



H. W. & C. R. SUMMERS.  
AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED APR. 30, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2.

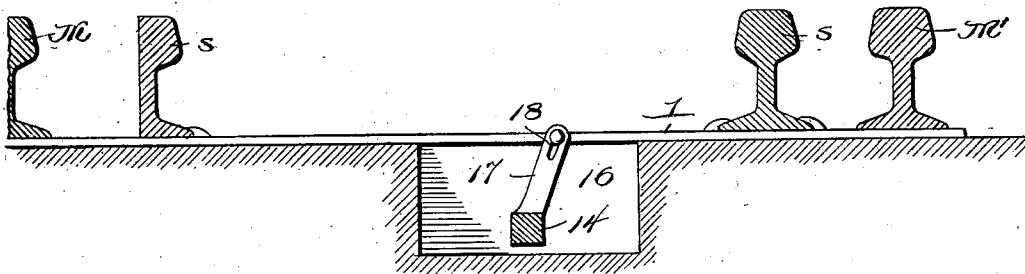


Fig. 3.

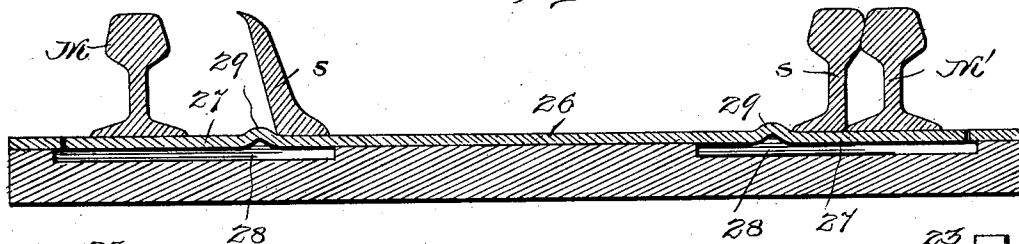
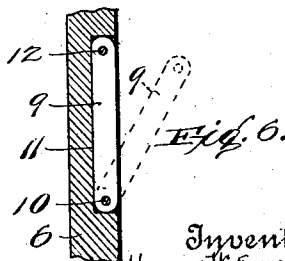
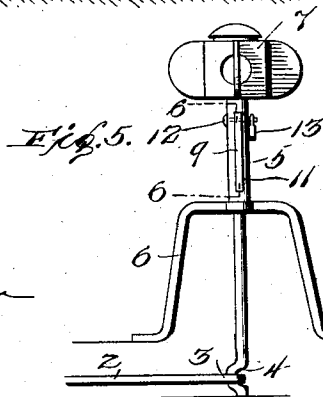
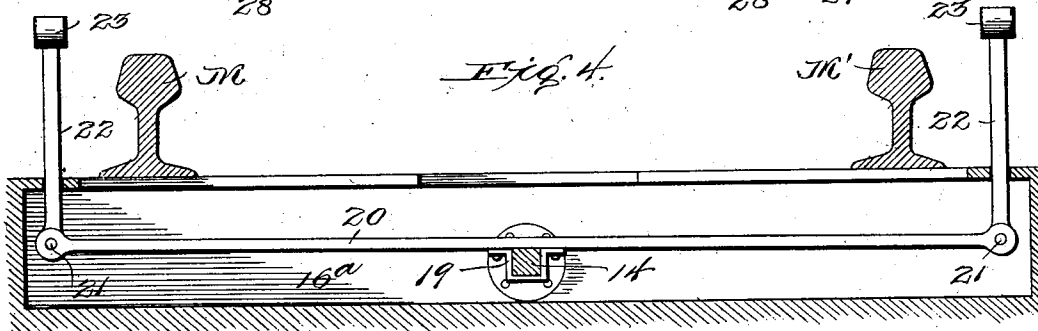


Fig. 4.



Witnesses  
*J. S. Kockman*  
*E. S. Roy.*

Inventors  
 Horace H. Summers  
 and Charles R. Summers,  
 by *S. T. Kolhaupfer.*  
 Attorney.

# UNITED STATES PATENT OFFICE.

HORACE W. SUMMERS, OF ELYRIA, AND CHARLES R. SUMMERS, OF  
NORWALK, OHIO.

## AUTOMATIC RAILWAY-SWITCH.

**SPECIFICATION** forming part of Letters Patent No. 747,501, dated December 22, 1903.

Application filed April 30, 1903. Serial No. 154,951. (No model.)

*To all whom it may concern:*

Be it known that we, HORACE W. SUMMERS, residing at Elyria, in the county of Lorain, and CHARLES R. SUMMERS, residing at Norwalk, in the county of Huron, State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Automatic Railway-Switches, of which the following is a specification.

This invention relates to an improvement in railway-switches, and has special reference to that type of switches commonly known as "automatic" switches and designed to be operated from the train both in the opening and closing operation.

To this end the invention contemplates a simple and practical form of switch-operating mechanism comprising means whereby an ordinary switch may be shifted at the will of the engineer without stopping the train or even slackening its speed and after the passage of the train may be set back into its original condition, so that a passing train, for which a preceding train may be switched off onto the siding, may be run up onto the main track in perfect safety. In this connection the invention contemplates a switch-operating mechanism which permits the engineer to automatically throw the movable switch-rails to open the switch sufficiently in advance of the locomotive reaching the same and which also provides means for automatically closing or restoring the switch to its original condition when the last car or caboose of the train has passed onto the siding.

A further object of the invention is to provide a switch-operating mechanism controlled from the train which may be associated with a switch-stand designed to be operated by hand, should it be necessary or desirable for any reason to manually operate or throw the switch. A special object of the invention in this particular resides in the provision of a switch-stand embodying means whereby the operating parts of the switch mechanism may be actuated for throwing the movable switch-rails, while at the same time the switch-stand remains in a locked condition against tampering by unauthorized agencies, so that only an authorized person hav-

ing a key to the lock of the switch-stand may be able to throw the switch-rails one way or the other by hand. This is a very advantageous and practical feature of the present invention, inasmuch as the ordinary types of automatic switches cannot usually be employed with a switch-stand on account of the latter being necessarily normally locked against operation.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts, which will be hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in the carrying out of the objects above indicated are necessarily susceptible to structural modification without departing from the scope of the invention; but a preferable embodiment thereof is shown in the accompanying drawings, in which—

Figure 1 is a plan view of a section of main track and siding, illustrating a switch equipped with the switch-operating mechanism and switch-stand improvement contemplated by the present invention. Fig. 2 is a transverse sectional view of the switch on the line 2 2 of Fig. 1. Fig. 3 is a similar view on the line 3 3 of Fig. 1, showing more plainly the construction and action of the preferable form of switch-rail lock to provide for fastening or securing the points of the movable switch-rails against lateral displacement or movement in either a closed or open position. Fig. 4 is a transverse sectional view on the line 4 4 of Fig. 1, showing more plainly the mounting and action of one of the vertically-oscillating transverse tread-levers associated with each end of the operating rock-shaft which projects into the contiguous portions of the main track and siding. Fig. 5 is a detail view, showing the modification contemplated in the construction of the switch-stand to provide for keeping the same in normally locked condition against operation by hand, while at the same time permitting of the actuation of the switch-operating mechanism from the train. Fig. 6 is a detail sectional

view on the line 6 6 of Fig. 5, showing the mounting of the flush-seated switching-handle for the switch-stand turn-post.

Like reference characters designate corresponding parts throughout the several figures of the drawings.

In carrying out the invention no change is contemplated in the track or switch construction *per se*, thereby rendering the switch-operating mechanism applicable to any ordinary types of switches for heading-in a train onto a siding. Hence for illustrative purposes there is shown in the drawings a section of main track embodying the main-track rails M M' and a section of an ordinary siding S, associated with the main track and including as a part thereof the usual transversely-shiftable switch-rails s, having a throw to and from the main-track rails in the usual manner to provide for opening and closing the switch according as the train is to pass onto the siding S or straight along the main track past the switch.

One of the features of the present invention is to permit of the operation of the switch-rails s from a switch-stand at one side of a track, so that the switch may be opened or closed by hand, should this for any reason be desirable or necessary, while at the same time providing a switch-stand device which under normal conditions is locked against tampering by unauthorized agencies. To provide for the throw of the switch-rails by hand or through the medium of the automatically-controlled switch-operating mechanism, there is associated with the switch-rails s a transversely-arranged reciprocatory shifting switch-bar 1, rigidly coupled to both of the switch-rails contiguous to the points thereof which cooperate with the adjacent portions of the main-track rails. The said transversely-disposed reciprocatory switch-bar 1, by reason of its rigid coupling with both of the switch-rails, provides for the movement of such rails in unison during the opening and closing action of the switch, and said switch-bar 1 is extended beyond one side of the main track and is connected to an adjusting-rod 2, which has an operative connection 3 at its outer extremity with the crank or equivalent 4 at the lower end of the switch-stand turn-post 5, constituting a part of the switch-stand device contemplated by the present invention. The switch-stand turn-post 5 is mounted in any suitable manner in an upright position within the bracket 6 of the switch-stand, which may be of the conventional form and is designed to sustain or carry in the usual manner at the upper end thereof the lamp or equivalent switch-signal 7, which indicates to the engineer whether the switch is open or closed.

In order to permit the turn-post 5 to turn when the automatic switch-operating mechanism is actuated, while at the same time be prevented from being operated by hand except when through authorized agencies, the

present invention contemplates a construction wherein under normal conditions there are no projections from the turn-post which would permit of sufficient leverage being imposed thereon to turn the same for operating the switch. Unless such leverage is provided the enormous friction of parts in conjunction with the pressure of the switch-closing spring 8 would prevent the manual throwing of the switch. The expedient resorted to in the present invention for securing the results stated is preferably in the employment of a normally flush-seated switching-handle 9. As plainly shown in Figs. 5 and 6 of the drawings, the switching-handle 9 simply consists of a straight bar-lever pivotally connected at one end, as at 10, to the turn-post 5 and adapted to fit flush within a handle-mortise 11, channeled out longitudinally in one side of the turn-post. When seated flush within its mortise 11, the free end of the pivoted switching-handle 9 is adapted to be held locked to the post through the medium of a suitable fastening-bolt 12 and padlock 13. With this construction when it is desired to operate the switch by hand the trainman or track-hand unlocks the lock 13, thereby releasing the free end of the handle 9, so that the same may be swung out of its mortise and be drawn upon to place the necessary leverage upon the turn-post for turning the same upon its vertical axis, and thereby operating the switch through the medium of the adjusting-rod connection 3.

The switch-closing spring 8 is preferably connected with the adjusting-rod 2 at one side of the main track and bears at one end against a fixed abutment 8<sup>a</sup>, so as to normally exert its tension or pressure in a direction for holding the switch normally closed and resisting the tendency to open the same.

The switch-operating mechanism controlled from the train is likewise associated with the transversely-disposed reciprocatory switch-bar 1. This switch-operating mechanism includes an operating rock-shaft arranged between and below the plane of the track-rails and extending through the plane of the switch, so as to project a distance into both the main track and the siding. In other words, this main operating rock-shaft bridges the switch, so that it may be operated by a train approaching the switch and also by a train after it has run past the switch into the siding. This main operating rock-shaft may be constructed and mounted in any suitable manner, so it will occupy this location and relation with reference to the switch, the main track, and the siding; but a preferable and practical construction is shown in the drawings, in which the said shaft is illustrated as being constructed in separate sections, which though operating in unison practically as a single shaft, yet may be respectively designated as the "main-track" shaft-section 14 and the "siding-track" section 15, arranged longitudinally in suitable boxings or chambers 16, provided beneath the ties and

coupled at their adjacent or adjoining ends, respectively, to opposite sides of the shifting switch-bar 1 through the medium of suitable rock-arm connections 17, preferably in the form of links rigid with the ends of the shaft-sections and having pin-and-slot connections 18 with the switch-bar 1, whereby the rocking movement of the shaft-sections will be transferred through said links to the bar 1 and provide for the reciprocation thereof to effect the lateral shifting movement of the switch-rails *s*. Any suitable type of links or bars 17 may be employed, so long as the same provide the necessary rock-arm motion for translating the rocking of the shaft-sections 14 15 into a reciprocatory movement for actuating the switch-bar 1.

Referring particularly to the main-track rock-shaft section 14, it will be observed that the same is arranged centrally and longitudinally of the same track-section adjoining the switch, and the said shaft-section is held fixed in this position through the medium of suitably-arranged bearings provided in the ties or in the boxing or chamber which serves as a housing for the said shaft-section. At the end of said shaft-section opposite its rock-arm connection or at the end thereof most remote from the switch-rails the same has rigidly coupled thereto, through the medium of any suitable coupling connection 19, a vertically-oscillating transverse tread-lever 20, mounted beneath the plane of the track-rails and operating in a cross portion 16<sup>a</sup> of the boxing or housing for the switch-operating mechanism. The vertically-oscillating transverse tread-lever 20 is coupled at its center to the end of the rock-shaft section remote from the switch and is of sufficient length to extend at its end beyond the outside of the plane of the track-rails, and to such ends the tread-lever has pivotally connected, as at 21, the lower ends of vertically-movable push-stems 22, the upper ends of which carry tread-plates 23, preferably of segmental form and adapted to be engaged by correspondingly-shaped actuating-shoes 24, carried at the lower ends of controlling-stems 25, operated in any suitable manner from the locomotive, tender, or other part of a train, as may be desired. A similar equipment is provided for the end of the siding rock-shaft section 15 remote from its coupled connection with the switch-bar 1. To such remote end of the rock-shaft section 15 is coupled, as at 19<sup>a</sup>, the central portion of a transversely-arranged vertically-oscillating tread-lever 20<sup>a</sup>, carrying at its ends the push-stems 22<sup>a</sup>, to the upper ends of which are fitted the segmental tread-plates 23<sup>a</sup>, designed to also be engaged by the actuating-shoe 24, designed to be thrown to an interfering position from the train.

From the construction described it will be obvious that an approaching train from the locomotive or tender thereof may have projected to an interfering position the actuat-

ing-shoe 24, which will come in contact with the tread-shoe 23 at one side of the main track, causing said shoe to be depressed, with the consequent oscillation of the tread-lever 20 and the turning of the rock-shaft section 14, which operation of parts effects an actuation of the switch-bar 1 in a direction, for instance, to open the switch, so that the train without stopping may pass onto the siding. After such train has passed off of the switch into the siding the projection of one of the actuating-shoes 24 from the last car or caboose will permit such shoe to come into engagement with one of the tread-plates 23<sup>a</sup> of the lever connections with the siding shaft-section 15, thereby causing an oscillation of such siding shaft-section in a direction to restore the switch to its original closed condition. If a signal should indicate that the switch was open, an engineer by operating the tread-lever 20 from the opposite side could close the same in advance of reaching the switch, so that it will thus be obvious that the opening and closing of the switch for main-track and siding purposes is completely under control of the train without stopping the same.

To provide for guarding against accidental displacement of the switch-rail points when the same have been adjusted to their positions, there is preferably associated with the same a switch-rail lock. In the construction shown this switch-rail lock consists of a plate member or members 26, fitted to one of the ties of the track over which plays the points of the switch-rails, and adjacent to the main-track rails the said member 26 is suitably provided with the pressure-locking springs 27, of flat leaf form and designed to have a vertical play sufficient to permit of the switch-rail points being forced over the same to either open or closed positions. The vertical play of the flat pressure-locking springs 27 may be provided for by forming cavities or recesses 28 in the tie upon which the plate member 26 is mounted. In the construction illustrated the pressure-locking springs 27 are in the form of flat spring-tongues stamped out of the plate 26 and provided at a point intermediate thereof with the crimps or bends, producing holding-shoulders 29, which are disposed a sufficient distance inside of the plane of the adjacent rails so as to engage at either side of the movable switch-rail points, according to whether such points are in open or closed positions with reference to the adjacent track-rail. Hence it will be obvious that in the movement of the switch-rails the same are forced over the shoulders 29 to positions at the outer or inner sides of such shoulders, so that the latter will necessarily act in the capacity of spring-locks for such switch-point rails in either of their positions. This is plainly shown in Fig. 3 of the drawings, and the construction provides for positively securing the switch-rails against lateral displacement after once having been set.

It will be observed that the construction

described provides a switch-operating mechanism arranged entirely below the ties and whose actuating parts are located outside of the plane of the track, thus presenting no 5 projections inside of the rails which could be engaged by hanging obstructions on the train or otherwise interfere with the free passage-way of the track.

From the foregoing it is thought that the 10 construction, operation, and many advantages of the herein-described switch will be readily apparent without further description.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In an automatic switch, the combination 15 with the transversely-shiftable switch-rails, of a train-actuated switch-operating mechanism having an operative connection with said 20 rails, a switch-stand device also operatively related to the switch-rails and normally frictionally locked against manual movement, but operable, through a slip action, in unison 25 with the train-actuated switch-operating mechanism, and a switch-rail lock having pressure-locking means engaged with the points of the switch-rails.

2. In an automatic switch, the combination 30 with the transversely-shiftable switch-rails and the switch-bar connecting the same, of a main operating rock-shaft consisting of separate main-track and siding shaft-sections extending 35 respectively into the main track and siding and both having at their contiguous ends rock-arm connections with the switch-bar, each of said rock-shaft sections being disposed 40 longitudinally of the tracks and provided at their ends remote from the switch with a vertically-oscillating transverse tread-lever, and vertically-movable push-stems pivotally 45 connected with the ends of the tread-levers and provided at their upper ends with tread-plates for engagement with a train-carried member.

3. In an automatic switch, the combination 50 with the transversely-shiftable switch-rails and the switch-bar connecting the same, of an operating rock-shaft consisting of separate

main-track and siding shaft-sections extending 55 longitudinally into the main track and sidings, respectively, said rock-shaft sections operating synchronously and having similar rock-arm connections at their contiguous ends with the switch-bar, and at their opposite 60 ends being provided with vertically-oscillating transverse tread-levers having vertically-movable tread connections with their opposite 65 extremities disposed outside of the plane of the track-rails, and a switch-rail lock having pressure-locking devices normally engaged 70 with the points of the switch-rails.

4. In a switch, the combination with the transversely-shiftable switch-rails and the switch-bar connecting the same, of a switch-operating mechanism including a train-actuated 75 rock-shaft having an operative connection with the switch-bar, and a switch-rail lock consisting of flat spring-locking tongues arranged for limited vertical play beneath 80 the points of the switch-rails and provided with upstanding holding-shoulders over which the switch-rail points are forced to open 85 and closed positions.

5. In an automatic switch, the combination 90 with the switch-rails and the switch-bar connected therewith, of a train-actuated switch-operating mechanism operatively connected with the switch-bar, and a switch-stand and signal device also operatively connected with 95 the switch-bar, said switch-stand device including a vertically-arranged turn-post, and a normally locked switching-handle pivotally fitted to said post and normally seated flush 100 within the surface thereof, substantially as set forth.

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

HORACE W. SUMMERS.  
CHARLES R. SUMMERS.

Witnesses for H. W. S.:  
HENRY W. INGERSOLL,  
LEE S. DAY.

Witnesses for C. R. S.:  
RALPH S. LEONARD,  
MARION W. BACOME.