



J. J. HILL.  
RAILWAY SWITCH APPARATUS.

No. 485,868.

Patented Nov. 8, 1892.

Fig. 6.

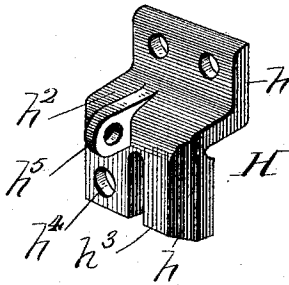


Fig. 3.

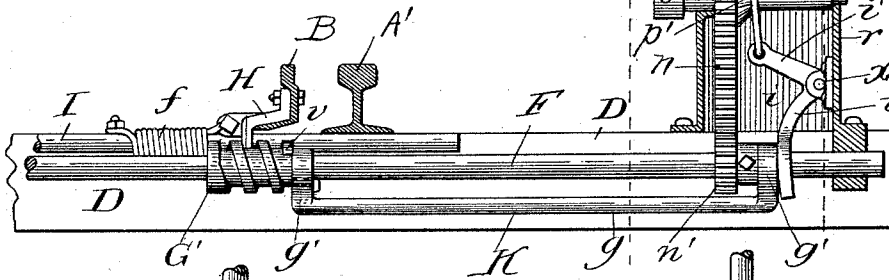
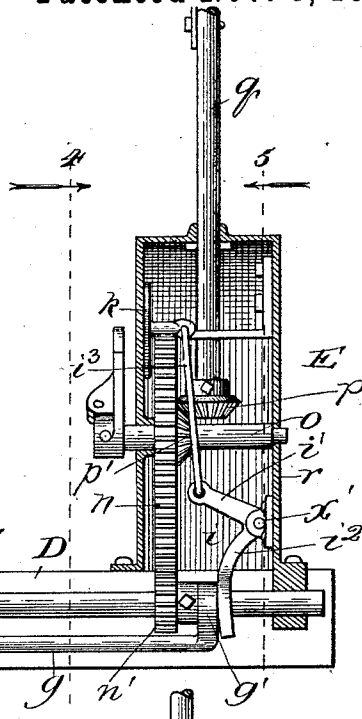


Fig. 4.

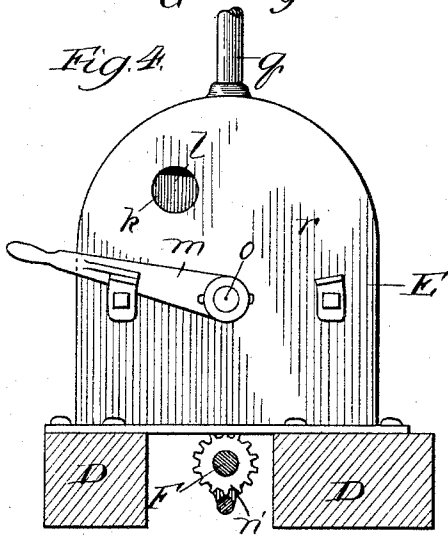
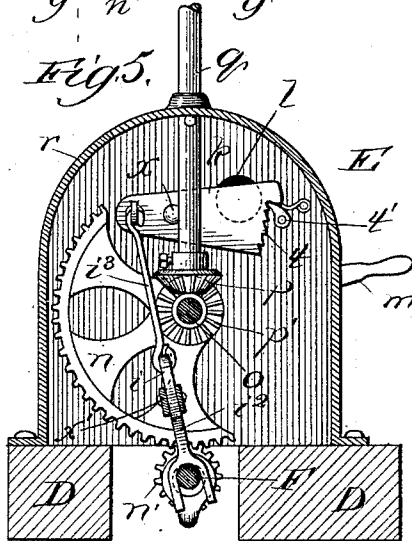


Fig. 5.



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# UNITED STATES PATENT OFFICE.

JOHN J. HILL, OF CHICAGO, ILLINOIS.

## RAILWAY-SWITCH APPARATUS.

SPECIFICATION forming part of Letters Patent No. 485,868, dated November 8, 1892.

Application filed December 1, 1891. Serial No. 413,700. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. HILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Railway-Switch Apparatus, of which the following is a specification.

My present invention is designed for the automatic accomplishment of two main objects in connection with railway-switches. One of these objects is to prevent derailment of a car or train in passing from the side to the main track when the switch is set for the main line or open, or vice versa, and the other is to provide for the automatic registration of a run through a switch when set for the main line. By accomplishing my first-named object, with the switch set for the main line, if in case, say, of accident or carelessness a locomotive, car, or train is run from the side track upon the main line instead of running from the switch upon the ties, as would be the probable result without the provision of my improvement, the switch will be thrown to continue the run to the main line, and when the switch is cleared it resumes automatically its set or open condition with relation to the main line without having disturbed or in any way affected the switch-operating appliance, as the switch-stand. By accomplishing my aforesaid second object a run through a switch set for the main line from a side track may be readily found out, thus without having to depend for the information upon a report of the fact from the person or persons liable to be held responsible for the occurrence.

Further objects of my invention are to provide for utilizing my aforesaid improvements in connection with the form of switch-operating mechanism set forth in Letters Patent of the United States No. 450,329, issued to me on the 14th day of April, 1891, and entitled an "Improvement in railroad-switch appliances," and to provide an improved construction of switch apparatus as to its general functions and as to details and combinations of parts.

In the accompanying drawings, Figure 1 is a plan view representing a broken section of a railway-track provided with my improvement in its preferred form as to details. Figs.

2 and 3 are sections taken, respectively, on the lines 2 2 and 3 3 of Fig. 1 and viewed as indicated by arrows. Figs. 4 and 5 are sections taken, respectively, on the lines 4 and 5 of Fig. 3, viewed as indicated by arrows and enlarged. Fig. 6 is an enlarged perspective view of a clip detail.

Although I do not wish to be understood as limiting my present improvements or any of them to use in connection with my aforesaid formerly-patented switch appliance, inasmuch as I have especially designed it for such use, certain details are provided for adapting it thereto, and the drawings illustrate it in that particular connection.

A' A<sup>2</sup> denote the rails of a main line A.

B B' are the point-rails of a split switch, and C is a side-track rail.

As illustrated in Fig. 1, the switch is open or "set for the main line" A, so that if a car or train moving in the direction toward the points of the switch-rails were to pass from the side track it would continue on the rails C and B, and if the rail B were rigid the car or train would inevitably run off at the end of the point-rail upon the ties D. I obviate this by rendering the point-rail B laterally yielding independent of the switch-operating apparatus, (switch-stand E and its connecting-bar F,) whereby the car or train in passing from the side track will throw the rail B against the rail A', the rail B' being sufficiently yielding inwardly by being locked only at its base to rock laterally under the strain and permit the wheel-flanges to pass between it and the rail C. Thus when the car or train clears the point-rails it continues on the rails A' and A<sup>2</sup> of the main line A. At the switch-stand E, I also provide registering mechanism actuated by the lateral outward throw of the switch-rail B to register the run through the switch and present the registration, whereby it may be readily observed, as by an official while traveling over the road, who may thus note the occurrence and investigate the matter with a view to placing the responsibility where it belongs.

The switch-stand E illustrated involves a simple construction, though no novel features of importance, so far as I am aware, and other forms of switch-stand or other kinds of switch-operating appliance may be used for my

purpose without thereby departing from my invention. It comprises the case  $r$ , in which is supported the rotary target-spindle  $q$ , carrying at its lower end a beveled gear  $p$ , meshing with a similar gear  $p'$  on a horizontal shaft  $o$ , journaled in the rear and front sides of the case and carrying a segmental rack  $n$ . One end of the shaft  $o$  projects beyond the adjacent side of the case and there has secured to it a handle  $m$ , means being provided to stop and lock the handle at the ends of its throw.

In the side of the case E, adjacent to the track, I provide an opening  $l$ , behind which is journaled an arm  $k$ , pivotally supported between its extremities, as at  $x$ , (see Fig. 5,) to extend toward its forward end, at which it is provided with ratchet-teeth  $t$ , normally across the opening  $l$ . One (the upper) longitudinal half of the pivotal arm  $k$  may be painted on the side exposed at the opening  $l$  in one color, which is normally visible through the opening to indicate that the switch has not been disturbed by a run through it, and the lower portion of that side of the arm may be of another color, raising of which coincident with the opening  $l$  presents indication of the switch having been run through. A spring-dog  $t'$  engages the ratchet-teeth  $t$  in a manner permitting that end of the arm  $k$  to be raised freely, but preventing descent thereof by holding it in the position to which it is raised, as hereinafter described, and thus registering the rise of the free end of the pivotal arm. The arm  $k$  is connected from the opposite side of its fulcrum  $x$  by a link  $i^3$  with one arm  $i'$  of a bell-crank  $i$ , fulcrumed at the rear side of the case  $r$ , as shown at  $x'$ . (See Fig. 3.) The other arm  $i^2$  of the bell-crank is the one actuated in the manner hereinafter described to work the register.

The connecting-bar F illustrated is, for the reason hereinbefore stated, of the rotary variety and carries between the switch-rails B and B' worms G and G'. The form of each worm need not vary from that set forth in my aforesaid patent, though to adapt them to cooperate with other details as employed in my present improvement they should have a longitudinally-sliding movement, each in the direction toward its adjacent switch-rail, being stopped at their inner ends by the heads  $s'$  of feathers  $s$  on the bar F. It will also be noticed that while according to the construction illustrated in my said former patent the bases of the switch-rails engage directly with the rotary switch-bar at the threads of the worms and the locking-points  $v$  on the latter are arranged to bear directly against the switch-rails I now for convenience to lower the plane of the bar F cause the rails B and B' to engage indirectly with the rotary switch-bar through the medium of depending clips H on the inner sides of the switch-rails near their points or behind the slide-plates  $w$ , and I lock the switch-rails by causing the locking-

points  $v$  of the worms to bear against the inner surfaces of the clips, thus still against the rails, but indirectly. The form and construction of the clip H are shown in Fig. 6. It is fastened through its vertical portion  $h'$  to the web of the rail, while its vertical portion  $h^3$ , which depends from the part  $h^2$ , seated on the rail-flange, is provided near one side with an aperture  $h^4$  and an eye  $h^5$ , and toward the opposite side near its base it is beveled, as shown at  $h$ , the inclination of the bevel corresponding approximately, at least, with the pitch of the worm.

The rotary switch-bar F is supported in bearings below the plane of the track on a plane at such a depth as to support the switch-rails through the medium of the lower edges of the clips H resting upon it, or, at least, to bring the plane of the worms above the lower edges of the clips, so that they may work against the latter. The end of the bar F, which enters the case of the switch-stand E, carries a pinion  $n'$ , with which the segmental gear  $n$  meshes, whereby turning of the handle  $m$  effects rotation of the switch-bar and by the action of the worms thereon throwing of the switch-rails and locking thereof at each end of their throw by the bearing of a worm locking-point  $v$  against the side  $h^3$  of a clip H.

Of course the switch-bar F is longitudinally immovable to obviate disengagement of the gear  $n'$  from the rack  $n$ . It may be stopped against longitudinal play by any suitable means for the purpose, such as collars, like those shown in my Letters Patent of the United States, No. 419,443, dated January 14, 1890, which, however, are omitted from the present drawings to avoid confusion in the views presented.

The sliding worm G', adjacent to the switch-stand, is caused to bear from its outer end through the medium of a suitable interposed abutment K against the arm  $i^2$  of the bell-crank  $i$ . The form of the abutment K illustrated is that of a rod or bar  $g$ , having collars  $g'$  at its opposite ends, which surround the switch-rod F and bear against the worm G' and bell-crank arm  $i^2$ . Thus when, as hereinbefore described, a car or train runs through the switch while the latter is set for the main line the switch-rail B will be thrown against the main rail A', sliding the worm G' with it, and the car or train will therefore run from the switch upon the main line instead of being derailed. The outward-sliding movement referred to of the worm G' obviously slides the abutment K against the bell-crank arm  $i^2$ , thereby effecting a downward pull on the linked end of the register-arm  $k$ , and accordingly a rise thereof at the opposite side of its fulcrum  $x$ , causing it to display more or less of the color on the lower portion of the surface of the register-arm, which remains locked in that position by the dog  $t'$ , and therefore registers the indication of the run through the switch. Access to the register for reset-

ting it by lowering the arm *k* on releasing it from the dog *h'* is supposed to be had only by an authorized official.

The registering mechanism shown and described in detail is simple and effectively serves my purpose. I believe myself to be the first, however, to provide a register of any kind in connection with a switch having a rail or rails laterally yielding when set and however the switch is thrown for setting it, thus yielding without affecting the throwing appliance. Accordingly I desire to claim such invention broadly and to avoid being understood as limiting this feature of my improvement to any particular construction or to use in connection with any particular details.

When a switch-rail B is thrown automatically by the cause described, it will be observed that such throw does not in any way affect nor is it impeded by the throwing mechanism of the switch-stand. Provision should be made, however, for automatically returning the yielding rail B to its set position (illustrated in Fig. 1) when removed therefrom by the run through the switch. This I accomplish by resilient retaining means for the rail B in the form of a suitable spring, which may be applied in any suitably-convenient manner for the purpose. As illustrated, I make the provision through the medium of a desired number of tie-rods (a single one would be practicable) secured to the switch-rails only by means of a spring-fastening. Thus four tie-rods I are shown, each resting near its opposite ends in bearings afforded by holes, like the hole *h<sup>4</sup>* in the clip H, in the depending portions of clips L, secured to the inner sides of the switch-rails, and in which bearings the tie-rods may freely slide longitudinally, and spiral springs *f*, surrounding the tie-rods, are secured each at one end to one of the latter and at its opposite end to a clip L at a suitable eye thereon, like the eye *h<sup>5</sup>* on the clip H.

I show the spring *f* as duplicated on each tie-bar, though one could be made to answer the purpose of returning a switch-rail to its set position after being cleared by the car or train which threw it therefrom under the conditions hereinbefore specified. It will furthermore be noticed that where my improvement is applied to a split switch in contradistinction to a stub-switch, with which latter it is also capable of use, I provide for rendering both point-rails B and B' independently and resiliently yielding laterally. While this is not indispensably necessary, I prefer to make such provision, so that when the switch is set for the side track a train coming in the same direction as that described, but on the main line, will remain on the main line—that is, will pass through the switch without being derailed—by forcing the yielding rail B' against the rail C. I do not, however, show for this contingency any means of effecting registry of the occurrence, though the register provided may be readily caused to serve the purpose.

The operating appliance E is designated a "switch-stand appliance" in the appended claims. That term, however, where used in the claims is intended to be construed, broadly, to include any means suitable for the purpose that may not technically be properly called a "switch-stand."

What I claim as new, and desire to secure by Letters Patent, is—

1. In a railway-switch, the combination, with a switch-stand appliance, of a switch-rail operatively connected with the said appliance and resiliently yielding laterally with relation to the adjacent main rail independently of the said appliance and a register connected with and operated by the independent outward throw of the switch-rail, substantially as and for the purpose set forth.

2. In a railway-switch, the combination, with a switch-stand appliance, of a split switch operatively connected with the said appliance and having its rail B laterally yielding toward the adjacent main rail independently of the said appliance, a register connected with and operated by the independent outward throw of the said switch-rail, a tie-rod connecting the rails of the split switch and loosely supported in its bearings, and a spring connecting the tie-rod with a switch-rail, substantially as and for the purpose set forth.

3. In combination with a main rail and a movable switch-rail in a railroad-track, a rotary switch-bar supported below the plane of the rails and provided with a worm having at its end a locking-point varying in pitch from that of the worm and a clip on the inner side of and extending below the switch-rail and provided with a beveled surface to be engaged by the worm, substantially as described.

4. In a railway-switch, the combination, with a switch-stand appliance, of a rotary switch-bar provided with a longitudinally-sliding worm to engage and actuate the switch, a rail of the switch being laterally yielding toward the adjacent main rail independently of the said appliance, substantially as and for the purpose set forth.

5. In a railway-switch, the combination, with a switch-stand appliance, of a rotary switch-bar provided with a longitudinally-sliding worm and supported below the plane of the rails, whereby the threads of the worm engage and actuate the switch, a rail of the switch being laterally yielding toward the adjacent main rail independently of the said appliance, substantially as and for the purpose set forth.

6. In a railway-switch, the combination, with a switch-stand appliance, of a register on the said appliance, a rotary switch-bar provided with a longitudinally-sliding worm and supported below the plane of the rails, whereby the threads of the worm engage and actuate the switch, a rail of the switch being laterally yielding toward the adjacent main

rail independently of the said appliance, and a movable abutment between the worm and register mechanism, substantially as and for the purpose set forth.

5 7. In combination with the rails A', A<sup>2</sup>, and C, the split-switch rails B and B', connected by one or more tie-bars I, supported loosely in clips L on the rails, springs *f*, connecting the tie-bars with the clips, a rotary switch-bar  
10 F, carrying the worms G and G', secured to slide outwardly on the bar, clips H on the switch-rails, engaging the worms, a switch-stand operatively connected with the switch-bar to rotate it for working the switch and

having an opening *l*, a pivotal signal-arm sup- 15  
ported on the stand behind the opening and provided with means for fastening it in its registering position, a bell-crank *i*, linked to the said arm, and an abutment K, confined on the switch-rod between the bell-crank and 20  
adjacent worm, the whole being constructed and arranged to operate substantially as and for the purpose set forth.

JOHN J. HILL.

In presence of—

M. J. FROST,

A. P. COBB.