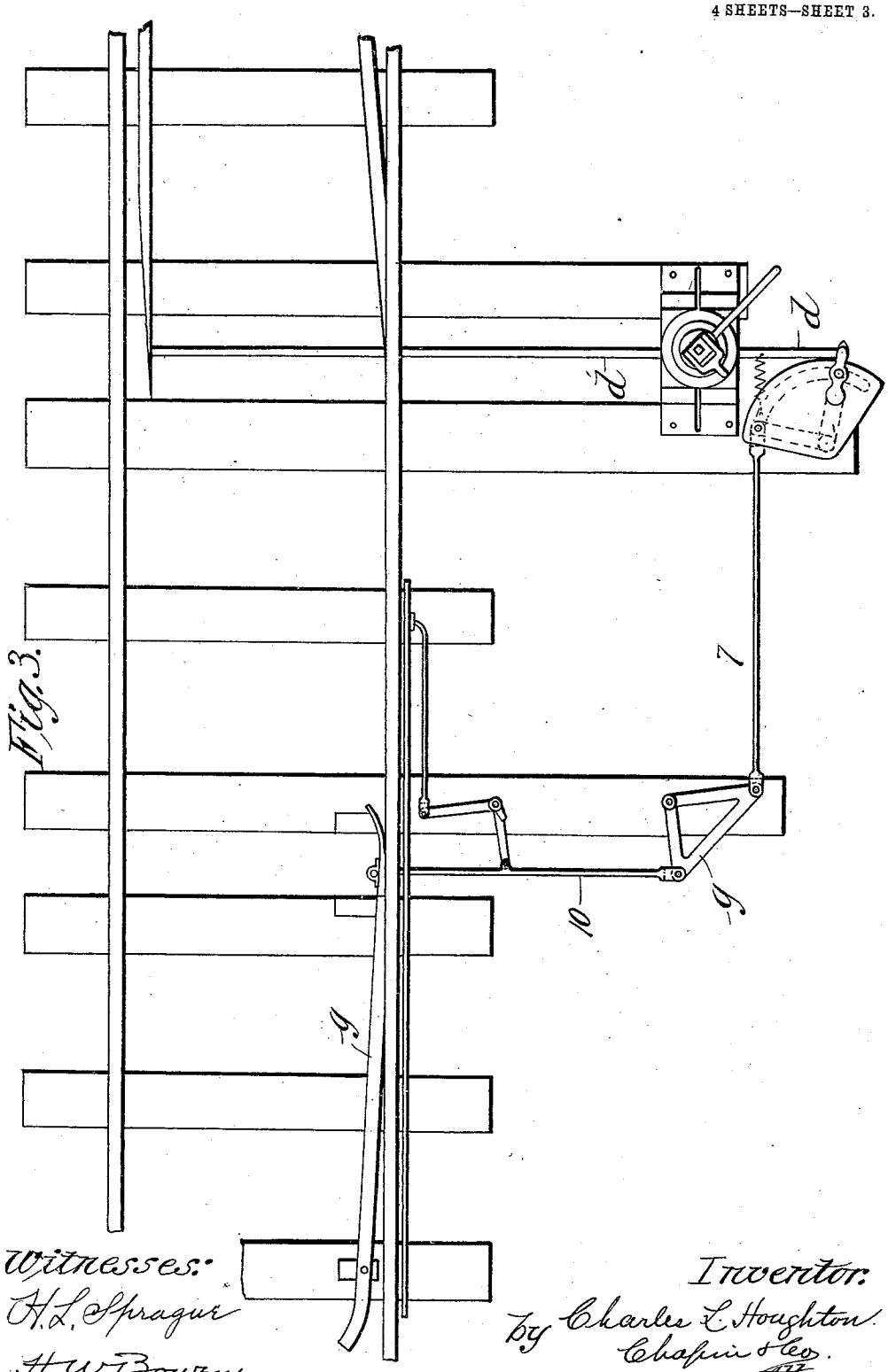

Fig. 3.

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4 SHEETS—SHEET 4.

Fig. 4.

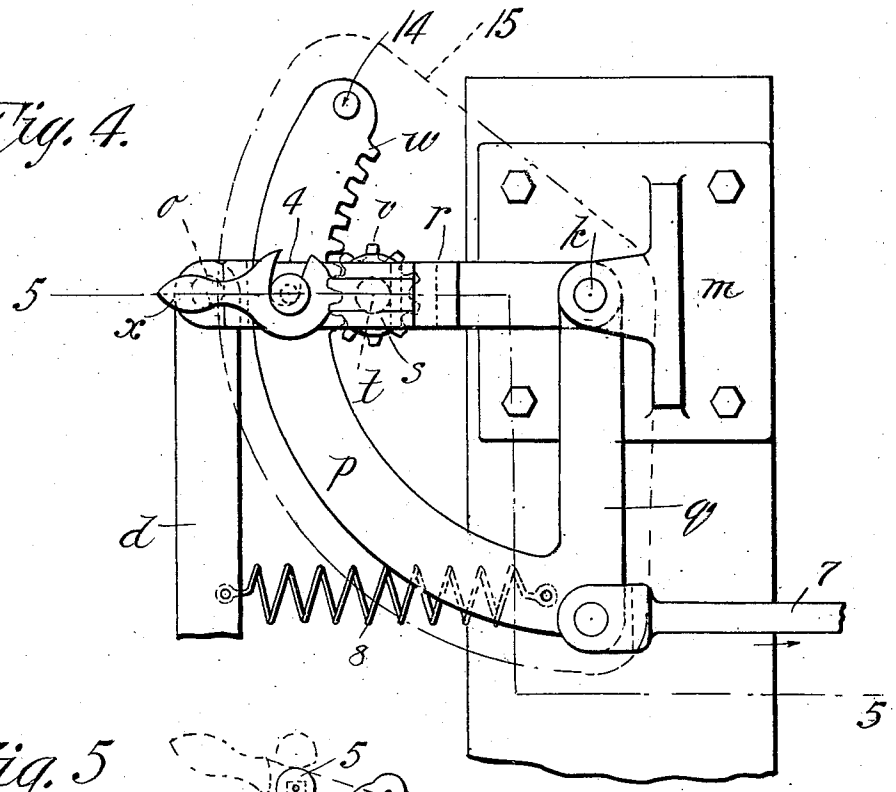
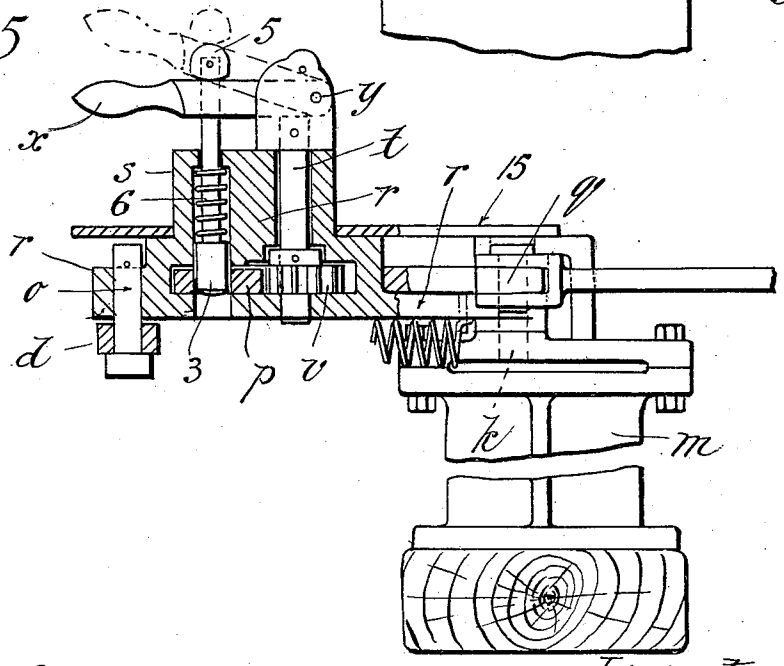


Fig. 5



Witnesses:
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H. W. Bowen

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UNITED STATES PATENT OFFICE.

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RAILWAY-SWITCH.

No. 872,997. Specification of Letters Patent. Patented Dec. 3, 1907.

Application filed June 7, 1907. Serial No. 377,765.

To all whom it may concern:

Be it known that I, CHARLES L. HOUGHTON, a citizen of the United States of America, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Railway-Switches, of which the following is a specification.

This invention relates to railway switches and has for its object the construction of a safety device for a facing point switch, whereby the latter will be automatically thrown by the train to safety position, (viz., to provide a clear main track,) if through carelessness of the switchman it is left in the wrong position, viz.,—in a position which would cause a train moving towards the facing-point switch to take the side-track.

In the construction embodying the present invention, a train can enter the turnout or siding only when the switch is held by the switchman in a position which renders the safety devices inoperative should the switchman abandon his post after having set the switch for the siding or turnout, the safety device will automatically set itself in operative position, that is the safety device will set itself in position to be operated by a train running towards the facing-points, whereby the latter will be thrown to give a clear main track.

The invention is clearly illustrated in the accompanying drawings, in which,—

Figure 1 shows a switch construction in plan view in which the invention is embodied. This figure shows the switch set to give a clear main track. Fig. 2 shows a plan view of the switch set so as to permit a train running against the switch-points or towards the right to take the siding or turn-out. Fig. 3 shows the switch-points in the same position as in Fig. 2 but with the safety devices in operative relation to the main track, should a train approach the switch running towards the right, the safety devices would throw the switch-points to the position shown in Fig. 1 thus giving a clear main track. Fig. 4 is a plan view on a larger scale of interlocking means between the switch-operating devices and the safety rail whereby these devices and the switch may be actuated by the movement of the train towards the point of the switch. Fig. 5 is a sectional elevation of the same, the plane of the section being on line 5—5, Fig. 4, certain parts being shown in a different position in dotted lines.

Referring now to these drawings, *a* indicates rails of the main line, and *b* the movable rail section constituting the switch, the ends of which are tapered in the usual manner for forming the switch-points indicated by *c*. These points are held properly spaced apart in the usual manner by a rod *d* which extends out to one side of the track to a switch stand *e*, which, as shown in the drawings, is of the well known Ramapo type and is provided with a lever *f* whereby it may be rotated to throw the switch-points.

The switch described, and the stand, are of ordinary and well known construction, the devices embodying the invention being operatively connected therewith, whereby it becomes impossible to accidentally leave the switch-points so set that a train running towards them, (that it to the right, as shown in the drawings) could run onto the siding or turn-out; and these devices comprise a safety rail *g* pivoted at *h* and located along inside one of the rails of the main track *a* in a position inclined thereto, the free end of said rail being that nearest the switch-point; said free end being turned, as at *j*, away from the rail. This free end of the rail is tapered to such a degree as will permit it to lie in contact with the main line rail for a portion of its length, as shown in Fig. 3.

Any train passing over the main line in either direction will cause the free end of this safety rail to swing out of its position of contact with the main line, as shown in Figs. 1 and 2, the flange of the wheel effecting this movement when the train is moving towards the switch-points, and the movement of the switch-points which are thrown by the engine of a train running onto the switch in the direction of the points *c*, serving to throw the safety-rail away from the main line rail.

The actual distance between the safety rail and the main line is somewhat exaggerated in the drawings for the sake of clearness.

The connections between the safety-rail and the switch stand *e* are made as follows: The rod *d* of the switch stand may be extended beyond the stand, (as shown in various figures of the drawing,) and connected with the devices illustrated in Figs. 4 and 5,

these devices consisting of a quadrant pivoted at *k* to a suitable support *m*, the quadrant having a swinging movement in a horizontal plane, the rod *d* being pivotally connected to one member thereof by the pin *o*. This quadrant consists of two members,—the segmental member *p* and the radial arm *q* being made in one piece, the other member being the swinging radial arm *r*,—both of these parts of the quadrant pivoting on the point *k* on which, when the member *r* is locked to the segment, the quadrant will swing as a whole, or on which the arm *r* may swing independently. This arm of cast or malleable iron has a boss *s* thereon in which, on a spindle *t*, is fixed a pinion *v* which engages with the teeth of a rack *w* on the segment *p*. On top of the boss *s* a lever *x* is pivotally hung in a rotatable head *y* in which the upper end of the spindle *t* is placed, and in the boss *s* is a locking-pin 3 for the segment *p*, the pin extending through a suitable hole in the latter which practically makes a one-piece quadrant of the parts *p*, *q*, and *r*. The lever *x* has a slot 4 therein which engages the upper end of the pin 3 which extends beyond the top of the boss and is provided with a head 5. The pin 3 has a spring 6, whereby it is normally pressed toward the hole in the segment which it is designed to enter. When the member *r* and the segment are locked together by the pin 3, as shown in Fig. 5, the segment may be released by raising the lever *x* to the position shown in dotted lines in Fig. 5, which will withdraw the pin from its engagement with the segment, and while so held in its elevated position, said lever *x* may be swung around to cause the pinion *v* engaging the rack *w* to swing the other two parts of the quadrant *p* and *q*, whereby a rod 7 attached to the latter may be moved endwise. During this rotative movement of the lever *x*, it becomes disengaged from the head of the pin 3, the lower end of which then rides on the surface of the segment *p* ready to snap into the hole provided for it when the segment is swung back to the position shown in Fig. 4. When such movement is imparted to the segment, to impart movement to the rod 7 in the direction of the arrow shown in Fig. 4, the spring 8 extending between said segment and the bar *d* will be distended and the tension of this spring is great enough, should the handle *x* be released, to return the segment *p* to the position shown in Fig. 4, and thus bring the safety-rail *g* into operative relation to the main track, whereupon the spring which actuates the pin 3 will shoot the latter into the hole provided therefor in the segment, thus locking the latter against further movement until the locking pin be again withdrawn, as described. The rod 7 is, through a suitable elbow-lever 9 and a rod 10, connected directly with the free point of the safety-rail *g*, the quadrant and rods 7 and 10 being close to the ground, the last named rod extending beneath the rails.

The switch-stand *e* above referred to, has a member, as 12 which is rotatable on a vertical axis by means of a lever *f*, as described, to give endwise movement to the rod *d*; and secured to this rotatable member is an arm 13 which when the parts are in the position shown in Fig. 1 (that is when the main line is clear,) extends over the end of the lever *x* or into such engagement therewith as will prevent this lever *x* from being swung upwardly, as shown in Fig. 5 in dotted lines.

In all cases, except when the switch-points *c* are to be thrown so as to direct a train running towards them onto the turn-out, the arm *r* forming part of the quadrant heretofore referred to, is locked to the segment *p*, the rod *d* of the switch proper being connected to the end of this arm *r* which extends beyond the segment *p*, as shown in Figs. 4 and 5. Therefore, if the lever *f* of the switch stand be grasped and the latter rotated from the position shown in Fig. 1 to that shown in Fig. 3 the endwise movement of the rod *d* towards the switch-point will swing the quadrant to the position shown in said Fig. 3 and through the rods 7 and 10 bring the safety rail *g* up into contact with the main line rail: And if the switch should thus accidentally be left set for the turn-out, any train approaching said switch from the left would first actuate the safety rail *g* which would immediately throw the switch-points in the opposite direction, giving a clear main track. If any train approaches the switch from the opposite direction that is to say running toward the left,—the flanges of the wheels would throw the switch-points in the well known manner to the position shown in Fig. 1 thus likewise providing for the safe passing of the train thereover, this action of the switch serving at the same time to throw the safety-rail away from the main line rail before the train would reach it. When it is desired, however, that a train approaching the switch from the left should take the turn-out or siding, the switch is first operated by the lever *f* to shift the switch-points *c* from the position shown in Fig. 1 to that shown in Fig. 2. This movement unlocks the lever *x* on the quadrant by the swinging of the arm 13 out of engagement therewith, and said lever *x* is then lifted to disengage the pin 3 from the quadrant and swung around to cause the parts *p* and *q* of the quadrant, by means of the rack and pinion, to move independently of the member *r*, and thus actuate the rods 7 and 10 to throw the safety-rail out of contact with the main line; and during the switching operation, this rail must be held out of contact by the switchman who holds onto the lever *x* during the passage of the train past the safety-rail; or, if the safety-

rail be longer than the distance between two trucks of a car, the lever x may be released by the switchman as soon as a car of the train is in position to hold the safety-rail g in the position shown in Figs. 1 and 2. Then, as soon as the train has passed, the spring 8 will return the safety-rail to the position shown in Fig. 3, thus shifting the switch-points also to the same position shown in that figure, and notwithstanding that the switch is set to throw the train onto a siding, it cannot do so owing to the fact that the safety-rail is in operable position in contact with the main line, and the switch is thus guarded automatically until the switchman again throws the switch-points back to the position shown in Fig. 1 which act will (through the fact that the arm x has again automatically become locked to the segmental member p,) throw the safety-rail away from the main line leaving the parts again in the position shown in Fig. 1, which is their normal position.

It is of course well understood that the type of switch shown and described herein is regarded as perfectly safe under all conditions, for a train running over it in the direction of the points c or "trailing points" as it is termed, for, if this type of switch be set wrong, (or, as shown in Fig. 3 for a train running in this direction,) the flange of the wheels will force the points over against the main line in time to give the train a clear track; but it is only when it becomes necessary to place these switches in which the points face the train that they become dangerous and it is to guard switches which must unavoidably be placed in this position that this invention is designed: And from the foregoing description, it has been shown that it is necessary to positively hold the safety rail out of operative relation to the main line to make it possible for a train to take the switch which will send it onto the siding or turn-out.

If the switch be left set in the wrong position, as shown in Fig. 3, the action of the safety-rail will throw the switch to a position of safety before the train reaches it, and when the switch has, as in Fig. 1, been properly set to give a clear main line, the safety-rail is then held out of contact with the main line and the switch cannot be operated thereby.

For the purpose of preventing the segmental part of the quadrant from being thrown too far, the end thereof is provided with a pin 14 which will come in contact in the side of the member r, when the segment has been swung, to throw the rail g away from the main line, as in Fig. 2.

To provide for the protection of the working parts of the device against ice accumulations thereon, a plate 15 (the outline of which is shown in dotted lines in Fig. 5,) is fitted pivotally to the standard or support m and the member r of the quadrant, this plate being shown in side elevation and partly in section in Fig. 5, and in the various plan views in full lines.

What I claim is:

1. The combination with a facing point switch and stand, of a safety rail located in operative relation to the main line track and capable of actuation by a train moving against the points of the switch, and connections between said safety-rail and switch stand, whereby when the switch is set to run the train on a side track, the safety rail will be moved into position to throw the switch back again to a position to give a clear main track, together with means to move the safety rail out of operative position while the switch is set for the side track.

2. The combination with a facing point switch and switch stand, of a train-actuated safety-rail pivotally supported near the main line rail, the free end being movable into and out of operative position relative to said main line, and connections extending from the switch stand to the free end of the safety-rail, and including means whereby the movement of the switch-stand to provide a clear main line will move the safety rail out of operative position, and vice versa, and a device to move the safety rail into inoperative position independently of the switch, and means to automatically lock the moving device for the safety-rail by the movement of the switch which provides a clear main line.

3. The combination with a facing point switch and switch-stand, of a safety rail located in operative relation to the main line, connections between the switch and switch-stand, and between the latter and the safety-rail and comprising a quadrant, one arm of which is movable relative to the other, said switch connections being connected to one of said arms and the safety-rail to the other, whereby the rail or the switch may be actuated independently; and a locking device for the arms of the quadrant whereby both safety-rail and switch may be actuated together by the actuation of the switch-stand.

4. The combination with a facing point switch and switch-stand and a safety-rail located in operative relation to the main line, of connections extending from the switch-stand to the switch and from the switch-stand to the safety-rail, said connections comprising a quadrant or elbow-lever, each arm of which is movable independently, and means to lock the arms together to move as one, and a spring associated with the connections extending to the safety-rail whereby when said rail is actuated to move it out of operative relation to the main line rail, it may be automatically returned to operative position.

5. The combination with a facing point

switch and switch-stand, and a safety-rail located in operative relation to the main line rail, of a quadrant, the arms of which are movable relative to each other, the arc of the quadrant being supported on one of said arms, and said arc having gear teeth thereon; a pinion supported on the other arm to mesh with said teeth, and means to rotate the pinion to vary the angle of said arms; connections extending from one arm of the quadrant to the safety-rail and other connections extending from the other arm to the switch-stand, together with means to lock the arms together whereby the quadrant may be moved as one piece by the actuation of the safety-rail, or the actuation of the switch-stand.

6. The combination with the main line rails, of a facing point switch whose normal position provides a clear main line, and a safety rail operatively located near a rail of the main line and the normal position of which is out of operative relation to said main line; connections extending from the switch to the safety-rail and comprising means whereby when the switch is set for a siding the safety-rail is swung into operative position relative to the main line, together with means included in said connections whereby when the switch is set for the siding, the safety-rail may be moved independently out of operative position.

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Witnesses:
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