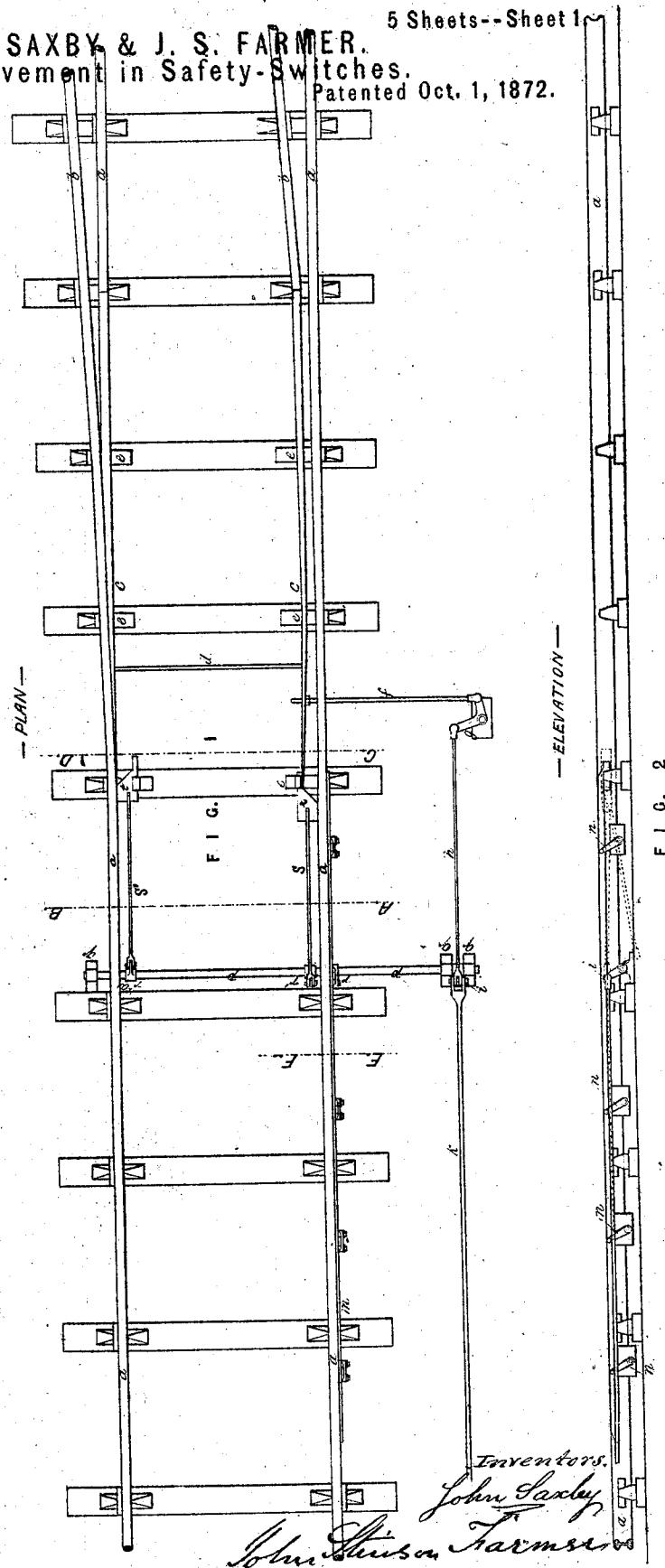
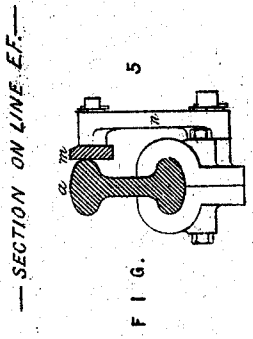
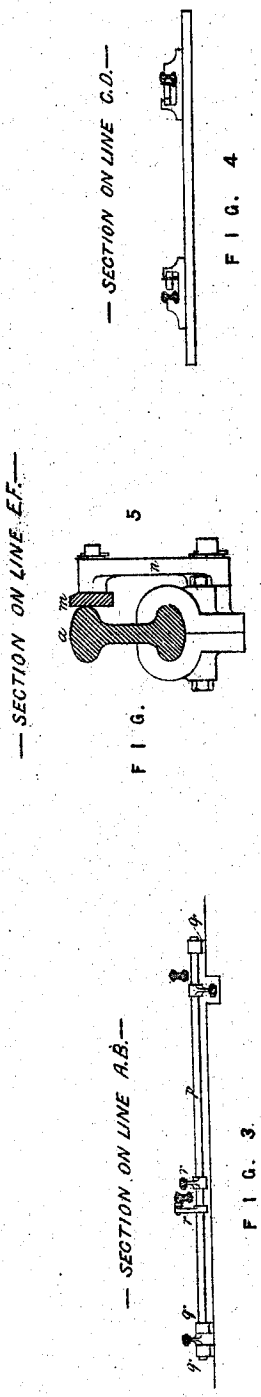


5 Sheets--Sheet 1

J. SAXBY & J. S. FARMER.
Improvement in Safety-Switches.
 No. 131,788. Patented Oct. 1, 1872.

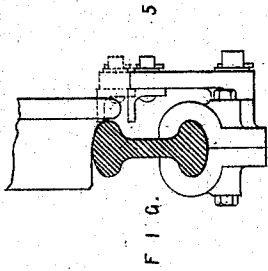


Witnesses.
 William Smith
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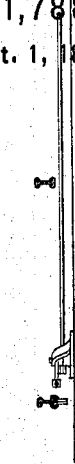
Inventors.
 John Saxby
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J. SAXBY & J. S. FARMER.
 Safety-Switches.
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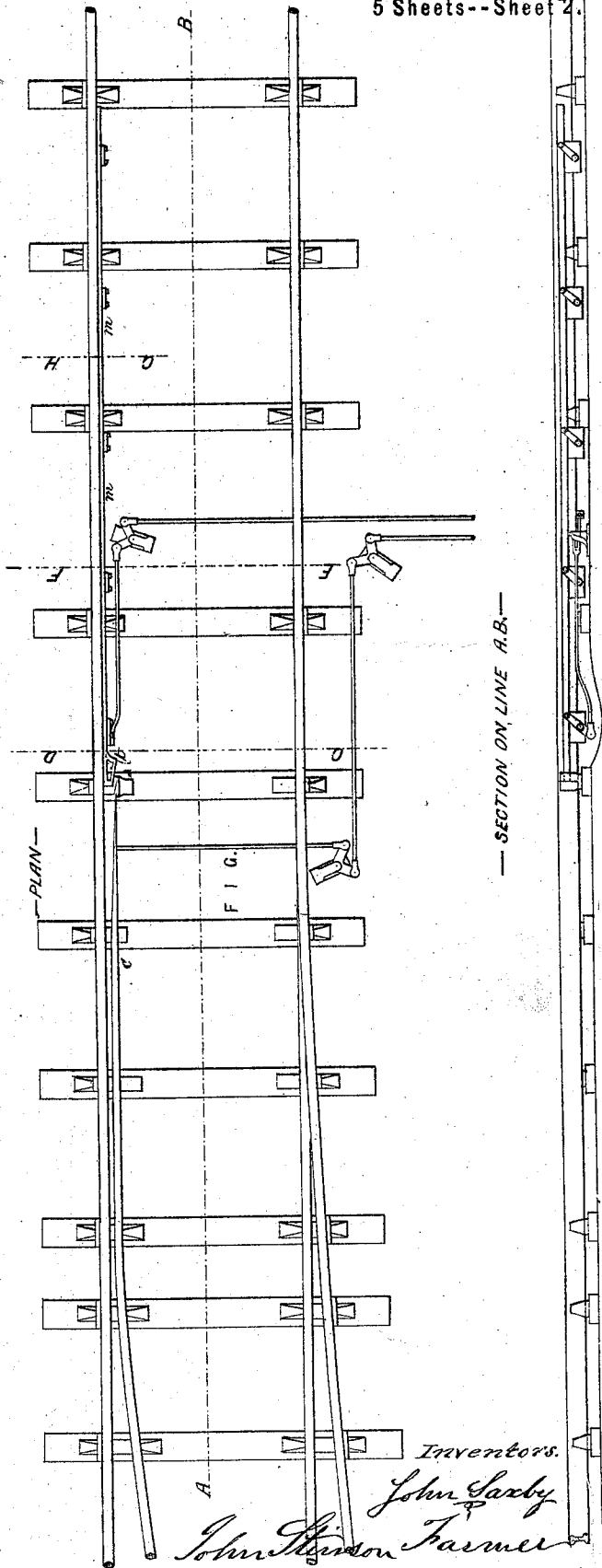
SECTION ON LINE G.H.



SECTION ON LINE E.F.



SECTION ON LINE C.D.



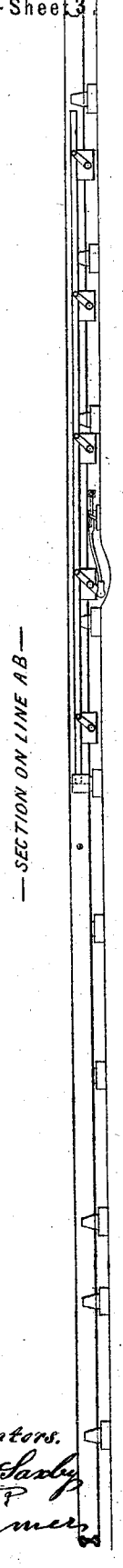
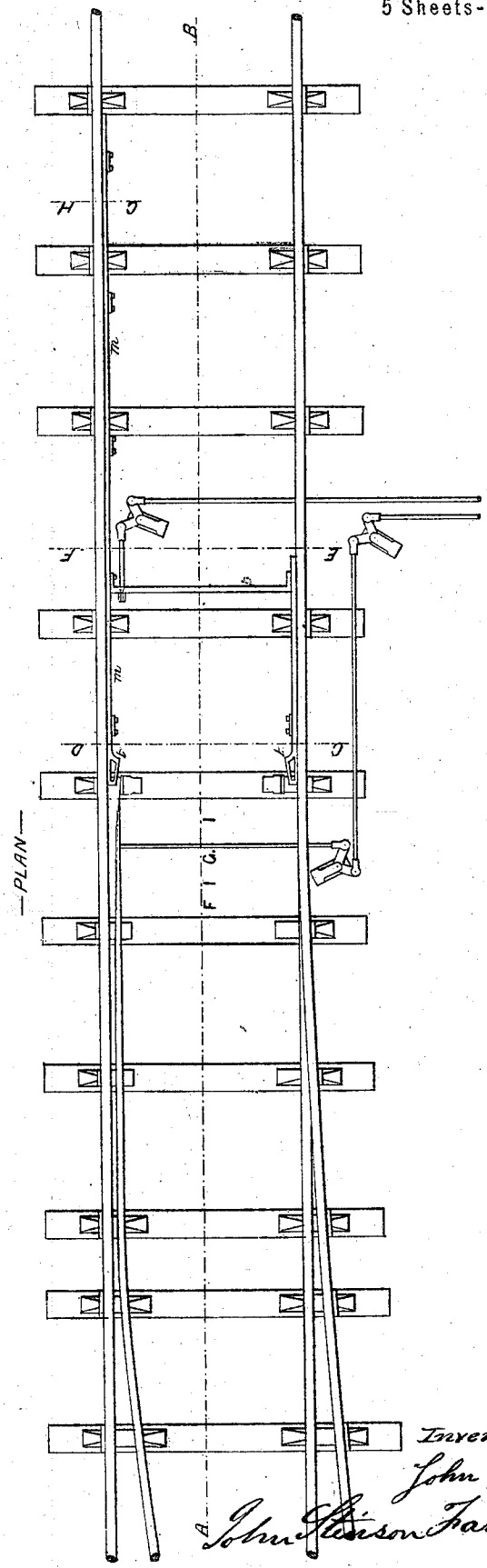
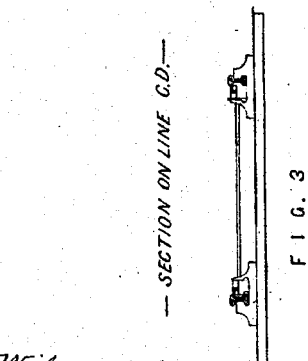
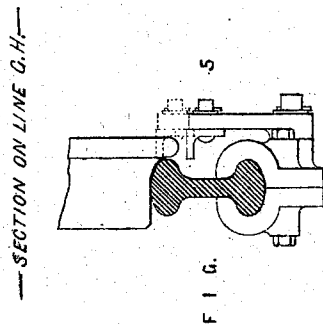
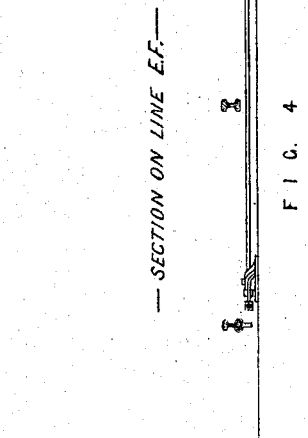
SECTION ON LINE A.B.



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Safety-Switches.
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SECTION ON LINE E.F.



FIG. 4

SECTION ON LINE G.H.

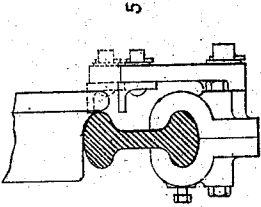


FIG. 5

SECTION ON LINE C.D.



FIG. 3

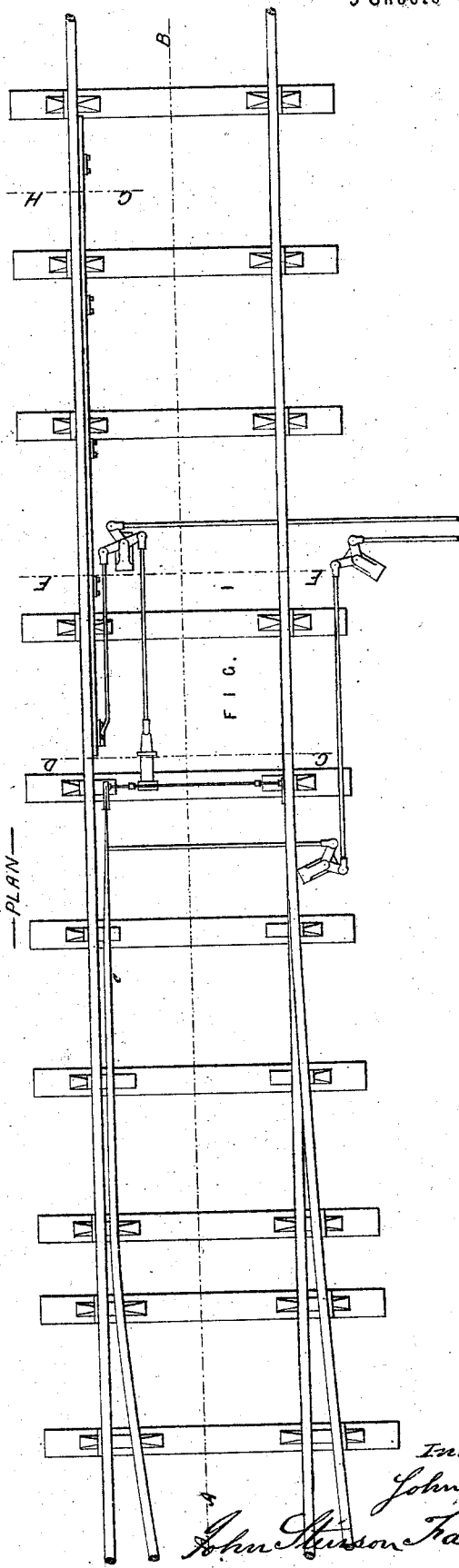


FIG. 1

SECTION ON LINE A.B.

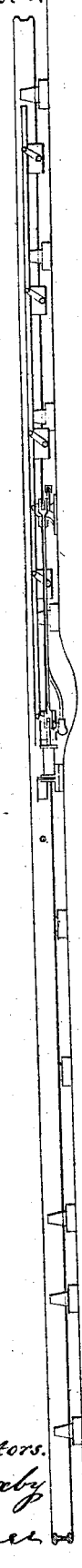


FIG. 2

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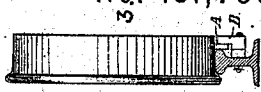


FIG. 3.

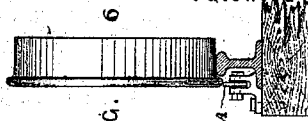


FIG. 6.

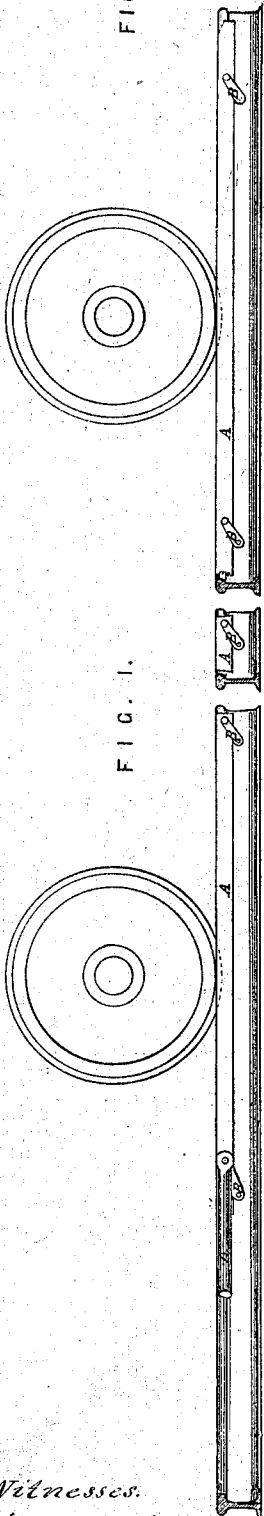


FIG. 1.

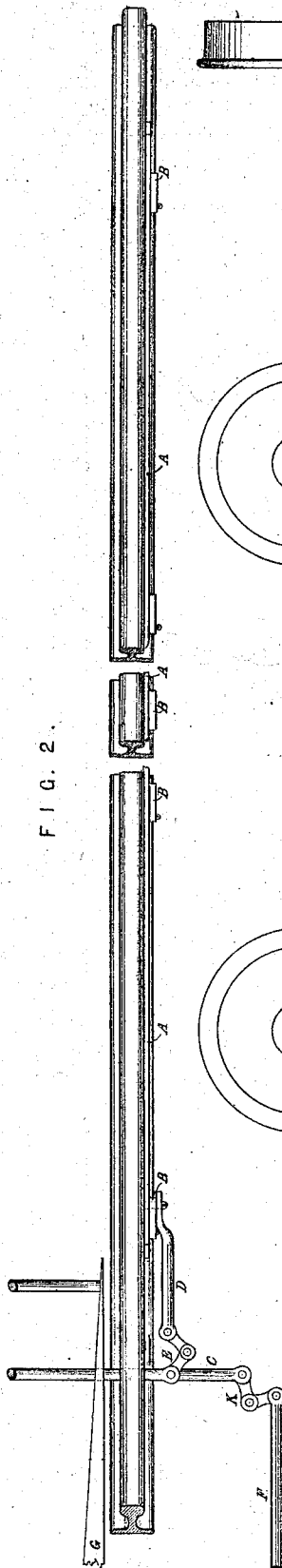


FIG. 2.

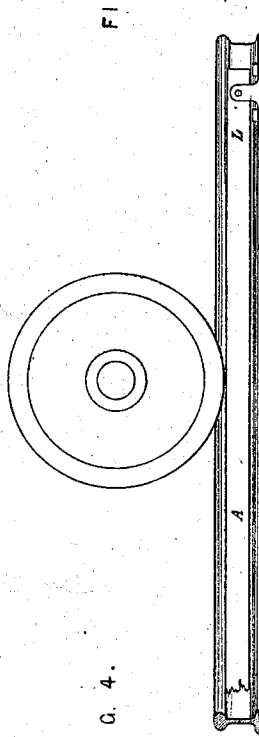


FIG. 4.

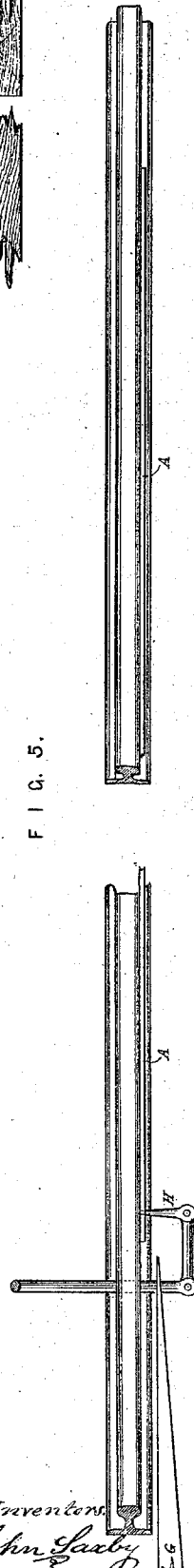


FIG. 5.

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UNITED STATES PATENT OFFICE.

JOHN SAXBY AND JOHN STINSON FARMER, OF KILBURN, NEAR LONDON,
ENGLAND.

IMPROVEMENT IN SAFETY-SWITCHES.

Specification forming part of Letters Patent No. 131,788, dated October 1, 1872.

To all whom it may concern:

Be it known that we, JOHN SAXBY and JOHN STINSON FARMER, of Kilburn, near London, England, have invented certain Improvements in Signal and Switch Apparatus, and apparatus for working and locking or securing railway points and signals, of which the following is a specification:

Nature and Objects of the Invention.

Our invention is an improvement in switching apparatus, designed for preventing certain accidents that occur at the points or junction of one line of rails with another. Sometimes, owing to expansion or contraction of rods, looseness of joints, or other causes, the shifting points of the rails do not receive the necessary amount of movement from the lever that works them, and thus when that lever is pulled over to its full extent it happens that the points are not brought home to the rails, and that the flanges of wheels which have to pass the points catch on them or between them and the rails. In such a case, notwithstanding that the signals may be connected by locking apparatus to the point-levers, a safety-signal may be given even when the points are in an unsafe condition. Again, it may happen that while a train is passing over the points, these points may be shifted intentionally or inadvertently, and thus part of a train may be guided onto one line and part onto another, tearing the train asunder and throwing the carriages off the line. Now, our apparatus, constructed as hereinafter described, will move the points against the rails and hold them there securely during the passage of a train; also prevent a signal from being given for either line unless the points are properly set for that line and properly secured. Should a train approach the points before they are brought home to their proper position the approach of that train is made to bring the points home and secure them in position before the front wheels of the train reach the points. The invention consists in the combination of blocks having inclined or wedge-shaped sides, with rock-shaft and connecting-rods for moving and locking the jointed or switch rails, and in the arrangement of a bar pivoted to the side of one of the rails, for locking the switch rails or

points during the passage of a train, all as hereinafter described.

Description of Sheets 1, 2, 3, and 4.

In the accompanying four sheets of drawing, we have illustrated our present invention, and therein and thereby shown its application under different circumstances, and such modifications in the details thereof, as under ordinary circumstances, render it applicable to ordinary junctions or at the crossings of or connection of one pair of rails with another pair of rails.

In Sheet 1, Figure 1 is a plan view, and Fig. 2 an elevation, of Fig. 1, showing a main line and crossing to a branch line, to which our invention is applied, and which is thereon shown; and for the purpose of making more clear the mechanical arrangements and disposition of the parts of the apparatus, we have shown in Fig. 3 a sectional view taken on the line A B of Fig. 1, and by Fig. 4 a section taken on the line C D of Fig. 1; and furthermore by Fig. 5, in which a section taken on the line E F of Fig. 1 is shown, by which, together with the other Figs. 1, 2, and 3, it will be seen that the reciprocating bar or rail mounted on radiuses is placed outside one of the rails, so that when it is in an elevated or raised position the treads of the wheel-tires of the passing train would act upon it, and cause it to operate upon and completely close and secure the points into one position or the other, in accordance with the prearrangement and disposition thereof; and until the last wheels of the train have passed over the reciprocating bar it is prevented from rising and the position of the points cannot be changed.

In Sheet 2, Fig. 1 is a plan view, and Fig. 2, a longitudinal section taken on the line A B of Fig. 1; Fig. 3 is a section taken on the line C D of Fig. 1; Fig. 4 is a section taken on the line E F of Fig. 1; and Fig. 5 is a section taken on an enlarged scale (of six times that of Fig. 1) on the line G H. It will be seen that in this sheet the reciprocating bar is placed inside of the rail, so that the flanges of the wheels of the passing train act upon it and (if not completely depressed) cause it to act upon and completely and firmly secure the points in the

position properly assigned to them for the safe transit of the train—that is, after the point-lever has been moved over for the purpose of changing the position of the points and directing the movement of the train in manner before described.

In Sheet 3, Fig. 1 is a plan view; Fig. 2, a longitudinal section of Fig. 1 taken on the line A B thereof; Fig. 3 is a section taken on the line C D of Fig. 1; Fig. 4 is a section taken on the line E F of Fig. 1; and Fig. 5 is an enlarged sectional view taken on the line G H of Fig. 1, in which, as in Sheet 2, the reciprocating bar or rail is placed inside of the main rail, and if it be not completely depressed it will be operated upon by the flanges of the wheels of the trains, and the points, after they have been moved over by the hand-lever, will be bolted or wedged firmly, and secured against the face of the permanent rail. Thus, unless the movement of the point-lever has completely opened or closed the points and completed the movement of the reciprocating bar, wedging and locking the points firmly in their proper positions, the signal for the passage of the train connected or interlocking therewith cannot possibly be given.

In Sheet 4, Fig. 1 is, as before, a plan view; Fig. 2, a longitudinal section of Fig. 1 taken on the line A B; Fig. 3, a section taken on the line C D; Fig. 4, a section on the line E F; and Fig. 5, a sectional view to an enlarged scale, taken on the line G H, the reciprocating bar being, as in the sheets 2 and 3, shown as fitted on the inside of the rail for the purpose of being acted upon and held down or controlled by the flanges of the wheels instead of by the treads of the wheel-tires, as in Sheet 1.

In Sheets 1, 2, and 3, the plan views, (Fig. 1 in each case,) show the points so adjusted as to leave them right for the train passing along the main line, the upper surface of the reciprocating bar being in such case shown below the horizontal level to which it could be depressed by the passing train, and in which position the bolt or bolts, wedge or wedges, employed for securing in the opened or closed position (as the case may be) the point or tongue of the switch, are there shown as effecting that object.

In Sheet 1, *a, a* &c., are the rails of the main line, and *b b*, &c., are the rails of the branch line; *c c*, &c., are the pieces of taper rails or switch points hinged or jointed at their broad ends, respectively, or working on pivots abutting upon the ends of the permanent rails in the usual manner. These two taper pieces of rail are secured together at the requisite gage or distance apart by means of a bar or stay piece, *d*. The switch-points *c c*, are caused to move back and forth upon bearing-chairs through or by means of a rod, bell-crank, and lever, or any of the well-known mechanical contrivances, in the ordinary way. The point-lever, which may be in the signal-box or elsewhere, is connected to and with the points, through the rods *h* and *k*, which are

jointed or connected together at *i*, the bell-crank *g* being employed to change the direction of motion or movement, as shown, and the rod *f* is connected at one end to the bell-crank, and at the other end to the points. On the outside of the rail the reciprocating-bar *m* is shown with the radial links *n n* connected to the rail. These are shown in the depressed position or the position in which they are at rest or out of action. The mode of mounting or fitting and applying the reciprocating bar and the connecting-links to the side of the fixed rail, is shown to an enlarged scale in Fig. 5. Between the jointed ends of the rods *k* and *h*, connecting the point-lever with the points, is shown a short lever-arm fitted upon the end of a vibrating shaft, *p p*, which extends across the road from the line of the rods *k h* on to the six-foot space. This vibrating shaft *p* is carried in bearings *q q*, and it has keyed or otherwise fixed upon it three other short vibrating arms or levers, *r r¹ r²*, the arm *r* being connected to the reciprocating bar *m*. When the arm *r¹* operates by means of a rod, *s*, the traversing wedge piece *t* and *r²* is, by means of the rod *s'*, connected with or to the traversing-wedge *t'*; thus the wedge piece *t'* is employed for firmly securing in position the points for the main-line traffic, and the wedge piece *t* is employed for firmly securing the points in the proper position for turning the train off from the main line on the branch line; but though the two wedge pieces are in this case moved by or through the movements of the same rod as that by which the points are moved from one position to another, the actual wedging up of the tongue of the switch against the inside of the fixed or permanent rail, does not take place until the points have been moved over as far as the lever-action will carry them, or until after the points have been moved from one position into the other, by means of the point-lever, wherever it may be placed and worked from.

In Sheet 1 two wedges, *t t'*, are shown as being connected to and worked by means of reversed lever-arms fitted upon the shaft *p p*, so that as the one wedge piece is moved forward the other wedge piece is correspondingly withdrawn, and vice versa; and while the wedging up of one tongue or point against the permanent rail is effected by the one traversing-wedge piece, the opening between the point and the side or face of the other wedge piece or block working against the inner face of the other rail, leaves sufficient space for the movement of the other tongue or point to be moved or opened to the full extent.

In Sheet 2 one wedge only is shown, and it is formed on or securely connected to one end of the reciprocating bar *m*, and this wedge piece *t* alternately operates upon each side of one of the tongues or points *c*. It is shown on the plan view, Fig. 1, clear of the points, and when it is brought into action by the movement of the lever connected to it, it

wedges the points close home to the rail for the branch or main lines. In this instance the reciprocating bar is fitted on the inner face of the rail. The rods and connection for working the points and those for operating the wedge piece may be worked from any convenient position, and in this arrangement or modification, as in that shown in Sheet 1, the interlocking gear or apparatus may be applied thereto in any of the well-known methods heretofore employed for locking some and unlocking other of the points and the signals corresponding therewith or relating thereto accordingly as they should be respectively locked or unlocked to insure the safe and proper working of the traffic over the main and branch lines.

In Sheet 3 similar letters of reference to those employed in Sheets 1 and 2 are employed for like or corresponding parts. In this sheet, as will be seen more particularly by the plan view in Fig. 1, two wedge pieces are employed, one right-hand and the other left-hand, each being intended to act alternately upon each side of the point or tongue with which it is associated. One of the wedge pieces in this instance is formed on the end of the longer reciprocating bar *m*, while the other wedge is on the end of a shorter reciprocating bar, and these two reciprocating bars are connected together and made to move simultaneously forward or backward to allow of the position of the points being changed, in the manner hereinbefore described; and when the points have been so moved by the operator, the wedging or securing firmly is effected by means of the switch-lock lever in the signalman's box; or if by any chance the points have not been carried over sufficiently far and firmly secured in their proper places, the signal for a train to pass cannot be given, and also while the train is passing over the points, the position of the points cannot be changed.

In Sheet 4 a reciprocating bar is fitted to the inside of the rail, but in this case instead of fitting to or forming upon the one end of the reciprocating bar, (as before described and illustrated,) a wedge piece for securing the point or points, the locking of the points is here effected by means of a sliding tongue upon the one end of a horizontal rod connected by means of a vibrating arm or lever and rod with the reciprocating bar. The points are connected together by a bar on edge close to their taper extremities or outer ends or points, and this bar on edge has two holes or slots therein at a suitable distance apart, so that the sliding tongue of the switch-lock apparatus can only be moved forward and projected thereinto after the points have been completely moved from one position into another by means of the point-lever, and are held firmly in their proper position, and cannot be moved therefrom, either voluntarily or inadvertently, while the train is passing over the points, by reason of the reciprocating bar. In this sheet, as in Sheet 2, there is but one reciprocating bar on the

inner face of the fixed rail, but there may be two reciprocating bars, and they may be either both on the inside or inner faces of the rails, or one may be on the inner and the other on the outer face or side of the rail. The points or switches may be moved from one position into another by means of a hand-lever by the roadside connected to the end of the rod; or they may be worked as will generally be the case, by a lever-handle within a "signal-box," and be either unconnected with the movement of other points or signals; or may, as in most cases we prefer that it should, be worked in connection with point-and-signal interlocking apparatus, in accordance with the several inventions previously patented by us and otherwise well known and now in general use.

In Sheet 1, where one rod, *k*, extending from the point lever-handle, is connected with and operates or sets in motion the two reversed wedge-pieces, *t* and *t'*, moving the one in one direction and the other in the reverse direction through the vibrating or rocking shaft *p'*, and the lever-arms *r* and *r'* thereon, and the points or switches *c* are moved over by the same action or movement of the point-lever and the rod *k'* and the moving parts *f g i*, while the reciprocating bar *m* is, by the movement of the points from one extreme to the other through the levers *n*, first raised up to the highest point and then lowered to a corresponding degree on the opposite side, in manner before described; but should the movement of the point-lever have been insufficient, or should any obstruction between the point and the permanent rail have interfered with the perfect closing of the point so that it remains open in the slightest degree, the horizontal surface of the reciprocating-bar *m* will remain higher than it should be, and the wheels of the approaching train will, in passing over the bar *m*, bring the whole weight of the engine or carriage upon the bar and cause one of the wedge pieces to move over the point and close it securely against the rail.

In Sheet 2 two separate rods and sets of connections are shown, the one connected to and with the points to which they are solely dedicated, and the other is for operating the reciprocating-bar *m*, with the wedge-piece at the one end of it, by causing it either to enter between and separate the movable switch-point and the fixed rail, or by wedging closely the point against the side of the fixed rail, in each case after the points have been set. By this arrangement of the apparatus, and the square end of the wedge-piece employed, if the points should be only half opened or be left half closed, the lever-handle of the switch-lock apparatus could not be moved over to its proper position in either direction, and the signal-levers being interlocked therewith no signal could be given for a train to pass.

In Sheet 3, two separate or independent rods are shown for moving the points and performing the locking or securing of the points, respectively as before described; but the right

and left hand wedge-pieces are, the one, upon a long reciprocating-bar, *m*, and the other, upon a short reciprocating-bar, both of which are connected together and moved back and forward by the vibrating or rocking shaft *p*, and here the square-ended wedge-pieces secure the same results.

Description of the Drawing on Sheet 4.

In Sheet 4, Figure 1 is a side elevation; Fig. 2, a plan or horizontal view; and Fig. 3, an end elevation of one mode of carrying our invention into effect. Figs. 4, 5, and 6 are corresponding views of a modification thereof.

A is a bar of iron, of any required length and size, fixed at the side of the rail, (by preference the rail next to the stock-rail.) This bar is fitted so as to be capable of moving on centers by means of the radial bars or arms B B fixed to the rail, and is connected to the rod C by means of the connecting-rod D and crank E. This crank E is connected to the rod C, which is connected to the crank K, which is connected to the rod F, which rod is connected to the lever for working the points G. When the rod F is acted upon by this lever for the purpose of shifting the points G the bar A is caused (through its connection with the rod C by means of the rod D and crank E) to make a semi-revolution on its centers of motion B B, and in this manner is caused in its motion, when unimpeded, to rise above the top of the rail. As, however, the wheels of the train are over or on this bar while it is passing over the points, it is obvious that the bar cannot be raised and consequently that the points cannot at such time be moved.

In Figs. 4, 5, and 6 is represented another mode of accomplishing the same object by means of a bar differently fitted to the side of the rail. In this case the bar A is mounted on a pivot or center of motion, L, at one end, and has formed at its reverse end two or more

notches, in one of which the point of the crank H rests. This bar is connected to the points, as shown in Fig. 5, and when the points G are moved as required the point of the crank H (which is moved at the same time) is caused to raise the end of the bar A, which, by describing an arc, allows the point of the crank to pass into the next notch. It will be seen, however, that as the wheels of the train passing over the points are on or over the bar they offer an impediment to the raising of the end of the bar, and thereby prevent the possibility of moving the points again before the train has passed over them. We have thus described two modes of accomplishing our object of causing the train to lock the points and keep them locked while passing over them, consisting of two different modes of fitting and acting on the bar; and we would remark that the apparatus connected with the bar for the purpose may be varied, so long as the bar itself is of greater length than the base of the two pairs of wheels of a locomotive engine or carriage and is fitted to the rail in such a manner as to admit of its being worked in the manner described.

Claims.

1. In the apparatus for working and locking or securing switch rails, or points, we claim the combination of wedge-blocks, rock-shaft, and their connecting-rods with said rails or points, substantially as specified.
2. In combination with the wedge-blocks, rock-shaft, their connecting-rods, and the switch rails or points, we claim the pivoted locking-bar *m*, substantially in the manner shown and described, for the purpose specified.

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JOHN STINSON FARMER.

Witnesses:

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