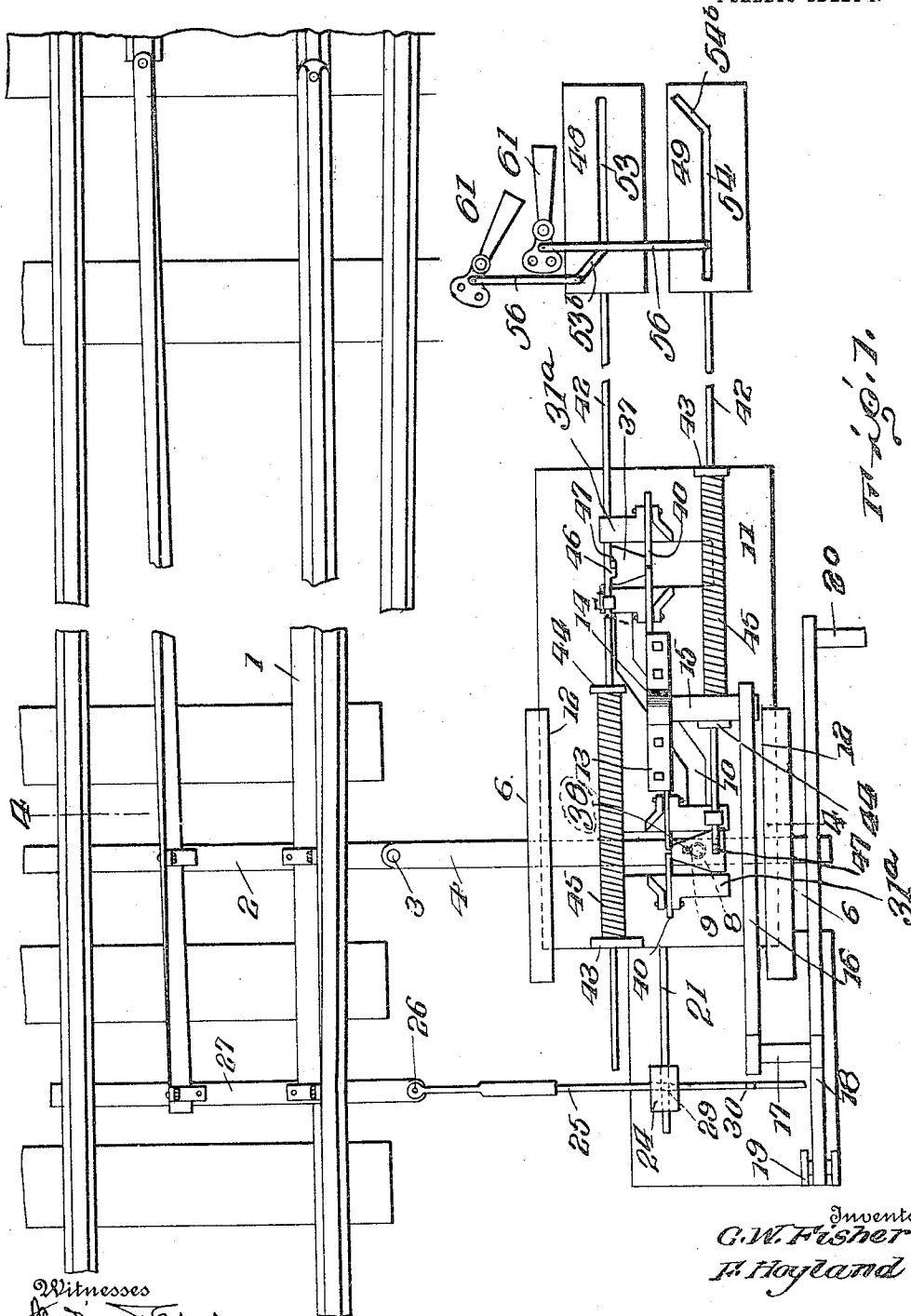


G. W. FISHER & F. HOYLAND.
 SWITCH AND SIGNAL APPARATUS.
 APPLICATION FILED JAN. 20, 1912.

1,124,408.

Patented Jan. 12, 1915.

4 SHEETS—SHEET 1.



Witnesses

Wm. M. Fisher

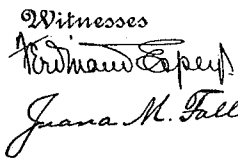
John M. Fallon

Inventors
G. W. Fisher
F. Hoyland

By *H. A. Macey* Attorneys

1,124,408.

4 SHEETS—SHEET 2.



Edmund Espey
Juana M. Fall

410 11a Inventors
G. W. Fisher
F. Hoyland

Thomasey Attorneys

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4 SHEETS—SHEET 3.

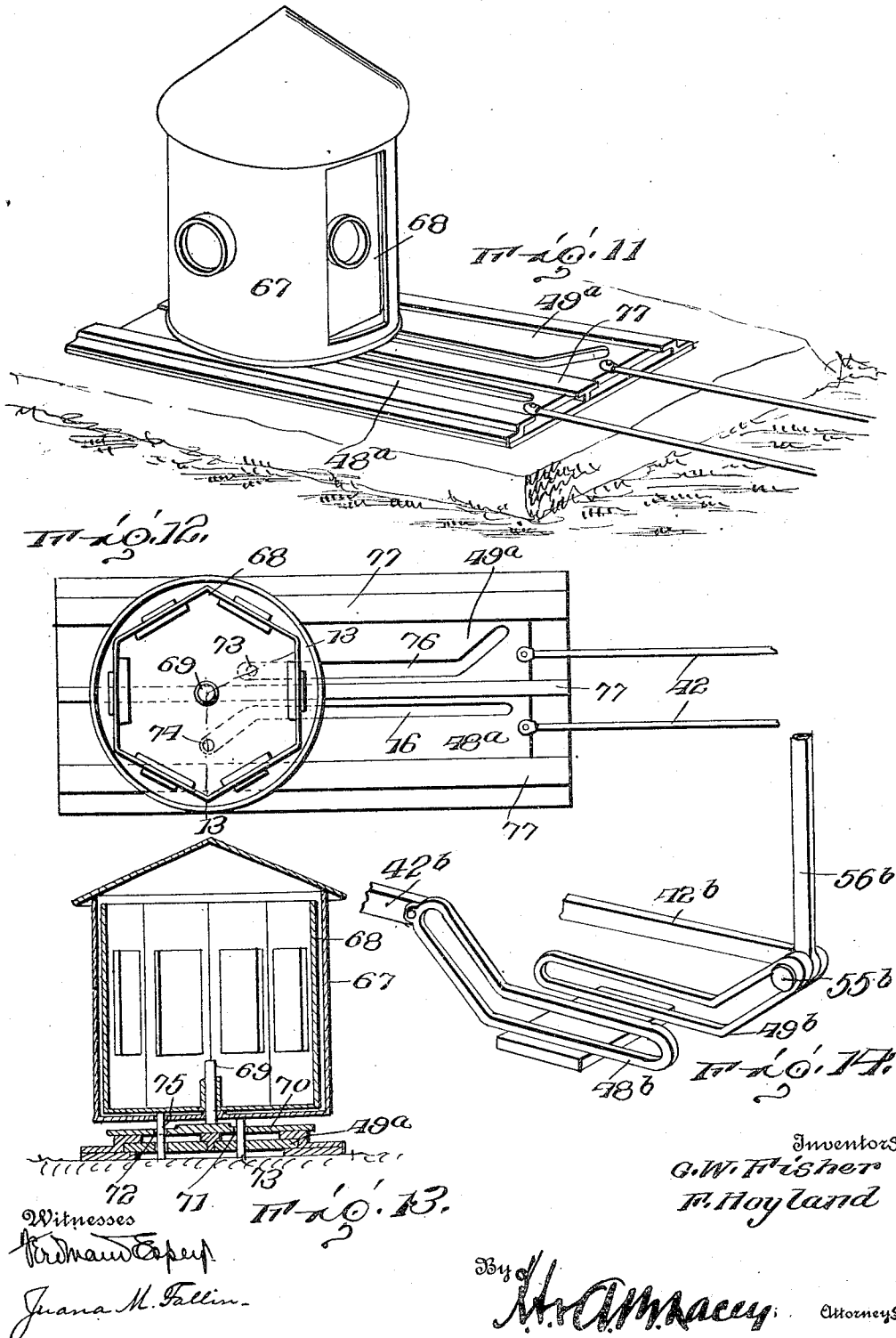


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Inventors
 G. W. Fisher
 F. Hoyland

By *H. Ammacy* Attorneys

UNITED STATES PATENT OFFICE.

GEORGE W. FISHER AND FREDERICK HOYLAND, OF JACKSON, MICHIGAN.

SWITCH AND SIGNAL APPARATUS.

1,124,408.

Specification of Letters Patent.

Patented Jan. 12, 1915.

Application filed January 20, 1912. Serial No. 672,407.

To all whom it may concern:

Be it known that we, GEORGE W. FISHER and FREDERICK HOYLAND, citizens of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Switch and Signal Apparatus, of which the following is a specification.

This invention comprehends certain new and useful improvements in combined switches and signals for railways, and the invention has for its primary object an improved mechanism of this character which will be simple in construction without complicated parts, reasonable in price, durable and not liable to get out of order, and easy to maintain, and fulfilling to a marked degree the requirements of present date standard railway equipment, which provides that the switch points must be locked in their positions, that the signals must denote main track, side track and danger indications, that the signals must denote danger indications before the switch points are unlocked, that the signals must remain at danger indications while the points are moved, that the signals can not be cleared until the points shall have been locked, that the signals must at once give danger indications automatically, if the switch is run through, or if the points are opened even to the extent of one-half an inch, that the switch must be provided with main line signals which are relatively high, and yard signals which are relatively low or of the type known as "dwarf," that there must be no springs used in any track connection, that the points must be so arranged as to preclude injury if the switch is run through, and that, if the signals are knocked down, the rails or switch points must be still held by the locking devices. And the invention also aims to provide a combined safety switch and signal mechanism which will not only possess the above-named characteristics and fulfil the before mentioned requirements, but which will be otherwise useful and efficient in operation and commercially desirable.

With these and other objects in view, as will more fully appear as the description proceeds, the invention consists in certain arrangements, constructions and combinations of the parts that we shall hereinafter describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawing, in which:

Figure 1 is a plan view of our improved apparatus; Fig. 2 is a side elevation of the switch stand; Fig. 3 is a longitudinal sectional view thereof; Fig. 4 is a transverse sectional view through the switch stand and switch points taken on the line 4—4 of Fig. 1; Fig. 5 is a detail plan view of the switch actuated plate stripped; Fig. 6 is a perspective view of one of the safety appliances hereinafter specifically described; Fig. 7 is a top plan view of a portion of one of said appliances; Fig. 8 is an elevation of the signals part of the mechanism being in section; Fig. 9 is a detail longitudinal sectional view of the signal stand on line 9—9 of Fig. 8; Fig. 10 illustrates the actuating plates for the signal; Fig. 11 is a detail perspective view of a small or dwarf signal; Fig. 12 is a top plan view thereof, the cover of the signal housing being removed; Fig. 13 is a diametrical sectional view through the signal housing; Fig. 14 is a perspective view of a modification hereinafter referred to; and, Fig. 15 is a fragmentary perspective view of the bar 25 to show the notches therein.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawing by the same reference characters.

Referring to the drawing, the numeral 1 indicates switch points which may be of any desired type and construction, and 2 designates a switch bar which is connected to the switch points, said switch bar being extended transversely beyond the track and pivotally connected, as at 3, to the transversely extending switch actuating bar 4 of our improved mechanism. The bar 4 passes freely through openings 5 formed for it in the sides 6 of the switch stand, being preferably supported in its transverse reciprocating movements by struts 7 connected in any desired way to the sides 6 of the stand and defining the bottoms of the openings 5.

The actuating bar 4 is formed intermediate of its ends with an upwardly projecting stud 8 preferably carrying a friction reducing roller or collar 9, said stud being accommodated in a slot 10 formed in a switch actuating slide plate 11 mounted for movement substantially longitudinally relative to the track in guide ways 12 formed on the

sides 6 of the switch stand. The precise formation of the slot 10 and the particular objects of such formation and the several functions of said slot in connection with the stud 8 will be hereinafter fully described.

To the upper face of the plate 11 is attached a longitudinally extending relatively narrow bar 13 bridging the slot 10 and which is formed with an upstanding apertured lug 14 in which a laterally extending pin 15 is mounted and held, said pin being pivotally connected by a longitudinally extending link rod 16 to a pin 17 extending laterally from a switch lever 18. The switch lever 18 is fulcrumed between standards 19 projecting upwardly from the switch stand at one end thereof, and is provided at its relatively free end with a laterally projecting handle 20.

A locking bar 21 is pivotally connected at one end to an arm 22 projecting downwardly from the lower face of the actuating plate 11, said locking bar passing longitudinally through the switch stand underneath the switch operating bar 4, and guided at its free end in an opening 23 formed for it in a bearing 24 which is formed on and that projects upwardly from the switch stand, as best illustrated in Fig. 2.

The locking bar 21 is designed to co-act with a safety lock in the form of a bar 25 which is pivotally connected at one end as at 26 to a bar 27 extending transversely of and connected to the switch points 1, and the other end of the bar 25 projects transversely underneath the bar 21 and through a transverse opening 28 formed in the bearing 24 at right angles to the opening 23. The bar 25 is provided in its upper edge with spaced locking notches 29 and 30. Describing now, at this point, the general operation of the switch throwing and locking mechanism, attention is first directed to the slot that is formed in the actuating slide plate 11. This slot is formed with two transversely extending end portions 31 and 32, longitudinally extending portions 33 and 34 leading toward each other from the end portions 31 and 32, and an oblique middle portion 35 which joins the portions 33 and 34, of which the side or bounding walls constitute a cam or wedge surface. Attention is also directed to the fact that the locking bar 21 is formed in its lower edge with a recess 36. Now, assuming the parts to be in the position illustrated in Fig. 1 of the accompanying drawings, it will be noted that the switch points 1 are locked by the locking engagement of the bar 21 in the notch 29 of the bar 25 and that the stud 8—9 will be at the end of the part 31 of the slot 10 of the member 11 which is nearest to the portion 33. As the switch lever 18 is swung over, it is manifest that the plate 11 will be moved in a direction to cause the stud 8 to be received in the

longitudinal portion 33 of the slot 10. So long as this portion 33 of said slot is moved along the stud 8, no movement will be imparted to the switch points 1, but the locking bar 21 which is carried by the plate 11 will be moved longitudinally, so as to bring the recess 36 toward the bar 25. In this movement of the plate 11, the forward end of recess 36 on bar 21 will reach the farthest side face of the bar 25 just an instant before the oblique middle portion 35 of the slot 10 reaches the stud 8, whereupon the bar 25 will be released from the bar 21 and the further movement of the plate 11 will cause the stud 8 to move laterally and thereby effect the shifting of the switch points. As the movement of the plate 11 is continued in the same direction, the stud 8 will be received in the longitudinal portion 34 of the slot 10, and the accompanying lateral movement of the bar 25 will bring the notch 30 of said bar into locking engagement with the bar 21, so as to lock the switch points, the said movement of the plate 11 reaching its limit when the stud 8 finally reaches a point intersected by the median lines of the portions 32 and 34 of the slot 10.

From the foregoing, a reverse movement of the parts to shift the switch points back again to the position illustrated in Fig. 1 will be at once apparent, and no further description thereof is deemed necessary.

It is to be observed that the formation and disposition of the end portions 31 and 32 of the slot 10 provide transversely elongated spaces between the points where the stud 8 is locked at the limits of movement of the plate 11 and the farther ends of such portions, these spaces being provided for a purpose which will now be described.

The side walls of the portions 31—32 of the slot 10 are thickened to form guides 31^a as shown in Fig. 6 on each side of the slot. The under faces of each pair of guides are rabbeted to receive between them sliding blocks 37, the blocks thus being permitted to have transverse movement relative to the plate 11 parallel to the portions 31 and 32 of the slot in said plate. Each of the blocks 37 is provided on its under side with spaced lugs 38 projecting down into the corresponding portion of the slot 31 or 32 and designed to receive between them the roller 9 of the stud 8 at the limit of movement of the stud. The upper face of each block 37 is formed with a wedge member 39 having a pointed end normally disposed immediately adjacent the adjoining ends of two longitudinally alining pliable and slightly resilient pins 40 supported in any desired way operatively upon the plate 11 but shown as pinned to the ends of the thickened walls 31^a. These pins 40 extend longitudinally of the plate 11. Should the switch be run through after being locked, the stud 8 will manifestly, owing

to its location between the lugs 38 of one of the blocks 37, cause said block to move laterally along the corresponding slot 31 or 32 and the wedge 39 of this block will force back the adjoining ends of the pins 40 so as to avoid any injury to the switch actuating mechanism. Upon such movement, the block 37 will be caught and a return movement thereof prevented by the bent ends of the pins 40 engaging over shoulders 41 formed adjacent the butt end of the wedge 39. To restore the parts to normal condition after the switch has been run through, it is only necessary to withdraw the bent pins 40 from their engagement with the shoulders 41, whereupon the block may be moved back again to its original position with the switch rod. Outwardly inclined converging stop members 11^a are also secured to the ends of the guides or thickened portions 31^a outward of the pins 37 and prevent the too great outward bending of the pins 40 under the action of the wedge 39.

The signal actuating mechanism of our invention includes longitudinally extending laterally spaced bars 42 which pass through diagonally disposed ears 43 on the plate 11. Each of the bars 42 is provided with a collar 44 between which and the adjoining ear 43 an encircling expansion spring 45 is mounted and held normally under compression. The bar 42 is further formed with a shoulder 46, the said shoulder being designed to engage lugs 47 which project upwardly from the respective blocks 37. The bars 42, under normal conditions, are moved with and by the plate 11, so as to simultaneously shift the switch points and set the signals. Thus when the plate 11 is shifted to the right, that is, to the position shown in Fig. 1, the plates 48 and 49 will have the relative position shown in Fig. 10 so that the signal 62, which is the side track signal, will be shifted to a danger position while the signal 61, which is the main track signal, will be shifted to its neutral position, thus indicating that the main track is open but that the side track is closed. Upon a reversal of the movement of the plate 11, the plates 48 and 49 will be shifted toward the left in Figs. 1 and 10, thus causing at first both signals to be brought to the danger position and then holding the main track signal at its danger position but causing a depression of the side track signal 62 to its neutral position. Under abnormal conditions, as, for instance, when the switch is run through, the consequent movement of one of the blocks 37 will disengage the lug 47 of that block from the bar 42 of the signal which has been set to denote safety indications, and consequently the spring 45 of such bar will be permitted to act to move the same in a direction to change such signal from safety to danger.

The bars 42 are pivotally connected at one

end to signal actuating plates 48 and 49, set on edge side by side for a longitudinal movement in upper and lower guide ways 50—50^a that form part of a stand or casing 51 that is supported adjacent the signal post or standard 52. The plates 48 and 49 are respectively formed with slots designated 53 and 54, respectively, one of said slots being formed with a longitudinally extending portion 53^a and an oblique or cam portion 53^b, and the other slot being oppositely disposed as to its corresponding portions, designated 54^a and 54^b respectively. Transverse pins 55 are received in these slots 53 and 54, one of said pins being secured to the lower end of a signal actuating arm 56 which is forked as shown at 56^a to receive the pin and the other pin being correspondingly connected to the lower end of a signal actuating arm 57 which is likewise forked as shown at 57^a to receive the pin. These arms 56 and 57 are provided with hoods 58 designed to extend down around the sleeves 60 projecting upwardly from the casing 51 so as to assist in preventing snow, ice, or the like, from clogging up the slots 53 and 54. The lower forked ends of the arms 56 and 57 straddle the respective plates 48 and 49 and work through the openings in guides 50. The upper end of the arm 56 is pivotally connected to a semaphore 61 adapted for main track indicating, while the arm 57 is connected at its upper end to and controls a supplemental semaphore 62 adapted for side track indications. In the present embodiment of the invention, the semaphores 61 and 62, arranged for both day and night indications, are so arranged that they indicate a clear track when inclined, and an open switch when horizontal, and when both are horizontal, they indicate danger, such as when a switch is split or run through. It is, of course, evident, however, that this arrangement is merely arbitrary and can be readily changed by reversing the plates 48 and 49 and the arms or semaphores 61 and 62, so that the signal actuating arms or rods 56 and 57 will be forced downwardly instead of upward in the actuation of the device.

From the foregoing description in connection with the accompanying drawings, the operation of our improved combined switch and signaling mechanism will be apparent. In the practical use of the mechanism supposing the parts to be in the relative positions illustrated in Fig. 1, a movement of the switch lever 18 to the left will slide the plate 11 in a direction to first unlock the switch points, while at the same time the signals are shifted, and a continued movement of the plate 11 will shift the switch points, the final movement of the plate effecting the locking of the switch points in their shifted position and at the same time actuating the signal mechanism. Describing more spe-

cifically the combined action between the switch operating mechanism and the signal operating mechanism, it will be noted that the neutral longitudinal portions of the slots 53 and 54 of the signal actuating plates 48 and 49 are coincident with the oblique portion 35 of the slot 10, and that the oblique portions of the slots 53 and 54 are respectively coincident with the neutral longitudinally extending portions of the slot 10. Bearing this in mind, it will be understood that in the initial movement of the plate 11, while the stud 8 is within the longitudinal portion 33 of the slot 10, the switch points will become unlocked and the plate 48 will move in a direction to draw down upon the rod 56 so as to throw the semaphore 61 to the danger position (both semaphores being then in such position) before the switch points are moved. While the oblique portion 35 of the slot 10 has the stud 8 within it during the movement of the plate 11, no movement whatever will be imparted by the plates 48 and 49 to the semaphores 61 and 62, owing to the fact that the pins 55 are riding in neutral or longitudinally extending portions of the slots 53 and 54, and the semaphores will both be in the danger indicating position until the stud 8 shall have reached the end of the oblique portion 35 and the switch points fully thrown and immediately thereafter locked, at which time the pin 55 of the plate 49 will reach and ride in the oblique portion 54^b of the slot 54. It will thus be seen that both semaphores or signals will be maintained in the danger position so long as any movement is being imparted to the switch points, and that they will be moved to the danger position and neither one released or shifted from such position until the switch points have been fully shifted and again locked. Should the switch be run through, one of the lugs 37 will be moved laterally relatively to the plate 11 and the corresponding bar 42 released so as to permit its spring 45 to act and throw the corresponding semaphore to the danger position.

It is to be understood that our invention is not limited to the details of construction and relative arrangement of parts disclosed in the accompanying drawings and hereinbefore described, as various changes may be made without departing from the scope of the invention as defined in the appended claims. For example, the rods 56 and 57 may be pivotally connected at their lower ends directly to the rods 42^a, corresponding to the rods 42, the plates 48 and 49 remaining stationary, and the pins that pivotally connect the bars 42^a with the bars 56 and 57 moving in the slots of said plates.

Having thus described our invention, what is claimed is:

1. An apparatus of the character de-

scribed including switch points, means for operating the switch points, signals controllable by the switch point operating means, means having a movement independent of said switch operating means tending to automatically move the signals to danger position, shiftable members operatively connected to the switch points one at either set position of the switch to move therewith when the switch is run through and having thereon means preventing the operation of the last named signal moving means, which is disconnected from the last named signal operating means so as to permit the automatic means to act when the switch is run through.

2. An apparatus of the character described, including switch points, operating mechanism therefor, including a plate, signals, operating mechanism for the signals, including bars, blocks carried by said plate and normally engaging said bars, springs connected to said bars and tending to move the same independently of the plate, and means for disengaging said blocks from the bars when the switch is run through.

3. An apparatus of the character described, including switch points, operating mechanism therefor, including an actuating plate, signals, operating mechanism for the signals, including bars movably connected to the plate, said bars being formed with shoulders, laterally movable blocks carried by the plate and formed with studs engaging said shoulder, springs connected to said bars and tending to move the same independently of the plate, and means for moving said blocks so as to disengage the studs from the shoulders when the switch is run through.

4. An apparatus of the character described including switch points, signals, means for operating the switch points including an actuating plate formed with a slot and a switch operating bar provided with a stud accommodated in said slot, said slot being formed with neutral portions and an intermediate operative portion, and means connected to said plate for operating the signals, said means including plates formed with slots each of which embodies a neutral portion and an operative portion and pins operating therein, the operative portion of the slot of one of said plates being in the same longitudinal position relative to the actuating plate as the neutral portion of the slot in the other of said plates, the operative portion of the slot in the last named plate being in the same longitudinal position relative to the actuating plate as the neutral portion of the slot in the other plate and the neutral portions of both of said slots being in the same longitudinal position relative to the remaining portions of said last named slots as the operative por-

tion of the slot formed in the switch plate is relative to the other portions of said switch plate slot.

5. An apparatus of the character described including switch points, operating mechanism therefor, signals, operating mechanism for the signals including operating bars, sliding blocks operatively connected to the switch points one at either set position of the switch to move therewith when the switch is run through and normally engaging said bars, and springs connected to said bars and tending to move the same independently of the switch point operating mechanism.

6. An apparatus of the character described including switch points, operating mechanism therefor including an actuating plate, signals, operating mechanism for the signals including bars movably connected to the plate, said bars being formed with shoulders, laterally movable sliding blocks mounted upon the plate and formed with studs engaging said shoulders, means connecting said blocks with the switch points one at either set position of the switch whereby they may move laterally therewith when the switch is run through, and springs connected to said bars and tending to move the same independently of the plate.

7. An apparatus of the character described including switch points, means for operating the switch points, a signal, a rod controlled by said operating means and operatively connected to the signal, means

urging the rod in a direction to throw the signal to a danger indicating position, means normally engageable with said urging means and holding said urging means from action, and means operated by the running through of the switch for shifting said holding means out of engagement with the urging means to thereby permit the urging means to actuate the signal to danger position.

8. An apparatus of the character described including switch points, a shiftable point operating member, said switch points having movement independent thereof, a signal controlled by said operating member, means carried by the operating member but having a movement independent thereof tending to throw the signal to a danger position, shiftable means holding the last-named signal moving means from action, and means operated by a movement of the switch points independently of the point operating member and operatively connected to said holding means whereby to shift the holding means and permit the last-named signal moving means to act when the switch is run through.

In testimony whereof we affix our signatures in presence of two witnesses.

GEO. W. FISHER. [L. S.]
FREDERICK HOYLAND. [L. S.]

Witnesses:

JERRE B. TOWNER,
WILLIAM G. JONES.

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