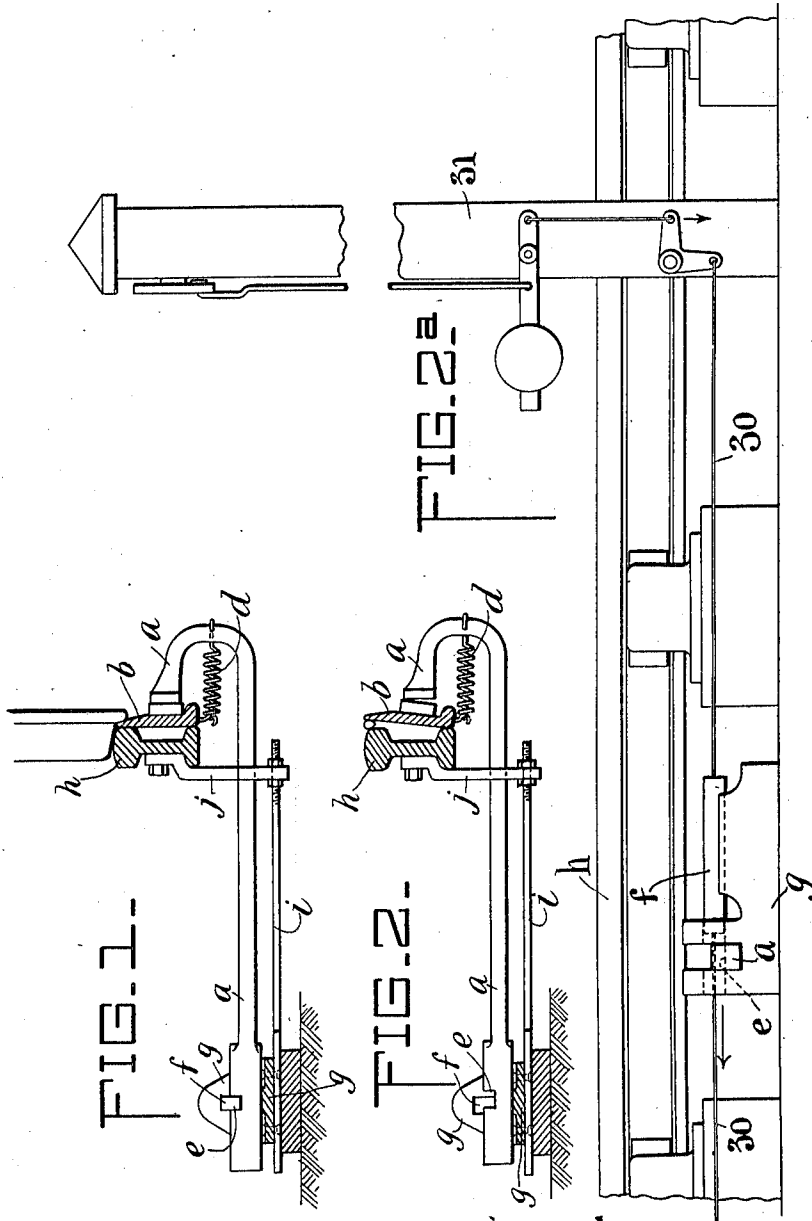


A. H. JOHNSON.
SIGNAL FOR RAILWAY SWITCHES.
APPLICATION FILED JUNE 9, 1911.

1,011,801.

Patented Dec. 12, 1911.

4 SHEETS-SHEET 1.



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4 SHEETS—SHEET 2.

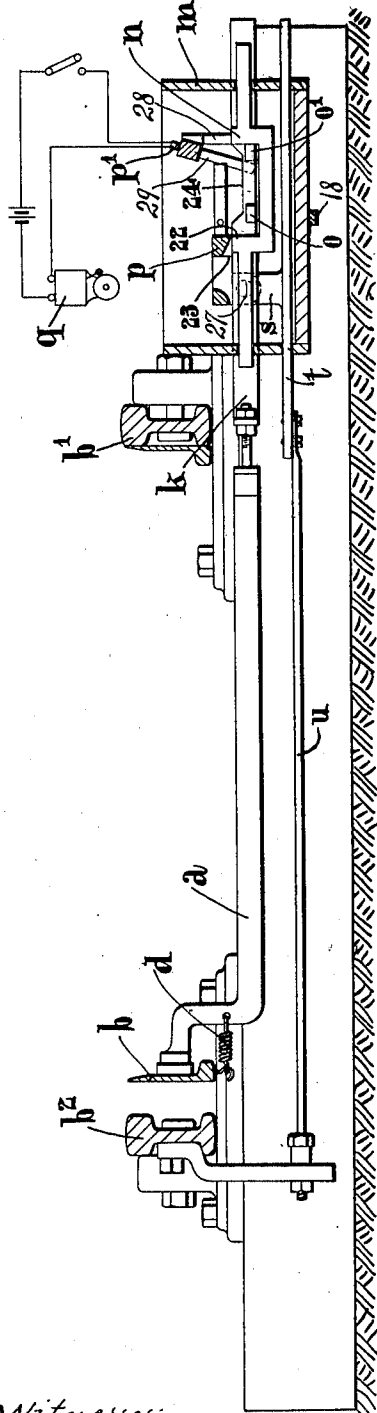


Fig. 3.

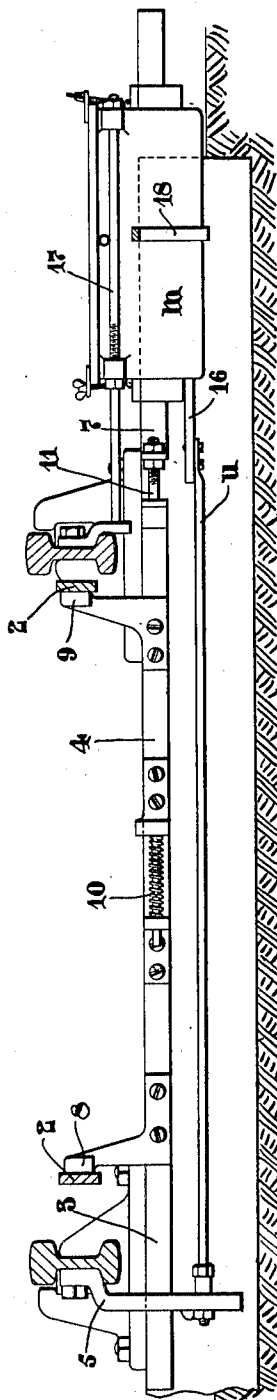


Fig. 5.

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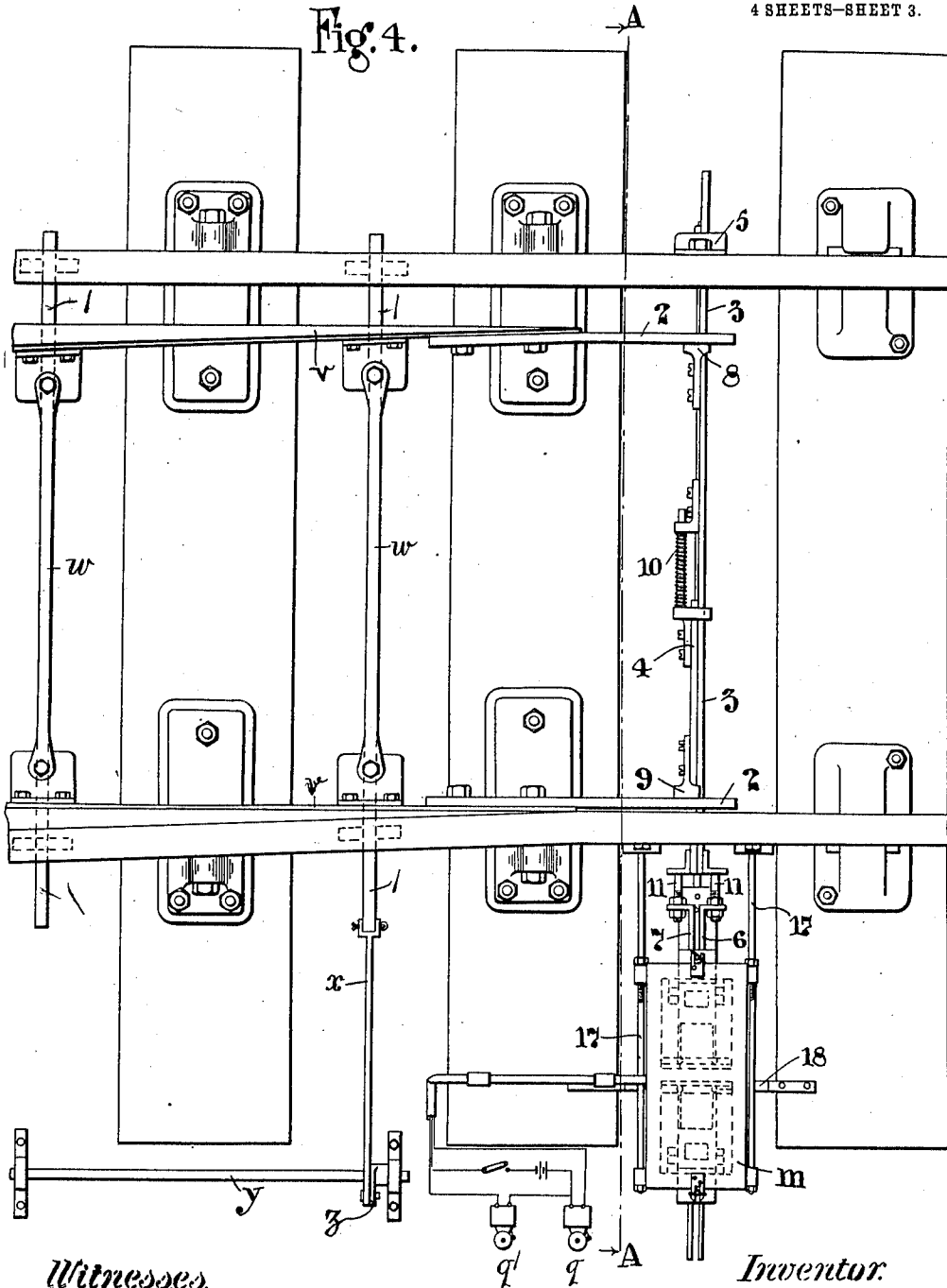
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

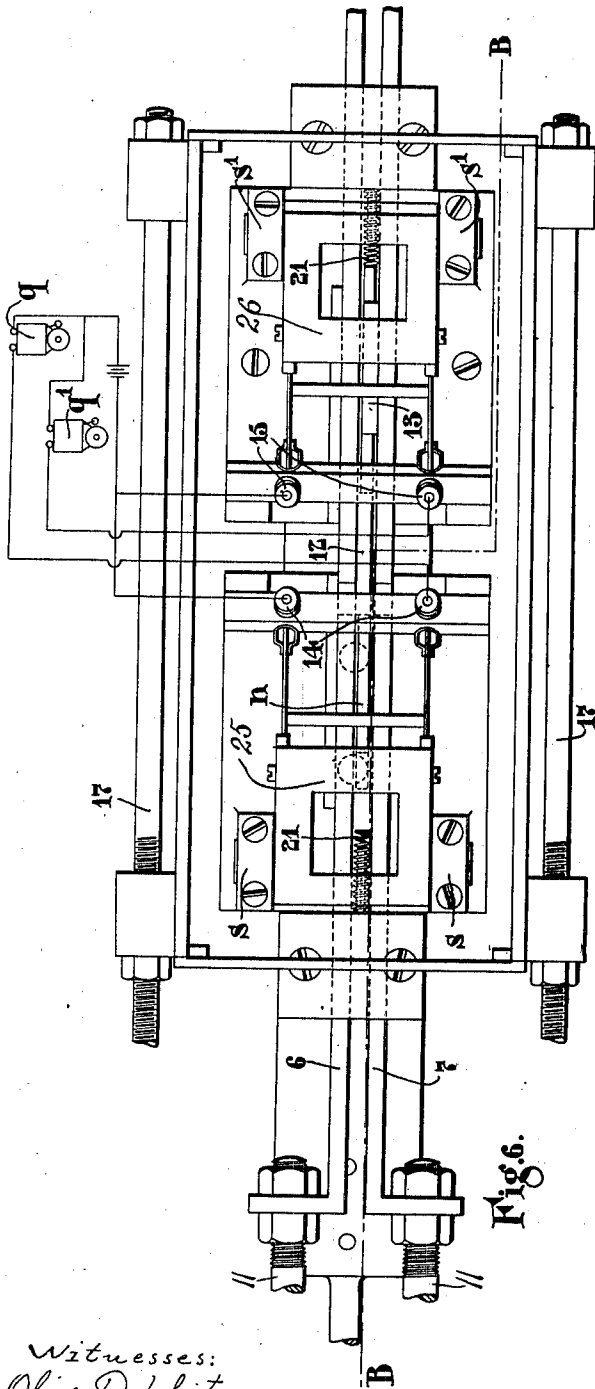


Fig. 6.

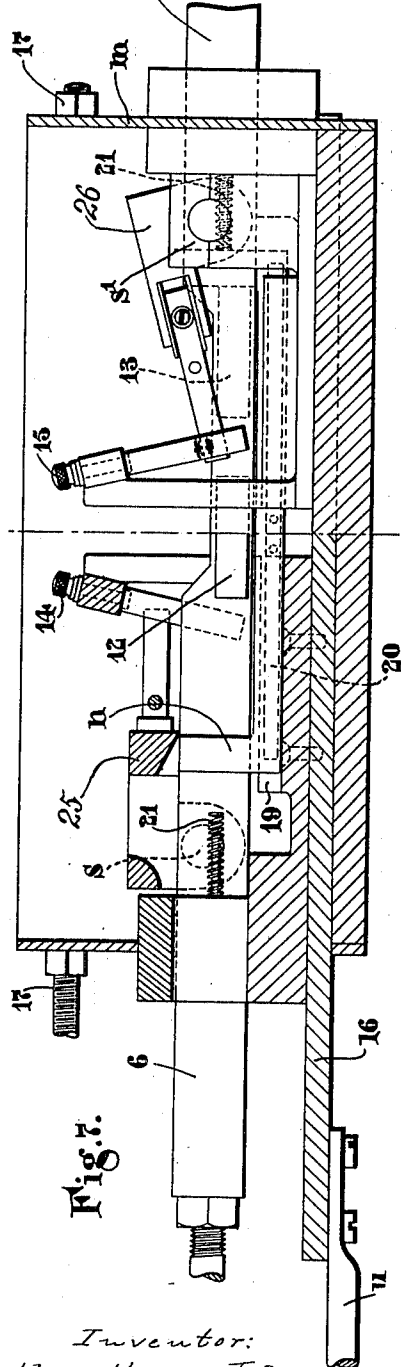


Fig. 7.

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UNITED STATES PATENT OFFICE.

ARTHUR HENRY JOHNSON, OF EPSOM, ENGLAND.

SIGNAL FOR RAILWAY-SWITCHES.

1,011,801.

Specification of Letters Patent. Patented Dec. 12, 1911.

Application filed June 9, 1911. Serial No. 632,232.

To all whom it may concern:

Be it known that I, ARTHUR HENRY JOHNSON, a subject of the King of Great Britain and Ireland, and residing at "Wanganui," Ashdown Road, Epsom, in the county of Surrey, England, have invented a certain new and useful Signal for Railway-Switches, of which the following is a specification.

My invention relates to railway switch point signaling apparatus.

In apparatus of the above type as constructed at present, the signalman is informed either by audible or visual signals or in some cases by a positive lock in the signal mechanism of any failure of the point rails to take up their correct position relatively to the main rails.

In applying an electric switch to devices of the type above indicated, it is in some cases inconvenient or impossible to arrange for the switch mechanism being carried directly by the device to which it is applied. Under these circumstances, difficulty is experienced, as any relative displacement of the parts carrying the switch mechanism and device would result in the switch being operated either earlier or later than the point at which it was originally intended.

In existing arrangements, the connections of the signaling mechanism are formed by pins or bolts which rapidly become worn, and thus introduce an amount of back-lash which causes the signal to fail to respond accurately to the movement of the switch.

The object of the present invention is to provide a railway switch signal mechanism in which the above disadvantages are obviated.

My invention consists in the improved railway switch signal arrangements to be hereinafter described.

Referring now to the accompanying drawings which illustrate my invention and form part of my specification: Figure 1 shows a view of my invention as applied to a mechanical bolt type of signal; Fig. 2 shows the position of the parts of the mechanism shown in Fig. 1 when a foreign body is lodged between the point and main rails. Fig. 2^a shows a diagrammatic view of the

signal. Fig. 3 shows in sectional elevation the application of my invention to an electric railway switch signal. Fig. 4 shows a plan of the application of my invention to a railway switch signal mechanism in which both the switches are contained in the same switch box. Fig. 5 is a sectional elevation of the view shown in Fig. 4, the section being taken on the line A—A in the direction of the arrow. Figs. 6 and 7 show a detailed plan and sectional elevation respectively of the switch box, the section shown in Fig. 7 being taken on the line B—B of Fig. 6.

In carrying my invention into effect according to one form, I provide an extension piece 2 on the point rail, *b*. Against this extension piece a follower rod, *a*, abuts, the wearing surfaces being of large area in order to minimize wear. The follower rod, *a*, is connected to the point rail or to the extension piece by means of a spring, *d*, so that the working faces of the follower rod and the extension piece are always kept firmly pressed together. It will be seen that in the above arrangement the spring, *d*, does not introduce any additional resistance to the operation of the switch over and above that entailed in moving the switch point, and consequently the spring, *d*, may be made as heavy as is desirable. The end of the follower rod remote from the point rail has a transverse slot, *e*, formed therein which in the closed position of the point rail registers exactly with a bolt, *f*, slidably mounted upon the fixed member, *g*. The member, *g*, is tied to the fixed rail, *h*, by means of an adjustable rod, *i*, bolted to the depending bracket, *j*, which also serves as a guide for the follower rod *a*.

As the member, *g*, is tied to the fixed rail and the follower rod co-acts with the moving rail, it will be evident that no relative movement of the parts due to spreading of the rails can take place, so that when the point rail is in the closed position, the slot, *e*, will register exactly with the bolt, *f*. The bolt, *f*, is arranged in series with the wire, Fig. 2^a, to the signal, 31, controlling the switch, so that it will be impossible to lower the signal into the clear position unless the bolt, *f*, registers with the slot, *e*, and the

point rail is hard up against the fixed rail. Further, if a foreign body such as a piece of ice should become jammed between the top edges of the point and main rails, the parts would assume the position shown in Fig. 2. In this position, however, the slot in the follower rod would not register with the sliding bolt, *f*, and consequently the signal cannot be placed at "line clear", while the audible or visual signal acting in conjunction with the signal mechanism would not be given.

In order to make the signal mechanism as sensitive as possible in this direction, I arrange that the surface of the follower rod bearing on the extension piece should be arranged as high as possible so that it is just clear of the flanges of the wheels. The above arrangement may be combined with both the point rails of a railway switch by duplicating the arrangement just described, in which case two bolts would be arranged in series with the signal wire 30, and unless the slots in both registered with each bolt, it would be impossible to operate the signal lever.

In Figs. 3 to 7 I have described my invention in connection with electric signal mechanism. In Fig. 3 I have shown my invention as applied to an electric switch signal mechanism in which a signal switch is arranged in each switch box. In this arrangement a follower rod, *a*, is kept pressed against the point rail, *b*, or its extension piece 2 by means of a spring, *d*. The bearing surface of the follower rod and the point rail is made of as large area as possible, so as to decrease the wear. To the follower rod, *a*, a motion plate, *k*, is attached; the ends of the motion plate are guided by correspondingly shaped apertures in the end of the box, *m*, containing the switch mechanism. The motion plate acts toward the end of its stroke to move after a certain amount of lost motion a similarly mounted detent member, *n*, by means of projections, *o* and *o'*. A movable switch plate, *p*, rotatably mounted on the bracket, *s*, by means of the pin, 27, is carried by the plate, *t*, which also carries the part 28, supporting the stationary member, 29, of the switch. Terminals, *p'*, are mounted on the member, 28, and are connected in circuit with an electric signal such as a bell, *q*. When the member *n* receives its slight motion toward the end of the stroke of the motion plate, and the edge, 22, clears the edge, 23, switch plate *p* rotates on the pin 27 until it rests on the lower surface, 24, of the motion plate, and in doing so completes a circuit between the terminals, *p'* and *p*, and sounds the electric bell, *q*.

On the point rail being moved in the reverse direction the motion plate, *k*, is moved

backward carrying with it the detent member, *n*, by means of the projection, *o'*. At the commencement of the backward motion, the beveled edges of the motion plate coming in contact with the switch plate, *p*, cause it to be raised, thereby breaking the circuit, after which the parts return to their initial position.

The example of signal mechanism which I have described is especially applicable to those cases where it is impracticable to attach the switch box to the stock rail with which the point rail contacts. It will be noticed that the switch box, *m*, is not attached to the rail, *b'*, with which the point rail, *b*, coöperates, but to the opposite rail, *b''*. If, therefore, any spreading of the rails takes place, the indication will be given too early unless special precautions are taken to prevent the original relationship of the detent and switch plates which control the signal circuit being disturbed.

In the apparatus illustrated the switch plate, *p*, is mounted on a bracket, *s*, which is attached to a plate or rod, *t*. This plate is slidable in the box, *m*, and is attached to the rail, *b''*, by an adjustable rod or distance piece, *u*. The original relationship of the detent and switch plates will thus be secured in spite of any spreading of the rails, so that the signal or other indication will be given precisely when the point rail is hard up against the fixed rail. Again the box, *m*, instead of containing a single switch mechanism, may accommodate several such sets.

In Figs. 4 to 7, I have shown the application of my invention to a duplex railway switch signal apparatus. The two movable members, *v*, of the switch are of the usual construction being linked together by ties, *w*, and operated by the rod, *x*. The rod, *x*, is actuated by the shaft, *y*, through a bell crank, *z*, and a connecting rod, 1, the shaft being operated from the signal cabin by any of the well known appliances. To the end of the movable rails, extension pieces 2, are fitted so as to be clear of the flanges of the locomotive wheels, and co-act with the switch mechanism hereinafter described for the purpose of indicating when the movable rails are in either of their extreme positions. The extension pieces are arranged as high up on the movable rails as possible so that if the movable rail is prevented from coming close up to the fixed rail say at the top, no indication will be given and the operation of the signal so as to give "line clear" will be rendered impossible by suitable interlocking arrangements. Follower rods, 3 and 4, are disposed beneath the rails, the follower rod, 3, having one of its ends carried by the bracket, 5, while the other end is connected to the motion plate, 6, slidably mounted in

the switch box, *m*. The follower rod, 4, is slidably mounted at one end on the follower rod, 3, while the other end is connected to the motion plate, 7. Followers, 8 and 9, are attached to the follower rods, 3 and 4, respectively, and are kept pressed against the extension pieces, 2, by means of the spring, 10, the follower rods being provided with large bearing surfaces in order to reduce the wear at these points. The motion plates are adjustably connected to the follower rods by means of the screwed connections, 11. Stops 12 and 13, attached to the motion plates, 6 and 7, respectively, actuate the detent member, *n*, through a certain amount of lost motion the arrangement being such that the detent member only receives a slight movement toward the end of the travel of the motion plates in each direction. The detent member, *n*, slides in a groove, 19, in the base and is disposed between the motion plates, a spring, 20, being disposed on the side of the member to provide the necessary friction and prevent the position of the member being changed by vibration. Springs, 21, are also provided on the box to prevent the member, *n*, being overshot if the switch is pushed smartly over. Two movable switch plates 25 and 26, rotatably mounted on brackets, *s* and *s'*, so act with the member, *n*, in a similar manner to that before described, and at the precise point of the movement of the switch rails complete the circuit between the corresponding terminals, 14 or 15, as the case may be. The completion of the circuit causes a signal such as either the bell, *q*, or the bell, *q'*, to be sounded or in some cases it may withdraw a bolt and permit the line signals to be operated. The bells are of different tones to indicate in which of the extreme positions the movable rails are, and may be supplemented by corresponding visual indicators if desired. The switch plate, 25, is mounted upon a plate, 16, slidably mounted in the box, *m*, the plate, 16, being connected by a tie or distance rod, *u*, adjustably attached to the bracket, 5, fixed to one of the fixed rails. The other switch plate 26, is fixed to the box, *m*, which is secured to the other fixed rail in an adjustable manner by means of the bolts, 17. Any spreading of the rails will thus correspondingly alter the position of the switch plates but as the travel of the motion plates will be effected to a like extent, the original relationship of the co-acting switch plates remains unaltered, and the signal will still be given when the movable rails are in either of their extreme positions. A strap, 18, supports the box, *m*, between the sleepers sufficient clearance being allowed between the bend of the strap and the box to permit movement of the sleepers without affecting the position of the box.

The operation of the device is as follows:—When the movable rails are in any other position than their extreme ones, the movable switch plates 25 and 26, rest upon the raised portions of the motion plates 6 and 7, and consequently the circuit between the terminals, 14 or 15, is not complete and no signal is given. If on the other hand the movable rails are moved into one of their extreme positions, toward the end of the movement, the motion plates, by means of the stops above described, cause a slight movement of the detent member, the end of which just coincides with the beginning of the beveled portions of the motion plates. When the motion plates and the detent member, *n*, reach the end of their travel the raised switch plate 25 or 26 falls as before described, and bridging either of the terminals, 13 or 14, causes a circuit to be completed and a distinctive signal or other device to be operated.

The arrangements which I have before described illustrate the application of my invention to railway switch signal mechanism, but it will be evident that my invention is not limited to such applications, as it may with advantage be applied to devices other than those mentioned. Also, by means of my invention mechanically operated switches may be utilized in conjunction with devices requiring the switch to be operated at a precise point in the movement thereof, and where there is a liability of relative movement of the apparatus and the box containing the switch mechanism taking place.

I wish it to be understood that the examples which I have described are simply to be regarded as typical and not in any way restricting the scope of my invention, as it is evident that many modifications may be made in the details thereof without departing beyond the scope of the same.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. The combination, with a railway switch having a fixed rail and a movable rail; of a signal, a follower rod, means causing the follower rod to bear freely against the movable rail throughout its movement and means co-operating with the follower rod for preventing the signal from being given when the movable rail is not completely set.

2. The combination, with a railway switch having a fixed rail and a movable rail; of a signal, a follower rod, a spring causing the follower rod to bear freely against the movable rail throughout its movement, and means coöperating with the follower rod for preventing the signal from being given when the movable rail is not completely set.

3. The combination, with a railway switch

having a fixed rail and a movable rail; of
a signal, a follower rod, a spring causing the
follower rod to bear freely against the mov-
able rail, a circuit for said signal, circuit
5 closing means in said circuit, a mounting for
said circuit closing means, an adjustable
member connecting the mounting for the cir-
cuit closing means to the fixed rail, means
coöperating with the follower rod to prevent

the operation of the circuit closing means 10
when the follower rod is not completely set.

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

ARTHUR HENRY JOHNSON.

Witnesses:

WILLIAM BRYSON,
P. A. OUTHWAITE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."