June 1, 1937. L. WYANT 2,082,133

RAILWAY SWITCH OPERATING APPARATUS

Filed May 28, 1932

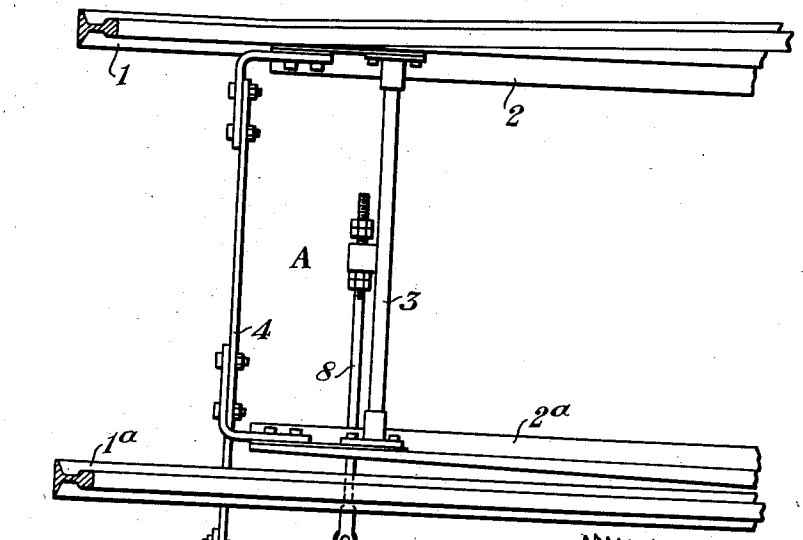


Fig.1.

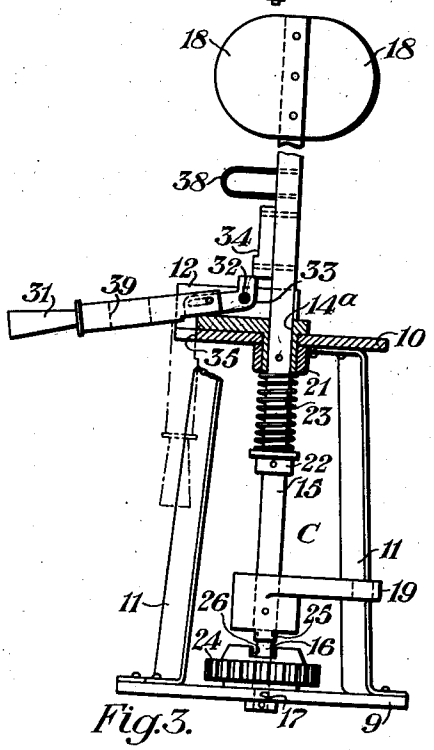


Fig.3.

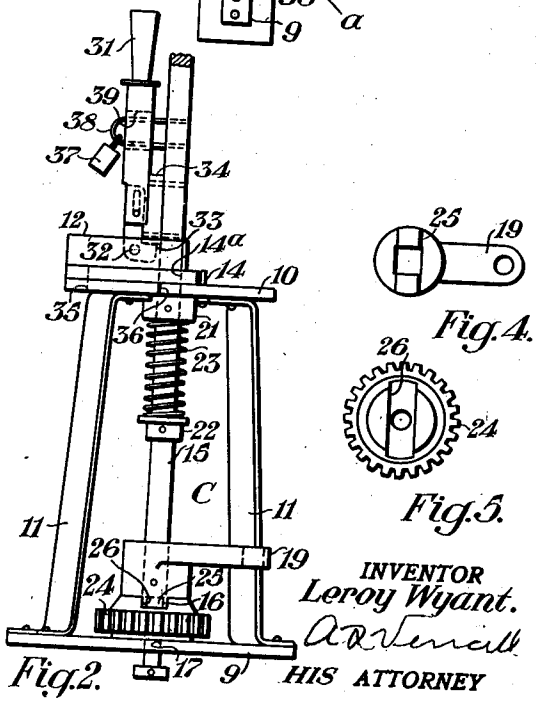


Fig.2.

Fig.4.

Fig.5.

INVENTOR
Leroy Wyant.
By A. R. Metcalf
HIS ATTORNEY

Patented June 1, 1937

2,082,133

UNITED STATES PATENT OFFICE

2,082,133

RAILWAY SWITCH OPERATING APPARATUS

Leroy Wyant, Chicago, Ill.

Application May 28, 1932, Serial No. 614,241

20 Claims. (Cl. 246—240)

My invention relates to railway switch operating apparatus, and has for an object the provision of novel and improved means for permitting operation of a switch either by a power device or by a manually operable lever.

I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claims.

In the accompanying drawing, Fig. 1 is a top plan view, partly diagrammatic, showing a railway switch provided with one form of operating apparatus embodying my invention. Fig. 2 is a view of a portion of the apparatus shown in Fig. 1 looking in the direction of the arrow *a*, and showing the parts in their normal positions. Fig. 3 is a view similar to Fig. 2, but partially sectioned to better illustrate the construction and showing the parts in a different position. Fig. 4 is a bottom view of the arm 19 forming part of the apparatus shown in the preceding views. Fig. 5 is a top plan view of the gear wheel 24 forming part of the apparatus shown in Figs. 1, 2 and 3.

Similar reference characters refer to similar parts in each of the several views.

Referring first to Fig. 1, the reference character A designates a railway switch, and the reference character B designates a mechanism for operating it. The switch A is of the ordinary and well-known construction, and comprises the usual stock rails 1 and 1a and movable switch points 2 and 2a, the switch points being connected together for simultaneous movement by a head rod 3 and a lock rod 4.

The operating mechanism B may be of any suitable type, and in the form here shown comprises a motion plate 5 and a locking device 6. The motion plate 5 actuates an operating rod 7 which is connected to the throw bar 3 of the switch A by means of the usual throw rod 8, and the locking device 6 cooperates with the lock rod 4 to lock the switch points in the two extreme positions of the switch in the usual and well-known manner.

The apparatus thus far described is all of standard construction, and its operation will be readily understood from an inspection of the drawing without further description.

Associated with the switch operating mechanism B is a combined switch stand and selector mechanism C embodying my present invention, which latter mechanism I will now describe. As best seen in Figs. 2 and 3, the mechanism C in the form here shown comprises a suitable supporting framework made up of a base plate 9 and a top plate 10 secured together in parallel spaced relationship by means of inclined standards 11. A channel shaped bracket 12 is mounted in the top plate 10 for rotation between two fixed stops 13 and 14, and is provided with a square hole 14a extending vertically therethrough which receives the usual switch actuating shaft 15 with some clearance. This shaft is square in cross section except for a circular extension 16 at its lower end which projects through, and is rotatably and slidably mounted in, a hole 17 in the base plate 9.

Secured to the shaft 15 at its upper end is a suitable signal, here shown as a pair of parallel vanes 18, and fixed to the shaft adjacent its lower end, is an arm 19. The arm 19 is connected with the motion plate 5 of the switch operating mechanism B by means of a link 20, the parts being so proportioned that rotation of the shaft 15 between the position in which the bracket 12 engages the stop pin 13 and the position in which the bracket 12 engages the stop pin 14, will move the motion plate 5 between its two extreme positions.

A compressed coil spring 23 surrounds the shaft 15 between a collar 21 which holds the bracket 12 in place and a collar 22 which is fixed to the shaft, and acts, together with the weight of the shaft, to bias the shaft to the relative vertical position in the supporting framework in which it is shown in Fig. 2, this being the normal vertical position of the shaft. When the shaft 15 occupies this vertical position, a gear wheel 24, which is journaled on the circular extension 16 between the arm 19 and the base plate 9, is operatively connected with the shaft by means of a suitable clutch device here shown as comprising a clutch member 25 formed on the hub of the arm 19 (see Fig. 4) and cooperating with a clutch jaw 26 formed in the upper face of the gear wheel 24 (see Fig. 5). The gear wheel 24 is adapted to be rotated by a suitable power device in a manner to rotate the shaft 15 between its two extreme positions, and for this purpose, this gear wheel as here shown is connected with an electric motor 27 through the medium of reduction gearing indicated in the drawing by a pinion 28 and the dash line 29. The means for controlling the motor 27 forms no part of my present invention, and is therefore not shown in the drawing.

The mechanism C also comprises a lever 31 by means of which the shaft 15 may at times be manually rotated between its two extreme positions. The lever 31 is pivotally mounted between

the parallel vertically extending sides of the bracket 12 by means of a pin 32, and normally occupies an upright vertical position in which it is parallel with the shaft 15, as shown in Fig. 2. This lever, however, is adapted to be at times rotated downwardly through an angle of approximately 90° to a position in which the lever is substantially perpendicular to the shaft 15, this rotation of the lever acting, through the medium of a cam 33 formed on the inner end of the lever and cooperating with a cam follower 34 secured to the shaft, to raise the shaft against the bias of its weight and of the spring 23, from its normal position to the position in which it is disconnected from the gear wheel 24, in which latter position it is illustrated in Fig. 3. When the shaft occupies this latter position, it will be apparent that it may be rotated between its two extreme positions by rotating the lever 31 in a horizontal plane.

The lever 31 also serves as a means for at times locking the parts against accidental displacement in one or the other of their extreme positions, and for this purpose the lever is made in two sections connected together by a pin-and-slot connection in such manner that, if the outer section is pulled outwardly when the shaft 15 is rotated to either of its two extreme positions, it may be dropped to a depending vertical position in which it will enter one or the other of two spaced peripheral notches 35 and 36 formed in the top plate 10. The position which the lever assumes when its outer end is dropped into the notch 35 is indicated by dot and dash lines in Fig. 3.

When the lever occupies its normal position, it may be locked in this position by placing a padlock 37 or other suitable locking device through the outer end of a staple 38 which is fastened to the shaft 15, and which passes through a suitable slot 39 in the outer section of the lever.

With the above described construction, it will be readily understood that when the manually operable lever 31 is locked in its normal position, rotation of the gear wheel 24 in the proper direction by the motor 27 will rotate the arm 19, shaft 15, bracket 12, and handle 31 as a unit, and that the rotation of the arm 19 in response to this rotation of the gear wheel 24 will actuate the motion plate 5 of the switch operating mechanism B in a manner to reverse the switch. When, however, the lever 31 is rotated in the vertical plane from its normal position to the position in which it extends at right angles to the shaft 15, the shaft 15 will become disconnected from the gear wheel 24, thus permitting manual operation of the shaft by rotating the lever 31 in the horizontal plane in the proper direction as previously described. It will also be readily understood that when the outer section of the lever is dropped into the notch 35 or the notch 36, rotation of the shaft 15 is prevented, with the result that the operating mechanism B, and hence the switch A, are then locked in the corresponding extreme position.

When the lever 31 is restored to its normal position after the switch has been operated by the lever, if the shaft 15 does not occupy the angular position in which the clutch member 25 can enter the clutch jaw 26, the clutch member will ride on the upper face of the gear wheel 24 until this gear wheel has been rotated to the proper angular position by the motor, at which time the spring 23 will force the shaft 15 to the position in which the clutch member can enter the clutch jaw, thus reconnecting the motor 27 with the shaft, and hence permitting subsequent operation of the shaft by the motor.

It should be particularly pointed out that with railway switch operating apparatus embodying my invention, the lever 31 performs three functions, that is to say, it serves as a means for disconnecting the shaft 15 from the gear wheel 24, as a means for rotating the shaft manually, and as a means for locking the parts against accidental displacement when the shaft 15 is disconnected from the motor.

One advantage of railway switch operating apparatus embodying my invention is that, with the exception of the operating handle being normally locked in an upright vertical position, the operation is identical to standard switch stand practice, thus making it easy for trainmen who are already familiar with the operation of switch stands to operate my improved apparatus.

Another advantage of railway switch operating apparatus embodying my invention is that the operating lever can be restored to its normal position to restore the apparatus to condition for power operation regardless of the position which the switch points occupy.

Still another advantage of railway switch operating apparatus embodying my invention is that, due to its simple design, it is reliable in operation, and is inexpensive to manufacture.

Although I have herein shown and described only one form of railway switch operating apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. In combination, a railway switch, a shaft adapted to be both rotated about its axis and to be moved longitudinally between a first and a second position, means connected with the shaft for operating said switch in response to rotation of said shaft, power means for rotating said shaft connected with the shaft when and only when the shaft occupies said first position, means for biasing said shaft to said first position, and a manually operable lever constantly connected with said shaft for moving said shaft in opposition to said biasing means and for rotating said shaft about its axis.

2. In combination, a railway switch, a shaft adapted to be both rotated about its axis and to be moved longitudinally between a first and a second position, means connected with the shaft for operating said switch in response to rotation of said shaft, a gear wheel mounted for rotation about said shaft, means for connecting said gear wheel with said shaft when and only when said shaft occupies its first position, power means for rotating said gear wheel, means for biasing said shaft to said first position, and a manually operable lever constantly connected with said shaft for moving said shaft in opposition to said biasing means and for rotating said shaft about its axis.

3. Railway switch operating apparatus comprising a bracket rotatable in a fixed plane between two extreme positions and provided with a hole extending therethrough, a switch actuating shaft extending through said hole and constrained to rotate in response to rotation of said bracket but free to slide longitudinally in said hole, means for biasing said shaft to one longi-

tudinal position relative to said bracket, a lever pivotally mounted in said bracket for rotation between a first position and a second position, means responsive to rotation of said lever from its first position to its second position for moving said shaft from said one longitudinal position relative to said bracket to another longitudinal position, and power means for rotating said shaft connected with the shaft when and only when the shaft occupies said one longitudinal position.

4. Railway switch operating apparatus comprising a bracket rotatable in a fixed plane between two extreme positions and provided with a hole extending therethrough, a switch actuating shaft extending through said hole and constrained to rotate in response to rotation of said bracket but free to slide longitudinally in said hole, means for biasing said shaft to one longitudinal position relative to said bracket, a lever pivotally mounted in said bracket for rotation between a first position and a second position, a cam operated by said lever, a cam follower secured to said shaft and cooperating with said cam to move said shaft from said one longitudinal position relative to said bracket to another longitudinal position in response to rotation of said lever from its first position to its second position, and power means for rotating said shaft connected with the shaft when and only when the shaft occupies said one longitudinal position.

5. A combined switch stand and selector mechanism comprising a supporting framework consisting of a top plate and base plate secured together in parallel spaced relation, said top plate being provided with a pair of spaced circumferential notches, a bracket mounted in said top plate for rotation between two fixed stops and provided with a square hole extending therethrough, a square shaft slidably mounted in said hole and provided with a circular extension which is rotatably and slidably mounted in said base plate, means for biasing said shaft to one longitudinal position relative to said bracket and said base plate, a manually operable lever pivotally mounted in said bracket and normally occupying a position in which said lever is substantially parallel with said shaft but movable to a second position in which said lever extends substantially at right angles to said shaft, said lever being constructed of two sections the outer one of which is adapted to be moved to a position in which it will enter one or the other of said notches to lock said shaft against accidental angular displacement, a cam formed on the inner end of said lever, a cam follower secured to said shaft and cooperating with said cam to move said shaft from the longitudinal position to which it is biased to another longitudinal position in response to rotation of said lever from its normal position to the position in which it extends at right angles to said shaft, a power operated gear wheel mounted on said circular extension, and means for connecting said gear wheel with said shaft when and only when said shaft occupies the longitudinal position to which it is biased.

6. A combined switch stand and selector mechanism comprising a fixed plate provided with spaced peripheral notches, a bracket rotatably mounted in said plate and provided with a hole extending therethrough, a switch actuating shaft extending through said hole and constrained to rotate in response to rotation of said bracket but free to slide longitudinally in said hole, a manually operable lever pivoted in said bracket and rotatable between a normal position in which said lever extends parallel with said shaft and a second position in which said lever is substantially parallel with said plate, said lever being formed of two jointed sections the outer section of which is adapted to cooperate with one or the other of said notches to at times lock said switch actuating shaft against rotation, power means for rotating said shaft normally connected with the shaft, and means responsive to rotation of said lever from its normal position to its second position to disconnect said power means from said shaft.

7. A combined switch stand and selector mechanism comprising a fixed plate provided with spaced peripheral notches, a bracket rotatably mounted in said plate and provided with a hole extending therethrough, a switch actuating shaft extending through said hole and constrained to rotate in response to rotation of said bracket but free to slide longitudinally in said hole, a manually operable lever pivotally mounted in said bracket and rotatable between a normal position in which said lever extends parallel with said shaft and a second position in which said lever is substantially parallel with said plate, said lever being formed of two jointed sections the outer section of which is adapted to be moved into engagement with one or the other of said notches to at times lock said switch actuating shaft against rotation, power means for rotating said shaft normally connected with the shaft, means responsive to rotation of said lever from its normal position to its second position for disconnecting said power means from said shaft, and means for securing said lever to said shaft when said lever occupies its normal position.

8. Railway switch operating apparatus comprising a vertical shaft rotatable between two extreme positions corresponding to the two extreme positions of a railway switch, manual means and power means for rotating said shaft both normally connected with the shaft, and means controlled by said manual means for disconnecting said power means from said shaft before said shaft can be rotated by said manual means.

9. Railway switch operating apparatus comprising a vertical switch actuating shaft, power means for actuating said shaft normally connected with the shaft, a manually operable lever constantly connected with the shaft and rotatable in two planes, and means responsive to rotation of said lever in one plane for disconnecting said power means from said shaft in order to permit operation of said shaft by rotation of said lever in the other plane.

10. Railway switch operating apparatus comprising a vertical switch actuating shaft rotatable to two extreme positions corresponding to the two extreme positions of a railway switch, manual means and power means for rotating said shaft both normally connected with the shaft, means for at times disconnecting said power means from said shaft to permit said shaft to be rotated by said manual means, and a signal secured to the upper end of said shaft for indicating the extreme position which said shaft occupies.

11. Railway switch operating apparatus comprising a vertical switch actuating shaft rotatable between two extreme positions corresponding to the two extreme positions of a railway switch, manual means and power operated means for rotating said shaft both normally connected with said shaft, means controlled by said manual means for disconnecting said power means from

said shaft before said shaft can be rotated by said manual means, and a signal secured to the upper end of said shaft for indicating the extreme position which said shaft occupies.

12. Railway switch operating apparatus comprising a rotatable switch actuating shaft biased to one longitudinal position and movable axially to another longitudinal position, power means for rotating said shaft connected with the shaft when and only when the shaft occupies said one longitudinal position, and a manually operable lever constantly connected with said shaft for moving said shaft from said one longitudinal position to said other longitudinal position and for rotating said shaft.

13. Railway switch operating apparatus comprising a member movable in two directions, means responsive to movement of said member in one direction for actuating a railway switch, power means for moving said member in said one direction normally connected with said member, means responsive to movement of said member in the other direction for disconnecting said power means from said member, and manual means for at times moving said member in said one direction and for at other times moving said member in said other direction constantly connected with said member.

14. Railway switch operating apparatus comprising a switch actuating shaft rotatable between two extreme positions corresponding to the two extreme positions of a railway switch and biased to one longitudinal position and movable to another longitudinal position, power means for rotating said shaft between its two extreme positions connected with the shaft when and only when the shaft occupies the longitudinal position to which it is biased, and a manually operable lever constantly connected with said shaft for moving said shaft from its one longitudinal position to its other longitudinal position and for rotating said shaft between its two extreme positions and for locking said shaft in either extreme position.

15. Railway switch operating apparatus comprising a vertical shaft rotatable between two extreme positions corresponding to the two extreme positions of a railway switch and movable longitudinally between two extreme positions, power means for rotating said shaft between its two extreme positions connected with said shaft when and only when said shaft occupies its one longitudinal position, and a hand lever constantly connected with said shaft for at times moving said shaft from its one longitudinal position to its other longitudinal position and for at other times rotating said shaft between its two extreme positions and for at still other times locking said shaft in either extreme position.

16. Railway switch operating apparatus comprising a vertical switch actuating member rotatable between two extreme positions and movable longitudinally between two extreme positions, power means for rotating said member connected with said member when and only when said member occupies its one longitudinal position, manual means for rotating said member constantly connected with said member, and means controlled by said manual means for moving said member longitudinally from its one extreme position to its other extreme position to disconnect said power means from said member before said member can be rotated by said manual means.

17. Railway switch operating apparatus comprising a vertical shaft rotatable between two extreme positions corresponding to the two positions of a railway switch and movable longitudinally between two vertical positions, means for biasing said shaft to its one vertical position, power means for rotating said shaft between its two extreme positions connected with said shaft when and only when said shaft occupies the vertical position to which it is biased, a manually operable lever connected with said shaft for rotation in two planes and effective when rotated in one plane for rotating said shaft between its two extreme positions, and means responsive to rotation of said lever in said other plane for moving said shaft from the vertical position to which it is biased to its other vertical position.

18. Railway switch operating apparatus comprising a vertical shaft rotatable between two extreme positions corresponding to the two positions of a railway switch and movable longitudinally between two vertical positions, means for biasing said shaft to its one vertical position, power means for rotating said shaft between its two extreme positions connected with said shaft when and only when said shaft occupies the vertical position to which it is biased, a manually operable lever connected with said shaft for rotation in two planes and effective when rotated in one plane for rotating said shaft between its two extreme positions, and means responsive to rotation of said lever in said other plane for at times moving said shaft from the vertical position to which it is biased to its other vertical position and for at other times locking said shaft in either extreme position to which it is rotated.

19. Railway switch operating apparatus comprising a vertical shaft rotatable between two extreme positions corresponding to the two positions of a railway switch and movable longitudinally between two vertical positions, means for biasing said shaft to its one vertical position, power means for rotating said shaft between its two extreme positions connected with said shaft when and only when said shaft occupies the vertical position to which it is biased, a manually operable lever connected with said shaft for rotation in two planes and effective when rotated in one plane for rotating said shaft between its two extreme positions, means responsive to rotation of said lever in said other plane from one extreme position to an intermediate position for moving said shaft from the vertical position to which it is biased to its other vertical position, and means effective when said lever is rotated in said other plane to another extreme position for locking said shaft against rotation.

20. Railway switch operating apparatus comprising a vertical switch actuating shaft rotatable between two extreme positions corresponding to the two extreme positions of a railway switch and movable longitudinally between two extreme positions, power means for rotating said shaft between its two extreme positions connected with said shaft when and only when said shaft occupies its one longitudinal position, and manual means constantly connected with said shaft and effective for at times moving said shaft from said one longitudinal position to its other longitudinal position and for at other times locking said shaft in either extreme position to which it is moved.

LEROY WYANT.