(No Model.)

R. H. ISBELL.

RAILWAY SWITCH.

No. 379,072. Patented Mar. 6, 1888.

Fig. 1.

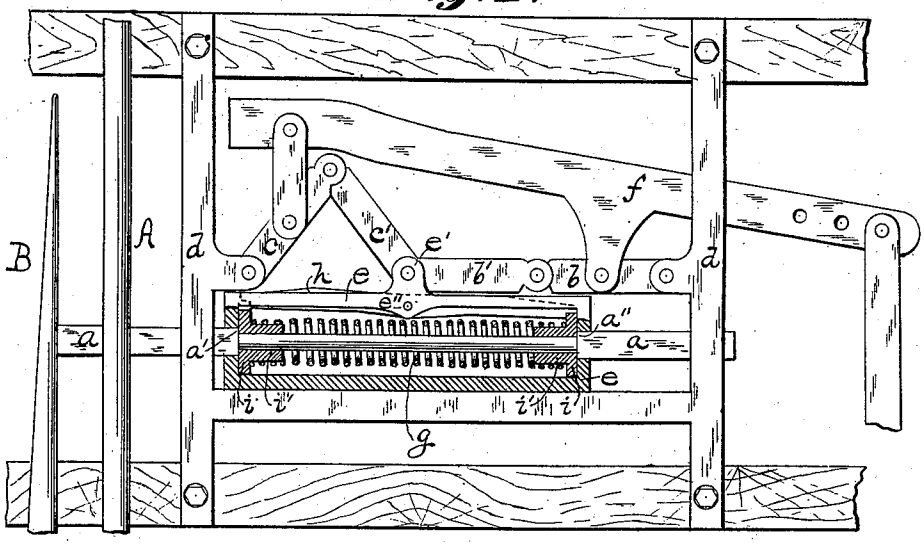


Fig. 2.

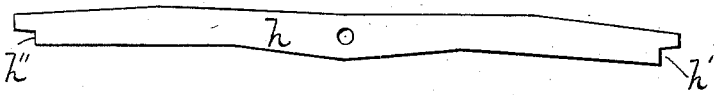
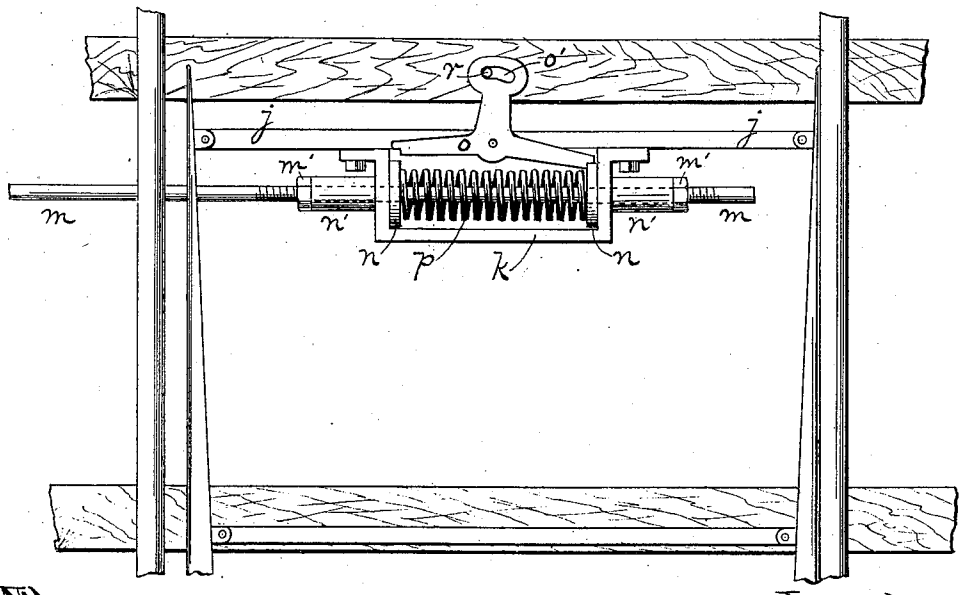


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT H. ISBELL, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ISBELL MACHINE COMPANY.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 379,072, dated March 6, 1888.

Application filed August 6, 1887. Serial No. 246,351. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. ISBELL, a citizen of the United States, and a resident of the city of New York, in the State of New York, have invented a new and useful Improvement in Railway-Switches, of which the following is a specification.

My invention relates to spring-switches in which a train approaching the open switch shifts the rails in passing over, while the spring serves to return the rails to their position after it has passed.

It consists, in general, of the addition to such a switch of a rocking bar which automatically connects the operative parts together in positive connection in the direction in which the switch may be shifted by the operator, and at the same time leaves it free to yield upon the spring in the other direction for the passage of a train, and its object is to reveal the presence of any obstruction between the movable and fixed rails by preventing the switchman from operating the switch.

Heretofore the trouble has been in spring-switches that the spring has in effect constituted a component part of the switch-bar, the movement of the rails in either direction depending upon the strength of the spring alone, and consequently that the operator might move the switch-bar, and thus (as he thought) throw over the switch, without in reality doing anything but compress the spring. This would occur whenever there was any obstruction between the rails sufficient to overcome the resistance of the spring. So, also, he might move the rails a part of the distance, compressing the spring for the remainder, and thus leave the switch partly open. The spring-switch, when operated in the night-time or from a switch-tower, thus introduces an element of danger not present in one operating through positive connections; but with my improvement applied to such a switch, while the spring still serves its purpose of allowing a train to shift it and of returning the rails after the train has passed, the system of connections extending from the hand of the switchman to the movable rails is positive in action in either position of the switch, and any obstruction is instantly revealed by their not acting or acting with difficulty.

In the accompanying drawings, in which the same characters indicate like parts, Figure 1 is a top view, partly sectional, of a switch operated by double toggle-joints embodying my invention. Fig. 2 is a detached view of the rocking bar. Fig. 3 is a top view of a single-lever switch embodying this improvement.

In Fig. 1, which represents a switch operated by a pair of toggle-joints such as is described in Letters Patent of the United States No. 358,398, dated February 22, 1887, and issued to George F. Betts and Walter S. Logan, for a railroad-switch, A is one of the fixed and B one of the movable rails. The switch-bar *a* is pivoted to the movable rail B and is operated by the coacting movement of the pair of toggle-arms *b b′ c c′*, which are pivoted at opposite ends to some stationary part *d* and at their adjacent ends pivoted together to an ear-piece, *e′*, which forms part of the frame or box *e*.

The lever *f* operates the toggle-arms in the manner described in the patent hereinbefore referred to, moving the box *e*, and with it the switch-bar *a*, to the right by doubling the arms *b b′* and straightening the arms *c c′*, and thereby locking the switch whenever either pair of arms forms a straight line.

The switch-bar *a*, which is a continuous rod, passes through the two ends of the box *e* by holes corresponding to its size. Within the box *e* the switch-bar *a* is of smaller size than at either end, shoulders *a′* and *a″* being thus formed in it, against which shoulders rests at each end a collar, *i*, connected with and forming one piece with the sleeve *i′*. Between the two collars *i*, and supported upon the sleeves *i′*, rests the compressible coiled spring *g*. The opening in the collar *i* and sleeve *i′* through which the switch-bar *a* passes is the size of the contracted part of the switch-bar, so that the collars and sleeves are left free to move inward upon it, but not outward. The collars and sleeves can also move inward within the box *e*, but are pressed against the respective ends of the box by the coiled spring.

The operation of the parts so far described is not different in principle from that of an ordinary spring-switch. When the switch is shifted by the operator moving the lever *f*, (and there is no obstruction,) the spring *g*

keeps the collars *i* pressed against the ends of the box, and the box and switch-bar are moved over together. If a train passes upon the open switch and partially shifts it, the shoulder *a'* nearest the rails presses against its adjacent collar *i*, and, moving it within the box, compresses the spring without moving the box *e* or the toggle-arms; and when the train has passed the recoil of the spring returns the parts to their former position. When the switch is in the opposite position, the shoulder *a''* acts upon its adjacent collar *i* in like manner.

My improvement consists, essentially, in the addition of the rocking bar *h*, pivoted to the box *e* at *e''*. It is so fitted and pivoted to *e* beneath the toggle-arms that the action of straightening the arms presses the shoulder *h'*, Fig. 2, down in front of the collar *i*, at the same time releasing the shoulder *h''* from connection with the other collar.

While the shoulder *h'* bears against the collar *i* in the position shown in Fig. 1, there is a positive connection of parts from the hand of the operator to the movable rail—viz., *f*, *e*, *h*, *i*, *a*, and B. When, therefore, there is any obstruction between A and B, the operator cannot move the switch, and if the obstruction is only slight, preventing complete action of the switch, but allowing of some action, this also is revealed by his not being able to make the complete movement of his lever. In other words, the rocking bar *h* locks the collar *i* to the box *e*, so that the switch cannot give upon its spring in that direction. The other end, however, is open, as before, and when the rail B is moved by the passing of a train the shoulder *a'* acts upon the collar *i* and the spring *g* is compressed, as before described, the collar *i* being free to pass under that end of *h*. When the switch has been shifted into the opposite position, and at the end of such movement *h* has been rocked so as to release one collar and engage the other, precisely similar conditions exist. The connection between the switch-house and rails is positive, and the switch may still yield for the passing of a train, all motions being reversed.

The rocking motion of *h* may be made slight without impairing its efficiency as a lock. The best form is to cause the toggle-joints to pass slightly beyond the straight line and have *b'* and *c'* begin to act upon *h* just as they reach the straight line. In such case there will be no break in the positiveness of action until after the switch has been completely shifted. The rocking bar *h* may be so pivoted that one shoulder, *h'*, does not release its collar *i* until the other shoulder, *h''*, engages with the other collar.

In Fig. 3 the principle is the same, with some modification of parts. The bar *j*, connecting the movable rails, has affixed to it a frame, *k*, through which at each end pass the sleeves *n'*, forming part of the collar *n*. The switch-rod *m*, by which the switch is operated, passes through the sleeves and collars, whose motion upon *m* is limited outwardly by the nuts *m'*. The coiled spring *p* bears against the collars *n* and presses them against the ends of the frame *k*. The rocking bar *o* is pivoted to the bar *j* and acts in the same manner as described above, locking the two collars alternately to the frame *k*, and thus accomplishing the same purpose as in Fig. 1.

Various methods may be adopted to turn *o* upon its pivot after each shifting of the switch, so as to release and lock the collars alternately. In the method shown *r* is a pin projecting upward from some stationary part and adapted to move in the opening or slot *o'* in the rocking bar *o*. During most of the time while the switch is passing from one position to the opposite, *o* retains its position relative to *k*, the pin *r* merely traversing its slot; but when very near the end of the slot, when the switch has been virtually shifted, *r* strikes the upper part of the slot, and, acting as a cam, thereby reverses the position of *o*. By regulating the length of the cam part of the slot *o'* and the distance of such slot from the pivot, the relative quickness with which the bar *o* is turned upon its pivot may be varied.

This improvement in spring-switches is especially adapted for the use in those operated by double toggle-joints, as shown in Fig. 1. No additional part is there needed to perform the rocking. The part which shifts and locks the switch also turns the bar *h* upon its pivot, and with an action which is sure. A further difference between the forms of Figs. 1 and 3 is that in Fig. 1 during the passing of a train the bar *h* remains stationary, but in Fig. 3 the bar *o* passes over and returns with *j*.

The parts described as collars (*e. g.*, the part *i* in Fig. 1) need not necessarily take that form, nor necessarily be movable upon the switch-bar *a*. Thus *i*, instead of a collar movable inward upon *a*, may be a pin affixed to *a* and moving through an appropriate opening in the frame *e*, *a* being of the same size throughout; or, again, the collar *i* may be a part of *a*, thus forming a shoulder thereon, the opening in *e* being large enough to admit it. The essential idea being the locking of the switch-bar to the frame in one direction while it is free in the other, such constructions would serve that purpose. The pin would merely be an equivalent for the combination of the collar *i* and the shoulder upon the switch-bar. When shifted by a train passing over, the pin would pass with the switch-bar out through the opening in *e*, the spring being compressed between the ends of *e* and the other corresponding pin upon the switch-bar.

I claim as my invention—

1. In a railway-switch, the combination of a compressible spring lying within a frame, a switch-bar adapted to compress the spring against the frame by movement in either direction, a rocking bar pivoted to the frame and adapted to alternately lock the switch-bar to such frame in each direction while leaving it free in the other, and means to rock

such bar upon its pivot at the end of each shifting of the switch.

2. In a switch operated by double toggle-joints, the combination of arms *b b' c c'* and the rocking bar *h*, both pivoted to *e*, with the frame *e*, containing and supporting the collars *i*, switch-bar *a*, and spring *g*.

In witness whereof I have hereunto set my hand, this 4th day of August, 1887, in the presence of two witnesses.

ROBERT H. ISBELL.

Witnesses:

GEO. C. BRAINERD,

SALTER S. CLARK.