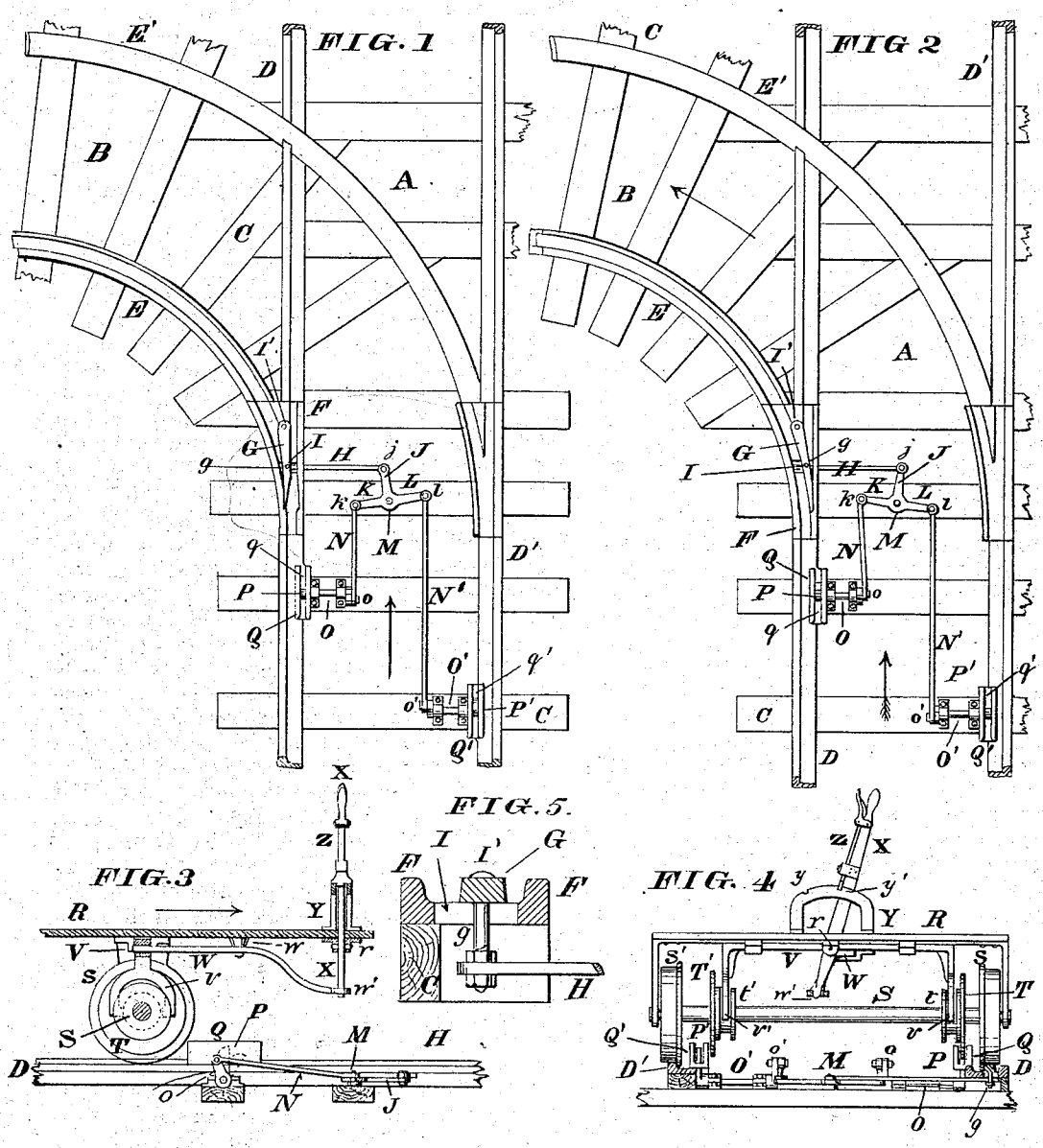
M. & J. W. FELS.

Railway-Switches.

No. 154,857. Patented Sept. 8, 1874.



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UNITED STATES PATENT OFFICE.

MEDARD FELS AND JOHN W. FELS, OF CINCINNATI, OHIO.

IMPROVEMENT IN RAILWAY-SWITCHES.

Specification forming part of Letters Patent No. **154,857**, dated September 8, 1874; application filed March 18, 1874.

To all whom it may concern:

Be it known that we, MEDARD FELS and JOHN W. FELS, both of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Railway-Switches, of which the following is a specification:

This invention relates to that class of railway-switches for which Letters Patent were issued to us July 15, 1873; and the object of our present improvement is to enable cars to operate the switch in such a manner as to run them either upon the main track or else to be diverted from the same into the side or branch track, at the option of the driver or conductor, it being understood that the switch-shifting appliances have been designed more especially for use upon street-railroads.

In the patent previously alluded to, the cars, if arranged to operate the switch, would always set it so as to divert them off from the main route upon the side track, thereby incapacitating them for use upon the main road or line. We overcome this objection by an arrangement of devices which will now be fully described.

Figure 1 is a plan of a railroad-track provided with our improved switch, which is set so as to conduct cars along the main route. Fig. 2 is another plan of the road, showing the switch changed so as to divert cars off onto the branch or side track. Fig. 3 is a vertical section through the front part of a car especially adapted to run upon the road, said car being represented as in the act of impinging against one of the "tappets" that serve to operate the switch. Fig. 4 is an elevation of the front of said car, showing the levers that operate the various devices for shifting the switch. Fig. 5 is an enlarged transverse section through the tongue of the switch and its accessories.

A represents the main route of a street-railroad, and B is a branch route, side track, or "turn-out" diverging from the same, these two tracks being secured to ties or stringers C in the usual manner. As customary, the main route A is composed of two parallel and flanged tracks, D D′, while the branch route or turn-out is formed with two rails, E E′. These last-mentioned rails are curved, so as to be concentric, and the inner one, E, is flanged, while the outer one, E′, is a flat or unflanged bar. Located at the junction of the rail E with the one D is a casting or plate, F, to which is pivoted, at I′, the tongue or switch proper, G, that is provided with a downwardly-projecting lug or pin, *g*, which engages with one end of a rod, H, disposed transversely of the track. The plate F is slotted at I to receive the pin *g*, which engages with the outer end of rod H, whose inner end is pivoted at *j* to the arm J of a compound lever or bell-crank, J K L, the latter being fulcrumed at M to one of the ties or other members of the track, so as to vibrate in a horizontal plane. Coupled to the arm K at *k* is one end of a connecting-rod, N, whose other end is attached to the crank *o* of a rock-shaft, O, which is supported in suitable bearings and disposed transversely of the track A. The outer end of this rock-shaft is provided with a tappet, P, that occupies a groove, *q*, in a block, Q, the latter being firmly secured to the inner side of rail D in such a manner as to cause said groove to be parallel with the track. Coupled at *l* to the other arm, L, of the bell-crank is a connecting-rod, N′, which communicates with the arm *o′* of rock-shaft O′, whose tappet P′ occupies a groove, *q′*, in block Q′.

The car R, which is designed especially to be used upon tracks provided with the above-described appliances for operating the switch, is arranged as follows: The front axle S is provided with two customary flanged wheels, *s s′*, and, in addition to these, two disks, T T′, which rotate freely upon said axle. Secured to the inner faces of these disks are grooved hubs *t t′*, for the reception of clutches *v v′* at the ends of a bar, V, which is capable of being shifted transversely of the car. This shipper-bar is operated by a rod, W, which is pivoted to the under side of the car at *w*, the forward end of said rod being provided with a slot, *w′*, to receive the lower end of a lever, X. This lever is pivoted to the car at *r*, and projects upward a sufficient distance above the platform to be at all times accessible to the driver or conductor of the car. A bridge, Y, is secured to the platform of the car, hav-

ing two notches, *y y'*, into either one of which the spring bolt or detent Z of the lever X is adapted to engage.

To illustrate the operation of our improvements we will suppose the car R to be approaching the junction of the two tracks in the direction indicated by the arrows in Figs. 1, 2, and 3, and that it is desired to run said car along the main route A without calling upon a switchman to set the tongue G. This result can be accomplished in a moment's time by the driver upon the front platform of the car, who has simply to grasp the handle of lever X and swing it to the right, so as to cause its detent Z to engage with the notch *y* of segment Y. This act shifts the disk T' along the axle S a sufficient distance to insure said disk entering the groove or channel *q'* of the block Q'. As soon as the progressive motion of the car has brought the disk in contact with the upwardly-projecting tappet P' the latter is depressed, thereby causing the rock-shaft O' to perform a partial rotation in its bearings. The result of this partial rotation of said shaft is that its crank *o'* is carried around a sufficient distance to shift the bell-crank J K L through the instrumentality of connecting-rod N'. This bell-crank is shifted in the direction shown in Fig. 1, and, as the rod H imparts a corresponding movement to the tongue G, the latter accordingly swings upon its pivot I', and, being thrown over to the extreme left side of plate F, allows an unobstructed passage of the car along the tracks D D'. The clutch-bar V *v v'* and notches *y y'* are so arranged with reference to each other as to compel the disk T to run clear of the block Q, when the other disk, T', is shifted so as to engage with the groove *q'* of the other block, Q'. Consequently, after the disk T' has escaped from tappet P' the other disk, T, cannot impinge against the tappet P so as to close the switch.

To divert the car off into the side track or branch route B the above-described operation is exactly reversed, the lever X being thrown to the left, thereby engaging its spring-catch Z with notch *y'* and shifting the disk T along the axle S, so as to cause said disk to enter the groove *q* and impinge against tappet P. This act shifts the operating bell-crank J K L and tongue G, as shown in Fig. 2, thereby closing the thoroughfare along track D D' and compelling the car to be switched off upon the turnout B E E. This position of the lever X and that of the shifting devices V *v v'* and T T' are clearly shown in Fig. 4, and it will be seen, by referring to this illustration, that, while the disk T is impinging upon the tappet P, the other disk, T', is clear of the box Q', and therefore said disk cannot affect the other tappet, P'.

In actual construction the disks T T' should be quite thin, so as to run in very narrow grooves in the blocks Q Q', which grooves, being so limited, would not allow a carriage or other wheel to enter them and thereby operate the switch in the wrong direction, or otherwise derange any part of the apparatus.

The shafts O O' may be placed in line with each other, if preferred, and the connecting-rods N N' be made of uniform length.

All of the operative parts except the tongue G and the two tappets P P' may be housed in, so as not to be rendered ineffective by dust or dirt, or the accumulation of snow and ice upon them.

Instead of the appliances described in this specification for shifting the operating-disks longitudinally of the car-axle, any other suitable devices may be employed—such, for example, as a screw, or cords passing around and over suitable rollers.

We claim as our invention—

The combination of the switch G *g* I', connecting-rod H, bell-crank K L M, rods N N', rock-shafts O O', tappets P P', and grooved block Q *q* with the tracks D D' E E' and disks T T' on the car, shiftable by the operator, substantially as and for the purposes set forth.

In testimony of which invention we hereunto set our hands.

MEDARD FELS.
JOHN W. FELS.

Attest:
GEO. H. KNIGHT,
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