(No Model.)

3 Sheets—Sheet 1.

J. I. VERNON.

RAILWAY SWITCH.

No. 522,568. Patented July 3, 1894.

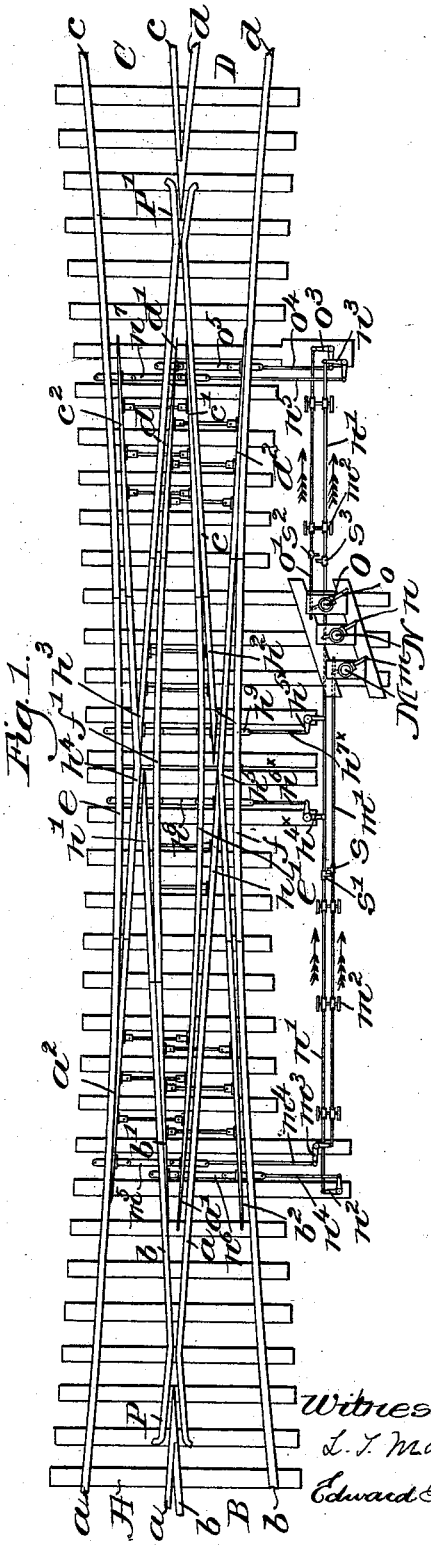

Fig. 1.

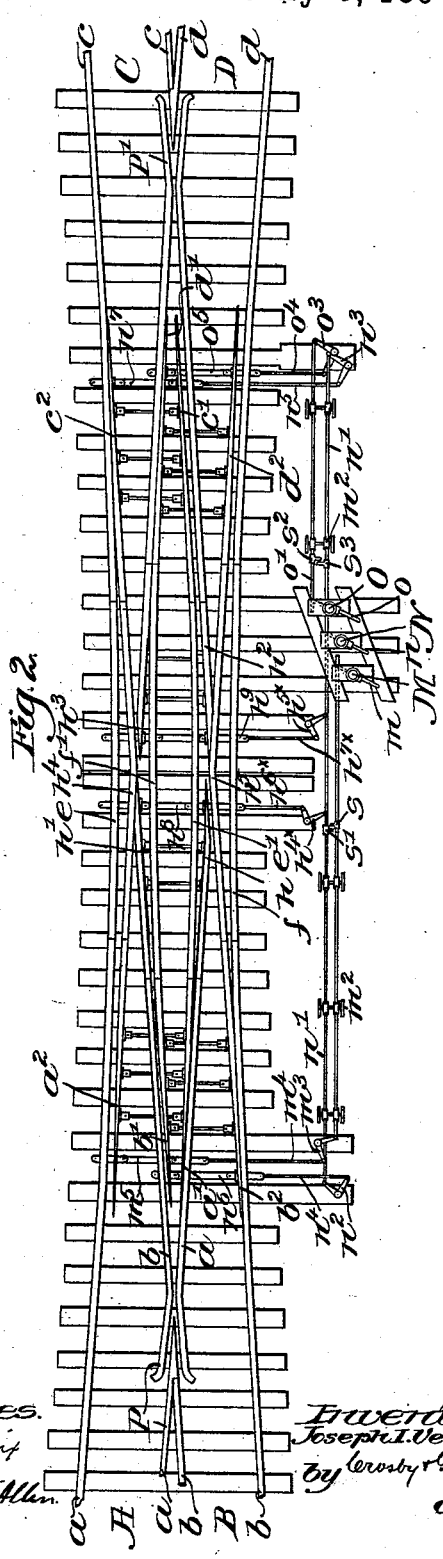

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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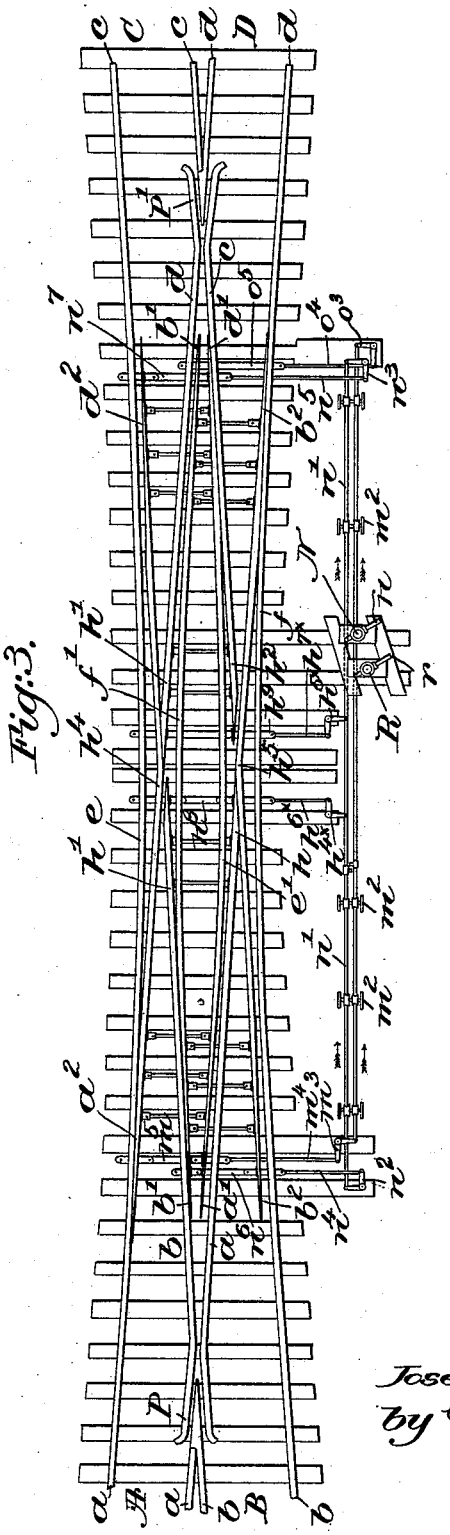
Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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RAILWAY SWITCH.

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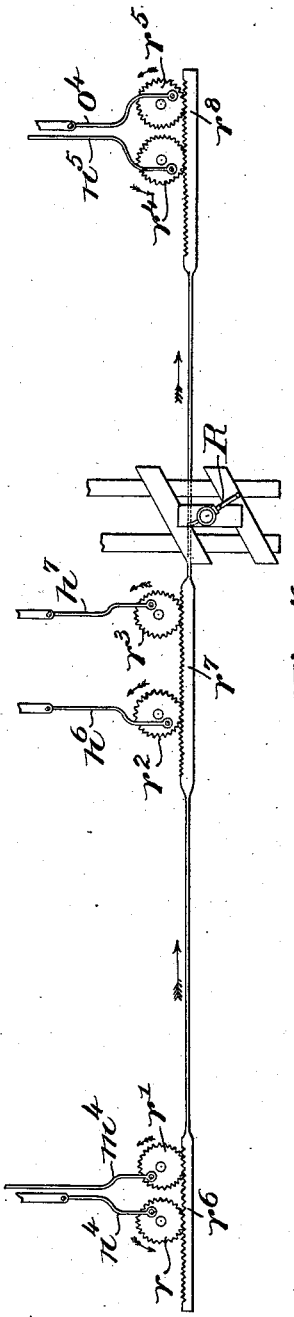

Fig. 4.

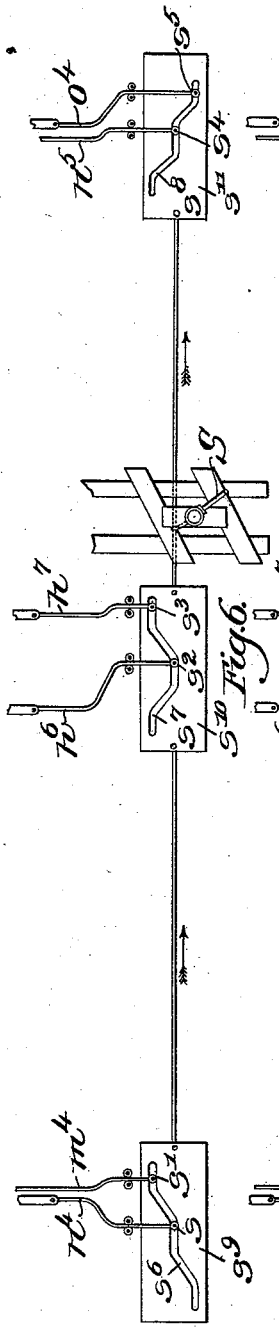

Fig. 5.

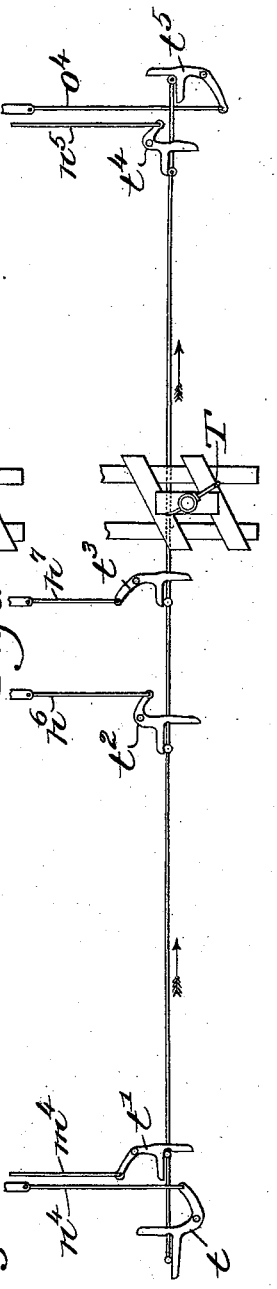

Fig. 6.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOSEPH I. VERNON, OF MANSFIELD, ASSIGNOR OF ONE-HALF TO WILLIAM F. ELLIS, OF SOMERVILLE, MASSACHUSETTS.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 522,568, dated July 3, 1894.

Application filed January 2, 1894. Serial No. 495,420. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH I. VERNON, of Mansfield, county of Bristol, State of Massachusetts, have invented an Improvement in Railway-Switches, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention in railway switches has especial reference to crossings fitted with movable point frogs and slips.

Prior to this invention in crossings of this kind, it has been customary to employ independent switch levers for operating or throwing the frog points and the slip points, thereby making it possible to throw the slip points without throwing the frog points, or vice versa. The fact that the slip points could be moved without also moving the frog points into corresponding proper position, has been found such an element of danger that the movable frog points have been frequently removed and the old type of frog substituted therefor.

The object of this present invention is to so improve the construction of switches of the above class as to render it practically impossible to have the frog points in a wrong position with relation to the slip points. This is accomplished by so interlocking the switch actuating levers or their connections as to compel the several points to be moved in certain predetermined order which insures the safety of trains operated over the crossing.

The preferred construction of apparatus, together with the operation of the same, will be hereinafter more particularly set forth in the specification and the essential features of the invention pointed out in the claims.

Figure 1 of the drawings represent in diagram a preferred embodiment of my invention as used for main line work, the same employing three switch operating levers; Fig. 2, a similar view showing the points thrown into other positions; and Figs. 3, 4, 5 and 6, diagrams showing modified forms of my invention.

Referring to the drawings, *a*, *a*, *b*, *b*, *c*, *c*, and *d*, *d*, are the fixed rails of two crossing tracks, which will be hereinafter referred to as the tracks A—B and C—D, the track A—D in Figs. 1 and 2, being the main or principal line. The outer track rails *a*, *c* and *b*, *d*, are joined respectively by the curved slip rails *e* and *f*, while the inner track rails *a*, *c* and *b*, *d*, are joined respectively by the slip rails *e'* and *f'*, as shown. The inner slip rail *e'* terminates at its opposite ends in the movable slip points *a'* and *c'*, co-operating with the inner track rails *a*, *c*, and the inner slip rail *f'* terminates at its opposite ends in the movable slip points *b'* and *d'*, co-operating with the fixed track rails *b* and *d*. The inner track rails *a*, *b*, *c*, *d*, terminate respectively at their ends adjacent the crossing points or frogs, in the movable frog points *h*, *h'*, h^2 and h^3, the points *h'* and h^3 co-operating with the fixed or stock frog rail h^4, while the points *h* and h^2 co-operate with the fixed or stock rail h^5, as shown. The stock rail h^4 terminates at its opposite ends in the movable slip points a^2 and c^2, co-operating with the track rails *a* and *c*, and the stock rail h^5 terminates at its opposite ends in the movable slip points b^2 and d^2, co-operating with the track rails *b* and *d*.

M, N and O represent three switch stands of suitable or usual type or construction, the same being provided respectively with switch operating levers *m*, *n* and *o*.

The lever *m* in the embodiment of my invention shown in Figs. 1 and 2, is connected with and to reciprocate the reach rod *m'* mounted to move longitudinally in usual roller or other standards m^2, said rod *m'* at its outer end being jointed to the bell crank m^3 connected by means of the switch rod m^4 with the tie bar m^5 joining the slip points *a'* and a^2.

The switch lever *o* Figs. 1 and 2 is connected with and to reciprocate the reach rod *o'* mounted to reciprocate in suitable standards m^2 and is jointed at its outer end to the bell crank o^3 in turn jointed to the switch rod o^4 connected with the tie bar o^5 joining the slip points *d'* and d^2.

The middle switch lever *n*, as shown in Figs. 1 and 2, and preferably, is jointed to the long reach rod *n'* at a point between the ends of the latter, as shown, said rod *n'* at its opposite ends being jointed respectively to the bell cranks n^2 and n^3, in turn connected by switch rods n^4, n^5, with the tie bars n^6, n^7, joining respectively the slip points *b'* and b^2, and *c'* and c^2.

In the embodiment of my invention Figs. 1 and 2, I also connect the frog points with and

to be moved by the reach rod n' and switch lever n, and, referring to the drawings, in the preferred construction the said rod n' between its ends is jointed to the bell cranks $h^{4\times}$, $h^{5\times}$, in turn connected by the switch rods $h^{6\times}$, $h^{7\times}$, with the tie bars h^8, h^9, joining respectively the frog points h, h', and h^2, h^3.

P and P′ are usual stationary frogs at the crossings of the rails a b and c d.

To compel proper movements of the several switch levers, I have interlocked the same, the said levers in Figs. 1 and 2, being so interlocked as to compel movements of the levers m and o in advance of the lever n when the points are moved from their positions Fig. 1, completing the main and principal line, and to compel movement of the lever n in advance of the levers m and o when the points are in the position Fig. 2, completing the other or crossing line.

Any desired locking devices may be employed, either in connection with the levers themselves, or the connections of the levers, the locking devices, as herein shown, consisting of lugs s and s' on the reach rods m' and n', and the lugs s^2 and s^3 on the rods o' and n'.

Referring, now, to Fig. 1, it will be seen that the several points are in position for the main or principal line A—D, the crossing track B being thrown upon the slip f, f', and the track C upon the slip e, e'. To throw the points into position Fig. 2 for the track B—C, it is first necessary to throw the switch levers m and o to the left to thereby move the slip points a', a^2, and d', d^2, into position Fig. 2, turning the tracks A and D onto the slips as shown, so that any train entering the crossing over either of these tracks before the frog points have been turned, will not be overturned by the said frog points, but will be directed over the slips upon the tracks C or B. After the levers m and o have been turned, then and not till then can the lever n be turned, turning of the latter throwing the slip points b', b^2, c', c^3, and all four of the frog points into position Fig. 2, completing the track B—C. To move the points back again into position Fig. 1, completing the principal line A—D, the lever n must first be turned back into its position Fig. 1, reversing the frog points and throwing the slip points b', b^2, and c', c^2, into their positions Fig. 1, directed upon the slips e, e', and f, f', so that any trains entering over the tracks B or C will be directed upon the slips, the still unmoved points a' and d' yielding in usual manner sufficiently to permit the trains to pass onto the tracks A and D in safety. The tracks A and D, however, are still protected by the points a', a^2, and d', d^2, still remaining turned upon the slips. After the lever n has been returned to its position Fig. 1, then and not till then can the levers m and o be returned to their positions Fig. 1, moving the slip points a', a^2, and d', and d^2, also into position Fig. 1, completing the main line A—D.

It will thus be seen that the main line A—D is always protected for trains in either direction by the slips.

It will be seen that the frog points can never be moved in advance of the slip points when such an advance movement would disarrange the track and render trains liable to derailment.

While I prefer to group the switch levers as shown, at a convenient point, and to interlock them in the manner shown, yet it is evident the switch actuating levers may be placed in any desired positions or locations and interlocked in any desired manner other than that herein shown if found necessary to meet varying requirements.

In Figs. 1 and 2, it will be noticed that the slip points a' and a^2, and d' and d^2 in the main line are operated by independent levers, and that the points b' and b^2, c' and c^2 are coupled with and operated at the same time as the frog points. I prefer this arrangement when the switch is introduced into a main line for the reason that it is desirable to have both pairs of points in the main line move independently of each other, and of the frog points, in order that their movements may not be hindered or obstructed by any accident to the frog points or their connections. The crossing or branch track B—C, however, being of less importance, may have its slip points connected with and moved at the same time as the frog points to save time in changing the switch.

When the crossing is located in a yard where one line is used as much as another, I may connect the points a', a^2, and d', d^2, with a single lever, as for instance, a lever r in a stand R, see Fig. 3, so that they will be thrown in unison, two levers being then required instead of three as in Figs. 1 and 2.

If desired, the points b' and b^2 and c' and c^2, may be operated by independent levers instead of by a common lever, as shown, they being, however, suitably locked with relation to the other points to insure safety in operation.

In Figs. 4, 5, and 6, I have shown my invention adapted for use in connection with a single actuating lever, all of which embody connections and modes of operation well known and common in switch constructions.

In Fig. 4, the switch rods n^4, m^4, h^6, h^7, n^5, and o^4 are connected respectively to crank pins on the pinions r, r', r^2, r^3, r^4, r^5, the pinions r and r' in mesh with the rack r^6, the pinions r^2, r^3, in mesh with the rack r^7, and the pinions r^4, r^5, in mesh with the rack r^8.

The several racks are connected as shown to be moved in unison by the single actuating lever R, which has two throws to the left from its position Fig. 4, each throw being through an angle of forty-five degrees more or less.

The crank pins on the respective pinions are so positioned that the first quarter throw of the lever R, moves the rods m^4 and o^4, but the crank pins of the other rods simply move past their dead centers without appreciably

moving their respective rods. The second throw of the lever R, moves the rods n^4, h^6, h^7 and n^5, but does not move the rods m^4 and o^4, the latter now moving past their respective dead centers.

In Fig. 5, I have shown the several switch rods n^4, m^4, h^6, h^7, n^5 and o^4, provided respectively with the roll studs s, s', s^2, s^3, s^4, s^5, moving in cam grooves s^6, s^7, and s^8, as shown, in the cam plates s^9, s^{10} and s^{11}. The several cam plates are connected to be moved in unison by the lever S, successive throws of which produce through the cam grooves, precisely the same movements as the mechanism Fig. 4.

In Fig. 6, the rods n^4, m^4, h^6, h^7, n^5 and o^4, are connected respectively with the crocodile-jaw levers t, t', t^2, t^3, t^4, t^5, connected to be moved in unison by the lever T operation of which produces precisely the same movements of the points as in Figs. 4 and 5.

All these modifications involve movements well known and understood by those conversant with switch construction and need not therefore be herein further described in detail.

This invention is not restricted to the particular construction or arrangement of devices herein shown and described, for it is evident the same may be varied and still come within the spirit and scope of the invention and accomplish the desired end.

Referring to Fig. 1, it is necessary that the slip points in line A—D be moved to turn said line onto the slips before the frog points are turned, and interlocking devices are provided for this purpose. But if the interlocking devices are such as in Fig. 1 to compel movements of the slip points in line A—D first and the frog points last, then the same interlocking devices must necessarily in Fig. 2 compel return movement of the frogs in advance of return movement of the slip points in said line A—D. On the other hand, it must not be possible to return the frog points from their position Fig. 2 to position Fig. 1, without at the same time moving the slip points in the line B—C also back into their position Fig. 1, to protect said line B—C, and it is therefore necessary to connect the slip points in the line B—C with the frog points so that the slip points are moved whenever the frog points are moved, leaving the slip points in the line A—D movable indpendently of the slip points in the line B—C and the frog points. Of course this arrangement may be exactly reversed and the slip points in the line A—D connected with the frog points and the slip points in the line B—C operated independently.

The gist of my invention therefore consists in connecting two sets of slip points in the same line and at opposite sides the frog points with and to be operated at the same time as the said frog points whenever the latter are moved, and providing such mechanism as shall permit the two sets of slip points in the other line to be operated independently of the first mentioned slip and the frog points, and so interlocking the several points either by means of separate interlocking devices or by means of the switch throwing devices themselves as shall compel the several points to be moved in the manner set forth in the specification, so that it shall be impossible to have the frog points in a wrong position with relation to the slip points.

The term "interlocking devices" as used in the claims includes interlocking devices independent of the mechanism for actually moving the switch points, or such a construction of switch point operating mechanism as shall in itself constitute an interlocking mechanism to compel movement of the points in the manner described.

I claim—

1. In a railway switch, two lines of fixed track rails crossing each other, movable point frogs at the crossing points of said lines of track, slip rails connecting said two lines of fixed track rails, two sets of slip points in one of said lines of track and located at opposite sides said point frogs, connections between said point frogs and said slip points to insure the movement of one with the other, means for moving the same, combined with two independent sets of slip points in the other line of track and located at opposite sides the said point frogs, means to operate said last named slip points independently of said first named slip points and of their connected point frogs, and interlocking devices to operate therewith, substantially as described.

2. Fixed track and slip rails, the former arranged to constitute two lines of track crossing each other; movable frog points at the crossing points of the two lines; four sets of slip points two in each set; independent levers to operate two of said sets in the same line at opposite sides of said frog points, means to move the other two sets of slip points and also said frog points, and interlocking devices, to operate, substantially as described.

3. Fixed track and slip rails, the former arranged to constitute two lines of track, one crossing the other, movable frog points; slip points arranged in four sets of two each, two sets in each line of track at opposite sides of said frog points, a single switch operating lever connected with and to operate said frog points and two sets of slip points in the same line of track; independent actuating levers connected with and to operate each of the remaining sets of slip points; and interlocking devices, to operate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH I. VERNON.

Witnesses:
AUGUSTA E. DEAN,
FREDERICK L. EMERY.