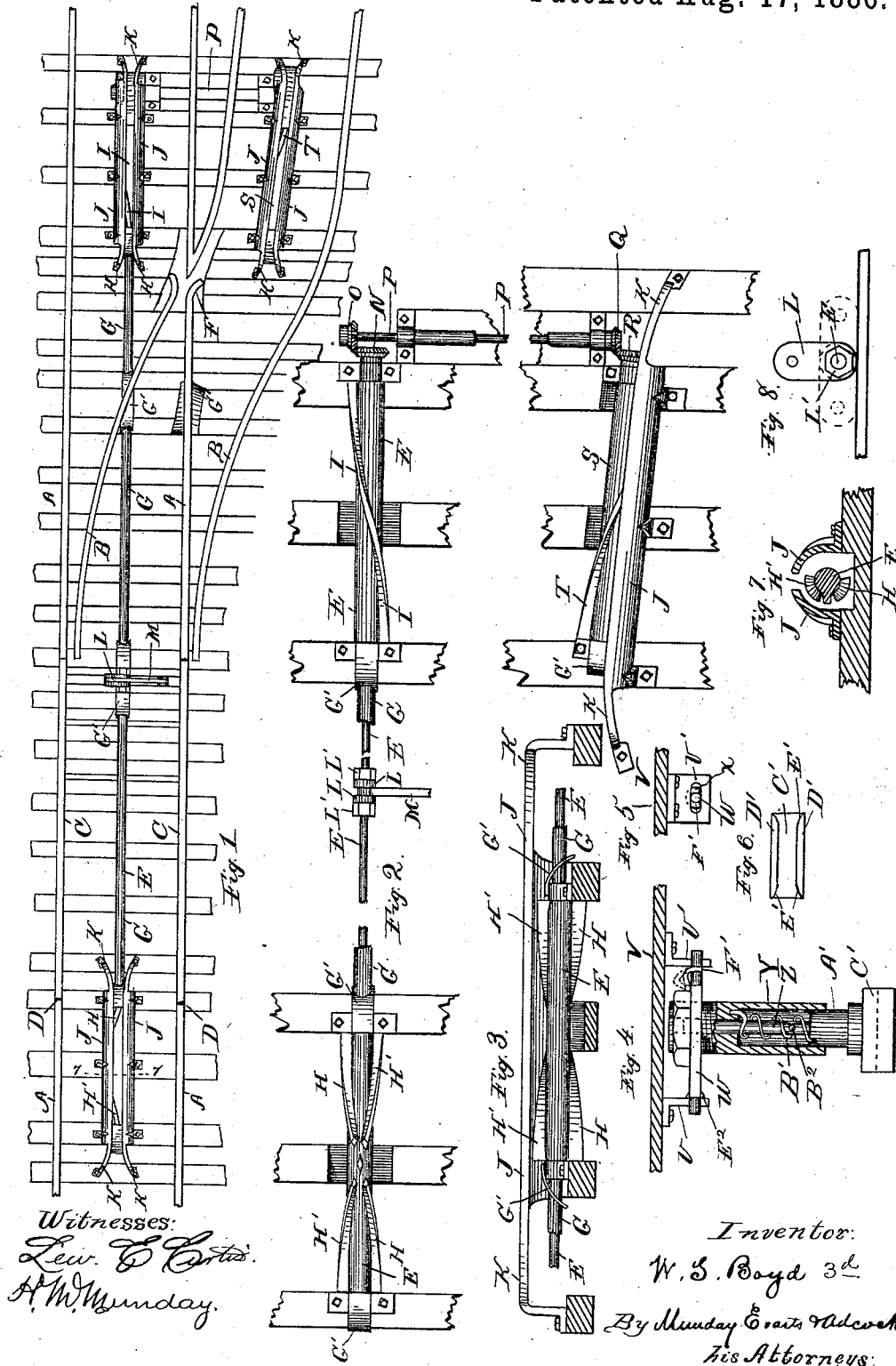


(No Model.)

W. S. BOYD, 3d.  
AUTOMATIC RAILROAD SWITCH.

No. 347,317.

Patented Aug. 17, 1886.



# UNITED STATES PATENT OFFICE.

WILLIAM S. BOYD, 3D, OF CHICAGO, ILLINOIS.

## AUTOMATIC RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 347,317, dated August 17, 1886.

Application filed December 21, 1885. Serial No. 186,233. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. BOYD, 3d, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Automatic Railroad-Switches, of which the following is a specification.

This invention relates to automatic railroad-switches of that class which may be operated at will by the attendants of trains passing over the same; and it has for its object to provide a device of this class in which the switch-rails shall be automatically set, so as to register with the rails of the main track, by a train coming either from the main track or from a siding, provided that they do not already so register, in which case they will remain undisturbed, and in which a train passing from the main track may operate to set the switch at will, so as to register either with the main track or the siding, thus causing the train to travel accordingly.

With these ends in view the invention consists, first, in a shaft arranged longitudinally between the rails of the main track and provided at one end, near the pivoted end of the switch, with two spirally-arranged flanges, right and left hand, intersecting each other, and at its opposite end with a single spiral flange, said shaft being provided with a crank connected by a pitman with the free end of the switch; secondly, a shaft arranged longitudinally between the rails of the siding, near the end of the same, and having a spiral flange; thirdly, a counter-shaft equipped with pinions meshing with pinions upon the ends of the said longitudinal shafts, which may thus be simultaneously operated; fourthly, in a shoe or shoes mounted upon swinging or adjustable rods attached to the engine, and, if desired, also to the rear car of the train, in such manner as to be under the control of the engineer and train hands who, by lowering the said shoe, may cause it to engage the spiral flanges of either the main or siding shaft, as the case may be, thereby setting or shifting the switch when desired.

The invention further consists in the improved construction and arrangement of details, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, in which like parts are indicated by similar letters of reference, Figure 1 is a plan view of my improved automatic switch, showing the switch-rails registering with those of the main track. Fig. 2 is a plan view of the switch-operating shafts, which have been half-way turned for the purpose of showing the spiral flanges, the guides covering said flanges having also been removed. Fig. 3 is a side view of the end of the operating-shaft having the double spiral flange, with the guide or cover removed. Fig. 4 is a side view, partly in section, showing the attachment of the operating-shoe to the under side of a locomotive or car. Fig. 5 is an end view of one of the hangers supporting the said shoe and its attachments. Fig. 6 is a bottom view of the shoe. Fig. 7 is a section on line 7 7 in Fig. 1; and Fig. 8 is an end view of the crank upon the main operating-shaft, with dotted lines showing said crank in different positions.

In said drawings A A designate the rails of the main track; B B, those of the siding; and C C are the switch-rails, which are pivoted in the usual manner at D D.

E is a shaft arranged longitudinally in suitable bearings between the rails of the main track, and extending at one end beyond the point at which the switch-rails are pivoted and at the other end beyond the frog F, where the inner siding-rail crosses the main track. Said shaft is incased, wherever practicable, by tubing G, to protect it from the weather or obstructions of any kind. One end of shaft E, near the pivoted end of the switch, is provided with right and left hand spirally-arranged flanges H H' crossing or intersecting each other, as shown in Fig. 2, and slotted at the point of intersection, so as to admit of the passage of the operating-shoe, as will be hereinafter described. These slots, crossing each other, form at the intersection of the flanges a diamond-shaped projection which serves to carry the operating-arm across the point of intersection, and to insure its being guided in its proper direction. Without this diamond-shaped projection the arm would be liable to switch off upon the other flange and reverse the rotation of the cam. The other end of shaft E has a single spiral flange, I. The

flanges at both ends of the shaft are protected by guide-covers J J which may be curved in shape, and which should be placed a sufficient distance apart to admit of the passage between them of the operating-shoe when the latter engages the flanges of the shaft. The ends of the said guides or covers are rounded or flared, as shown at K K, so that they will with certainty guide the operating-shoe into engagement with the spiral flanges when it shall be desired to operate the switch. The shaft E is provided at a point nearly opposite the free end of the switch with an arm or crank, L, which is connected by a pitman, M, with one of the switch-rails. This arm or crank should be of such a length that a half-revolution of the shaft will cause the switch-rails, operated thereby, to register either with the main track or the siding, according to the direction in which the shaft is turned. Said crank should also be so arranged that when the main shaft is operated it will pass slightly beyond the center or axis of rotation to either side, thereby serving to lock the shaft in the position in which it may be placed or adjusted. The end of the shaft E, which extends to the siding, has a pinion, N, meshing with a pinion, O, on one end of a counter-shaft, P, the other end of which is also provided with a pinion, Q, in turn meshing with a pinion, R, on one end of a shaft, S, arranged longitudinally between the rails of the siding and having a spirally-arranged flange, T. When, as in the drawings hereto annexed, the pinions N O Q R are so disposed as to cause the shafts E S to turn in the same direction, the flanges I and T should be right and left hand. When the shafts turn in opposite directions, the flanges will both be either right or left hand, as the case may require. The flange T of shaft S is protected by guides or covers J J in the same manner as the flanges of the main shaft E.

Beneath the locomotive, and also, if desired, beneath the rear car of the train, are placed the operating-shoes, which are under the control, respectively, of the engineer and the train hands or conductor, and the former of which serves to set the switch for the passage of the train, while the latter may be used to change the switch for following trains. The construction and operation of said shoes being identical, only one need be described.

U U' are hangers or brackets, secured under the truck-frame V of the locomotive or car, and having bearings for a longitudinal shaft, W, the bearing in one of the hangers, U, consisting of a horizontal slot, X, which admits of a laterally-sliding movement of one end of the said shaft. The latter carries a downwardly-extending cylindrical tube or casing, Y, in which is placed a vertically-sliding rod, Z, having at its lower end a follower, A', between which and the upper end of the casing is arranged a spring, B', coiled around the rod Z, and serving to force the latter, with its attachments, in a downward direction, a pin or stop, B<sup>2</sup>, being, however, arranged so as to prevent

its being forced entirely out of the casing. The upper and lower ends of the spring are attached, respectively, to the upper end of the casing and to the follower A', so that the said rod, while it is free to oscillate slightly, shall be prevented from revolving entirely in its bearings. The extreme lower end of the rod Z carries the shoe C', which may be described as consisting of a rectangular block, provided at its sides with parallel downwardly-extending flanges D' D', beveled at their ends, as at E', so that they will readily and certainly engage the spiral flanges of the operating-shafts, which will in practice pass between the said flanges D' D'.

The method of placing and securing the shaft W in its hangers has been shown in Fig. 4. One end of said shaft is first passed, from the inside, through the bearing in the hanger U' a sufficient distance to enable the other end of the said shaft to be adjusted in the slot X in the hanger U, and drawn back until a collar, E<sup>2</sup>, formed upon the shaft, strikes the said hanger. A latch, F', pivoted to the opposite end of the shaft or its attachments, is then thrown down against the hanger U', thus securing the shaft in such a manner as not to interfere with its freedom of motion, while at the same time it, with its attachments, may be readily removed from one car to another, as occasion may demand.

The operating-shoe may be thrown out of or into operation by means of a suitably-arranged chain, cord, system of levers, or other appropriate mechanism, whereby it may be swung laterally, to either side, so as to raise it out of engagement with the spiral flanges of the operating-shaft, or by which it may be lowered, so as to engage said flanges. This mechanism has not, however, been shown in the drawings hereto annexed. A cord attached to the shaft and led to the interior of the locomotive or car will serve the purpose, as such cord will hold the apparatus up laterally out of the way, and when loosened will allow it to swing into position.

At suitable points at the ends of the spiral flanges, and also at the points where the operating-shoe, when the train passes, will cross the rails of the side-track, I arrange suitable beveled or inclined guides, G', which shall prevent the shoe from striking against the ends of the said flanges or the rails, which might involve danger of breakage. When the shoe, on the contrary, strikes the said inclined guides, it will be gradually forced upward against the tension of the spring B' until it engages the flanges, or passes over the rails, as the case may be.

The operation of this invention will be readily understood from the foregoing description taken in connection with the drawings hereto annexed. When a train traveling upon the main track finds the switch in proper position or closed, the shoe will be allowed to remain swung out of action, unless it shall be desired to change the switch after the passage of the

train, in which event this may be accomplished by lowering the shoe of the rear car, which will then engage the appropriate spiral flange of the main shaft into engagement with which it is guided and held by the guides or covers J J', imparting to the latter a one-half revolution, and thus shifting the switch. A train passing from the siding onto the main track will invariably lower the operating shoe, which, if the switch be open, will serve to close it.

The method herein described of hanging the shoe will enable the latter to turn slightly in its bearings and adapt itself to the spiral flanges, thus enabling the operation to take place easily, and without much wear or friction. The spiral flanges of the operating-shafts may be formed directly upon the latter, or, preferably, upon cylindrical enlargements formed upon or secured on the same; but the said spiral flanges may be entirely dispensed with, and in their place spiral grooves may be formed in the shafts, or in suitable cylinders or drums upon the same. This latter construction would involve a slight modification in the operating-shoe, which would then consist of a simple rectangular block.

In order that the switch may be operated by hand, I provide the shaft at or near the crank with a square portion or nut, lettered L' in the drawings. A wrench applied to this part will enable the shaft to be turned by hand and the switch thrown over.

I would state that while I consider the construction and arrangement of parts herein described the most advantageous for reducing my invention to practice, I do not limit myself in this respect, but reserve the right to all such changes and modifications of detail as may be resorted to without departing from the object of my invention.

I claim—

1. The main operating-shaft provided at one end with right and left hand spiral flanges or grooves intersecting each other and adapted to be operated by a shoe or shoes of a passing train, whereby the said operating-shaft may be turned in either direction and thus operating a switch, the free end of which is connected by a pitman with an arm or crank upon the operating-shaft, substantially as set forth.

2. The herein-described guides or covers having flared ends arranged over the spiral flanges upon the operating-shafts a sufficient distance apart to admit of the passage of the operating-shoe, which is thereby guided and held in engagement with the said spiral flanges, substantially as set forth.

3. In an automatic switch, a main operating-shaft arranged longitudinally between the rails of the main track and having at one end two spiral intersecting flanges or grooves and at the other end a single spiral flange or groove, a pitman connecting the free end of the switch with an arm or crank upon the said shaft, a shaft arranged longitudinally between the rails of the siding and having a

single spiral flange or groove, and a counter-shaft having pinions meshing with pinions upon the ends of the operating-shafts, all arranged and operating substantially as set forth.

4. The inclined guides arranged at the ends of the spiral flanges upon the operating-shafts and at the points where the operating-shoe will cross the siding-rails for the purpose of guiding the said shoe gradually in an upward direction and thereby avoiding breakage, substantially as set forth.

5. The main operating-shaft arranged between the rails of the main track and extending from a point beyond the pivotal end of the switch to a point beyond the frog where the inner siding-rail crosses the main track, said shaft being provided at its former end with two intersecting spiral flanges or grooves, and at its latter end with a single spiral flange or groove, substantially as set forth.

6. The automatic switch-operating mechanism consisting of a shoe mounted upon a vertically-sliding rod attached to the locomotive or rear car of a train, or both, said shoe being constructed and adapted to engage the spiral grooves or flanges on the operating-shafts of the switch, substantially as and for the purpose set forth.

7. The operating-shoe consisting of a rectangular block provided on its under side with parallel downwardly-extending flanges beveled at their ends and adapted to engage spiral flanges upon the switch-operating shafts, substantially as set forth.

8. The operating-shoe mounted upon a vertically-sliding rod arranged in a tubular casing, which is in turn attached to a longitudinal horizontal shaft, whereby the said casing may be swung laterally, so as to raise the shoe out of engagement with the spiral flanges or grooves upon the switch-operating shafts, in combination with the shaft and spiral flanges, substantially as set forth.

9. The operating-shoe mounted upon a vertically-sliding rod arranged in a casing which is attached to a shaft having near one end an annular collar and near the other end a pivoted latch, whereby the said shaft with its attachments may be mounted detachably in hangers, one of which is provided with a horizontal slot, substantially as set forth.

10. In an automatic switch, the operating-shafts having spiral flanges or grooves, the covers or guides for the same having inclined or beveled ends, and the laterally swinging and adjustable vertically-movable and slightly-oscillating or laterally-movable operating-shoe attached to the under side of the train and adapted to enter between the guides or covers and thereby be held in engagement with the spiral flanges or grooves of the operating-shafts, substantially as and for the purpose set forth.

11. In an automatic switch operated by a spiral cam, the operating-shoe hung by springs to have a slight freedom of motion,

as indicated, so as to accommodate itself to the guides, substantially as specified.

12. In a switch-operating spirally flanged cam constructed to lie lengthwise with the track and to be operated by the moving train through the medium of a dependent arm, the employment of two spiral flanges crossing each other and furnished at their intersec-

tion with a diamond-shaped piece at the center to cause the arm to follow the flange in the direction in which it started, substantially as specified.

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Witnesses:

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LEW. E. CURTIS.