J. IMRAY.

SWITCH-SIGNAL.

No. 169,811. Patented Nov. 9, 1875.

Fig. 6

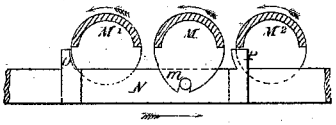


Fig. 7

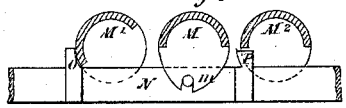


Fig. 8

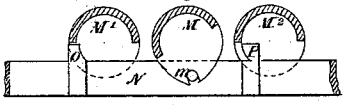


Fig. 9

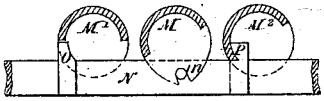


Fig. 3.

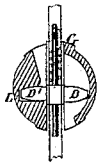


Fig. 4

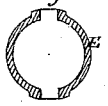


Fig. 5

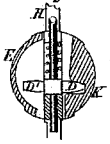


Fig. 1

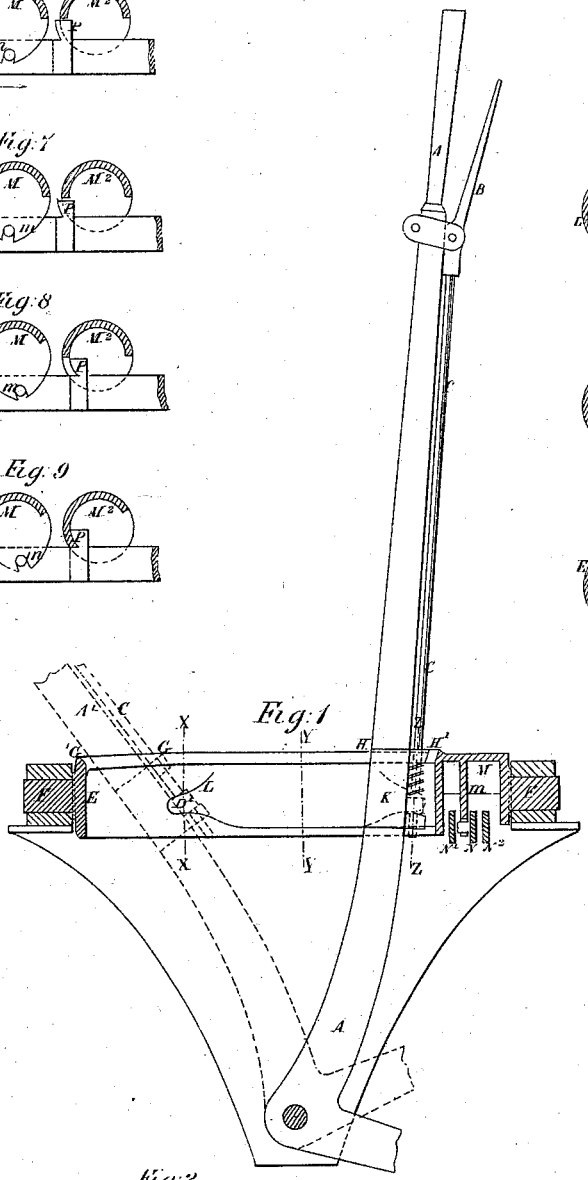
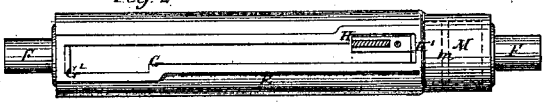


Fig. 2



Witnesses:
Albion W. Barrison
J. C. Donnell

Inventor:
John Imray
by C. S. Whitman
atty

UNITED STATES PATENT OFFICE.

JOHN IMRAY, OF No. 20 SOUTHAMPTON BUILDINGS, CHANCERY LANE, ENGLAND.

IMPROVEMENT IN SWITCH-SIGNALS.

Specification forming part of Letters Patent No. **169,811**, dated November 9, 1875; application filed April 26, 1875.

To all whom it may concern:

Be it known that I, JOHN IMRAY, of No. 20 Southampton Buildings, Chancery Lane, in the county of Middlesex, England, civil engineer, have invented an improved apparatus for holding and interlocking the levers employed to work the points and signals of railways; and do hereby declare that the following description, taken in connection with accompanying sheet of drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvement, by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to secure by Letters Patent—that is to say:

For working the points and signals of railways at junctions and elsewhere there is usually a row of levers—some for shifting the points, and some for raising or lowering the signals—and those levers are generally provided with interlocking gear, whereby their movements are controlled, so that danger cannot arise from the shipping of a point when the signals or other points are not set suitable for such shift, nor from giving of a signal when the points or other signals are not set suitable for such signal being given.

My invention relates to apparatus applicable to such a system of point and signal levers, whereby the holding of each lever at either end of its stroke and the interlocking of each lever with others of the system are safely and simply effected by means of slotted rocking shafts. For this purpose I construct apparatus in the manner shown on the accompanying drawings, of which—

Figure 1 represents a side view of one of a series of levers employed for working railway points and signals, with a longitudinal section of a rocking shaft applied to it, according to my invention, for the purpose of holding the lever at either end of its stroke, and working the interlocking gear. Fig. 2 represents a plan of the rocking shaft; and Figs. 3, 4, and 5 represent transverse sections thereof, respectively, on the lines X X, Y Y, and Z Z of Fig. 1.

A is the lever, provided, in the ordinary way, with a spring-catch, B, and its rod C extending down one face of the lever. At the lower end of the catch-rod C there are formed two projections, D and D′, and the rod C is pressed down by a helical spring interposed between these projections and the upper part of the guide, in which the rod works. E is the rocking shaft, which is hollow, and has a slot on its upper and under sides for the passage through it of the lever A. It is provided at the ends with trunnions F F, which work in bearings fixed on the framing of the apparatus. At either end of the slot in the rocking shaft parts are laterally recessed, G G′ and H H′, on the upper side, and corresponding parts are recessed on the under side in the opposite direction. There are also formed within the rocking shaft E, on opposite sides of its interior cavity, recesses K and L, into one of which, K, the projection D from the catch-rod engages, when the lever A is in the position shown in Fig. 1, and into the other of which, L, the other projection, D′, engages, when the lever is brought over to the other extreme of its stroke, as indicated by the dotted lines A′ in Fig. 1.

It will be seen that when the spring-catch rod C is down the lever A, at either extreme of its stroke, is engaged in one of the side recesses, H H′ or G G′, and, by means of the projecting lip H or G of the rocking shaft, is prevented from being moved. Fig. 5 shows the lever so held in the recess H H′. Now, on grasping the spring-catch lever B, so as to close it toward A, and thereby to raise its rod C, the projection D, acting in the recess K, partly turns the shaft E on its axis, and thereby removes the lip H from behind the lever A. The lever can then be pulled along the slot in E to the position A′, Fig. 1, the projection D′ entering the recess L. On letting go the spring-catch, its rod C being caused to descend by the spring, the projection D′, engaged in the recess L, causes the shaft E to turn still farther round, and thus brings the lip G in front of the lever, as shown in Fig. 3. On again grasping the spring-catch the shaft E is turned backward, so as to remove the lip G from before the lever, which can then be moved along the slot to its forward posi-

tion A, and secured there by the further turning of the shaft E backward, caused by the descent of the projection D when the spring-catch is let go.

It will thus be seen that when the lever A is to be moved there is necessary the preliminary operation of raising the spring-catch rod, which partly turns the shaft E, and when the lever has been moved the letting go of the spring-catch still further turns the shaft E in the same direction.

The movements thus imparted to the shaft E are utilized for the purpose of working interlocking gear, as I will now describe. And, first, it is to be understood that every lever of the series is provided with a rocking shaft, arranged to work in the manner described above; also, that each of those rocking shafts has a semi-cylindrical part, M, extending beyond the slotted part, and of such length as may be required for the interlocking gear.

In order that the nature and action of this interlocking gear may be more clearly understood, I will assume that there are only three levers to be interlocked; and I refer to Figs. 6, 7, 8, and 9, which show, in transverse section, the positions of the rocking shafts belonging to the three levers in four different conditions of their relative movements. I will suppose that the middle lever, of which M is the rocking shaft, works a pair of points for guiding a train along a main line when the lever is in the front position A, Fig. 1, and for guiding it along a branch when the lever is moved over to the position A′, Fig. 1. I will also suppose that M^1 is the rocking shaft of the lever which lowers the main-line signal, and that M^2 is the rocking shaft of the lever which lowers the branch signal. Each of these rocking shafts must, as explained above, be moved in the direction of the arrow, Fig. 6, before pulling back the lever to which it belongs, and is moved still farther in the direction of the arrow on letting go the spring-catch after the lever has been pulled back.

The point-lever rocking shaft M has a crank-plate, *m*, projecting down from it, with a slot, which engages on a pin or stud fixed on a bar, N, which is mounted in guides, so as to slide horizontally in a direction transverse to the rocking shafts, or parallel to the row of levers. On this bar are fixed two stops, O and P, differently shaped, the one, O, being formed with a curved side to fit the exterior of the rocking shaft M^1, and the other, P, having its other side curved to fit the interior of the shaft M^2.

The three levers being all toward the front, as A, Fig. 1, the points being set right for the main line, and both signals up at "danger," the rocking shafts are in the position shown in Fig. 6. In this position the shaft M^2, being stopped by P, cannot be turned, and hence the lever of the branch signal is locked at "danger; but the shaft M^1 is free, and, therefore, the main-line signal can be lowered when its shaft M^1 is turned into the position shown in Fig. 7, so as to be in front of the stop O. In this condition the bar N cannot be moved, and consequently the shaft M, which works it, and therefore the point-lever, is locked, the branch signal also remaining locked, as before.

The main-line signal being again raised to "danger," the condition is as shown in Fig. 6. If, now, the points be shifted, the shaft M is turned as shown in Fig. 8, and the bar N is moved by the crank-plate *m*, so as to bring the stop O under the lip of the shaft M^1, which is thereby obstructed. In this condition the main-line signal is locked at "danger;" but the movement of the bar N having moved the stop P clear of the lip of the shaft M^2, the branch signal can be lowered, and in that case the shaft M^2 takes the position shown in Fig. 9, where its lip comes behind the stop P. While it remains so the bar N cannot be moved back, and consequently the point-lever is locked with the points set for the branch line as well as the main signal-lever, which remains locked at "danger."

Although Figs. 7, 8, and 9 illustrate the interlocking effected when the several levers have made their full stroke, and the rocking shafts have turned far enough to release their levers from the recesses at one end and engage them in the recesses at the other end of their respective slots, it will be readily understood that the locking is effected also when the rocking shafts make only that part of their stroke which suffices to release their levers, and that the unlocking is not effected till the rocking shafts have made their complete stroke, so as to re-engage their levers.

Thus the preliminary operation of raising the catch-rod of any lever effects the locking, and the final operation of letting the catch-rod descend effects the unlocking.

The bar N may extend any desired length along the row of levers, and have on it such stops, like O and P, as may be required for the purpose of interlocking. Also, there may be several bars, like N, arranged side by side, as shown with respect to three, N, N^1, and N^2, in Fig. 1; and where there are many such bars required for the complete interlocking of any system of levers, the part M of the rocking shafts may be made of such length as is necessary to accommodate them and their respective stops.

Having thus described the nature of my invention, and in what manner the same is to be performed, I would have it understood that I do not claim, generally, the application of the movement of the spring-catch rod to the purpose of holding or releasing a lever at either end of its stroke, or of working interlocking gear; but

I claim—

1. The slotted rocking shaft E, with the lateral recesses G G′ and H H′ at each end of its slot, by the partial rotation of which shaft a point or signal lever is held or released at

either end of its stroke, substantially as herein described.

2. The combination of the rocking shafts E with the sliding bars N, provided with stops O P, for the purpose of reciprocally locking and unlocking point and signal levers, substantially as herein described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 4th day of March, 1875.

JOHN IMRAY.

Witnesses:
CHAS. D. ABEL,
JNO. P. M. MILLARD.