No. 621,386. Patented Mar. 21, 1899.

W. H. THORP.

RAILWAY SWITCH.

(Application filed July 15, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

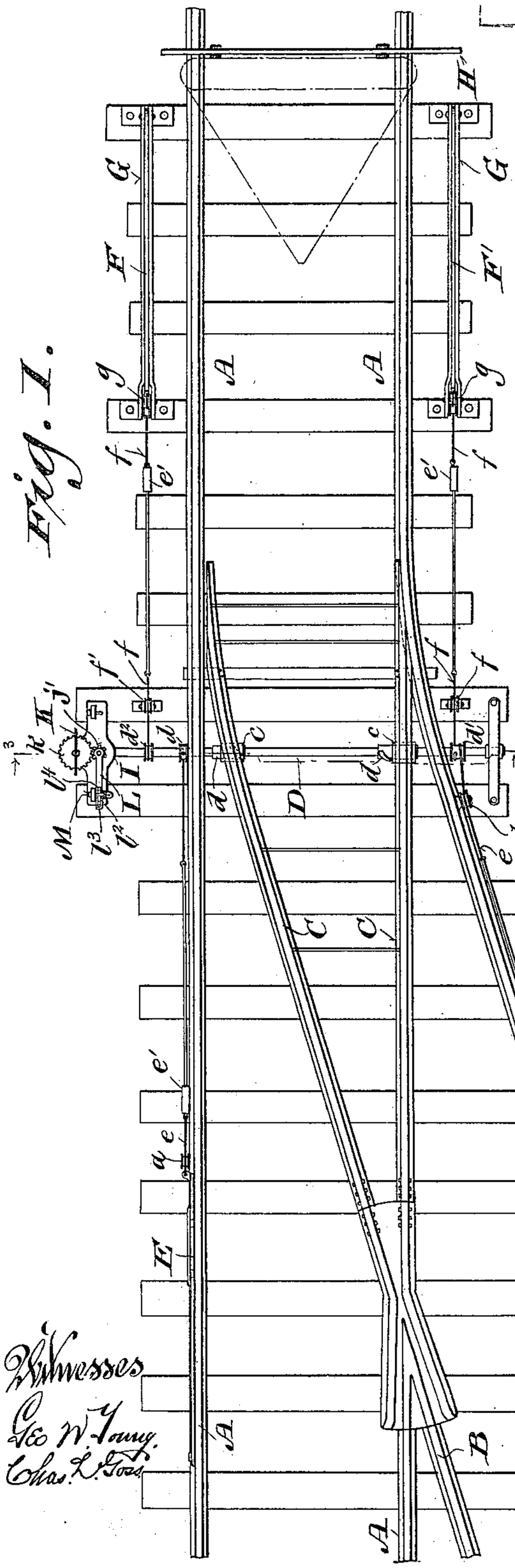
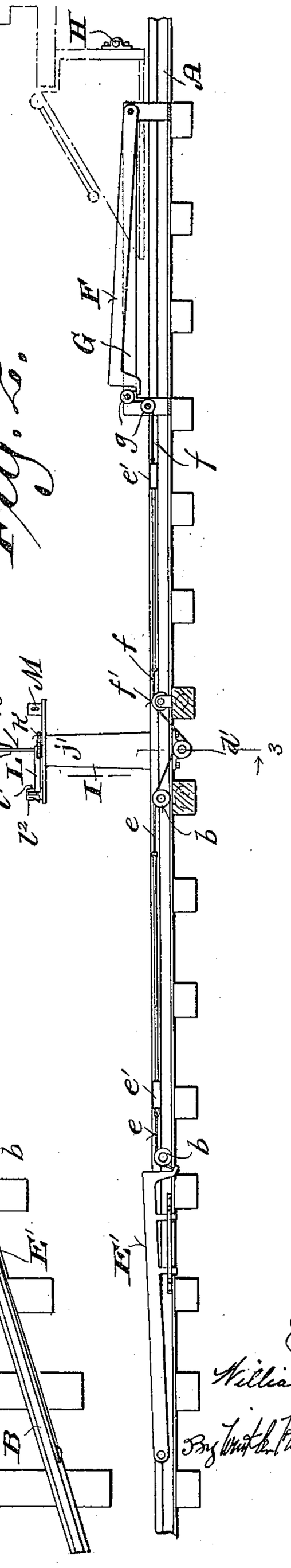


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

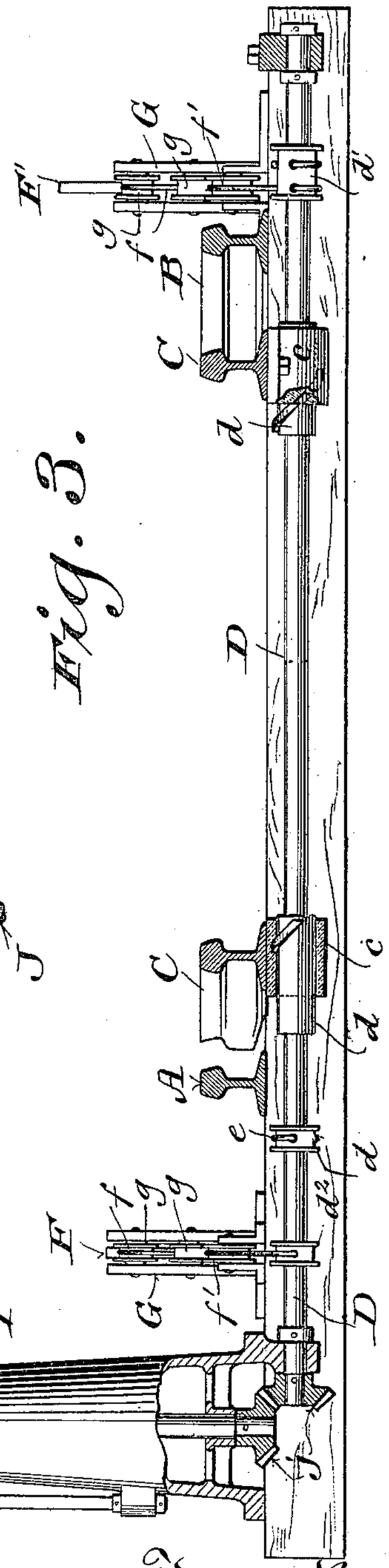


Fig. 4.

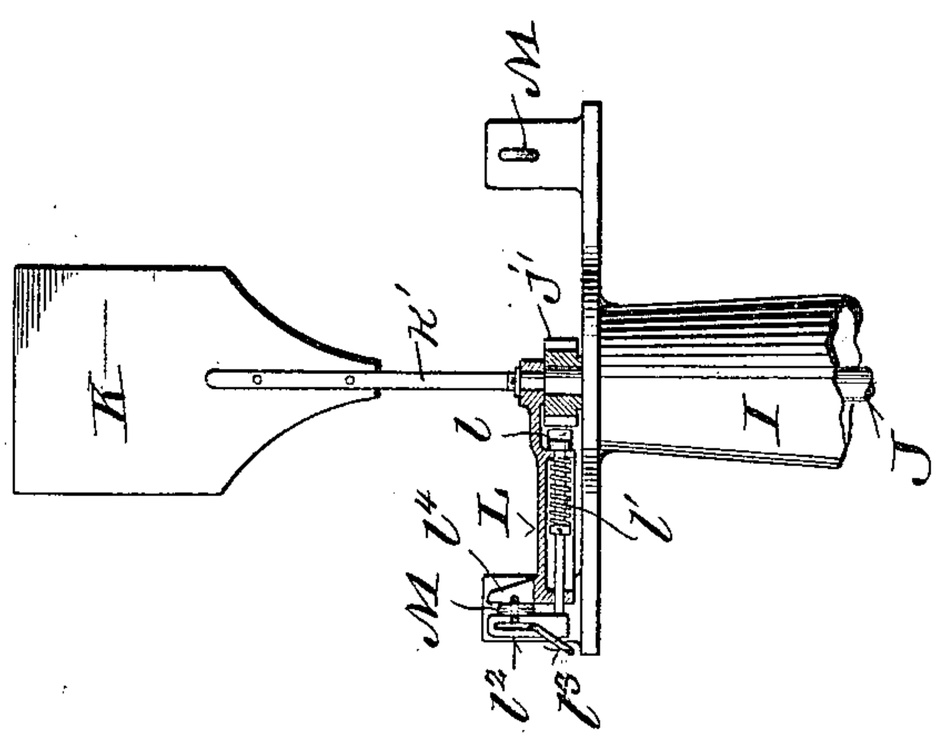


Fig. 5.

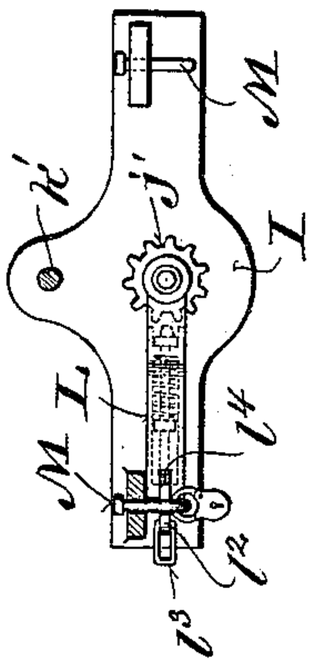
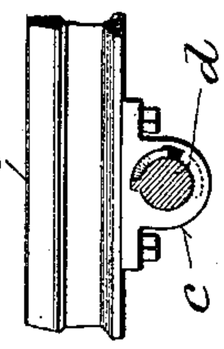


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM H. THORP, OF BEAVER DAM, WISCONSIN.

RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 621,386, dated March 21, 1899.

Application filed July 15, 1898. Serial No. 685,983. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. THORP, a citizen of the United States, residing at Beaver Dam, in the county of Dodge and State of Wisconsin, have invented certain new and useful Improvements in Railway-Switches, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The main objects of my invention are to avoid accidents occurring by reason of misplaced switches; to cause a train, car, or locomotive approaching the switch in one direction upon the main or side track to automatically set the switch in the proper position for the train, car, or locomotive to pass; to enable the engineer of a train or locomotive approaching the switch in the opposite direction to shift the switch into position for running upon either the main or side track without stopping, and generally to improve the construction and operation of devices of the class to which the invention pertains.

It consists in certain novel constructions, arrangements, and combinations of parts, as hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a plan view of a railway-switch and of the switch-shifting mechanism which embodies my invention. Fig. 2 is a side elevation of the same. Fig. 3 is an enlarged vertical cross-section on the line 3 3, Figs. 1 and 2; and Figs. 4, 5, and 6 are detail views of parts of the mechanism.

A A designate the rails of the main track, B B the rails of a side track, and C C the rails of a switch for connecting the main track with the side track.

D is a rock-shaft which extends across the track underneath the movable ends of the switch-rails C C. It is provided with screws or worms *d d*, which are adapted to engage with nuts or spirally-grooved boxes *c c*, attached to the bases of the switch-rails at or near their movable ends, as shown in detail in Figs. 3 and 6, and when turned to open and close the switch.

E E′ are vertically-movable tread-bars pivoted at their outer or farther ends one to the outside of the outer rail A of the main track and the other to the outside of the outer rail B of the side track and connected at their inner ends, nearest the switch, with sheaves *d d′* on the rock-shaft D by chains or cables *e e*, which pass over suitable guiding-sheaves *a* and *b b*. These chains or cables are wound around the sheaves *d* and *d′* in opposite directions, and the sheaves *a* and *b b* are so arranged that the depression of the bar E will turn the switch-rails C to the right into the position in which they are shown in Fig. 1, thus closing the switch for the main track, while the depression of the bar E′ will turn said rails in the opposite direction, thereby closing the switch for the side track. When the switch is in the position in which it is shown in Fig. 1, the inner end of the bar E′ will be elevated above the head of the adjacent rail B, while the inner end of the bar E will be lowered approximately flush with the head of the adjacent rail A. If under these conditions a train, locomotive, or car approaches the switch on the side track B, the first pair of wheels that pass over the bar E′ will depress its inner end, thereby turning the rock-shaft D to the left and through its screws or worms *c* automatically shifting the switch-rails so as to close the switch for the side track and allow the train, car, or locomotive to pass from the side track upon the main track without breaking, bending, or injuring the points of the switch-rails. If another train or locomotive should follow in the same direction on the main track, it would depress the inner end of the bar E, which had been raised by the passage of the preceding train over the bar E′, thereby shifting the switch-rails C in the opposite direction or into the position in which they are shown in Fig. 1, and thus allowing the second train or locomotive to proceed on the main track past the switch without injury to the points of the switch-rails. It will thus be seen that the depression of either of the bars E or E′ by the passage of a truck-wheel over it elevates the other into operative position.

To shift the switch automatically for a train approaching on the main track, so that it may continue on the main track or pass upon the side track without stopping, two vertically-movable bars or levers F F′ are pro-

vided on opposite sides of the main track and on the opposite side of the rock-shaft D from the tread-bars E and E'. These bars F and F' are each pivoted at or near their outer ends farthest from the switch in stands or supports G, and are connected at their inner ends with sheaves d' and d^2 on the rock-shaft D by chains or cables $f\,f$, which pass over suitable guiding-sheaves f' and $g\,g$. The chains or cables f are wound around the sheaves d' and d^2 in opposite directions with respect to each other and also with respect to the chains or cables $e\,e$, so that the depression of either bar will elevate both bars E and F or E' and F' on the opposite side of the track, while the remaining bar E or E' on the same side of the track will be lowered.

Each of the stands or supports G for the bars or levers F and F' consists, as shown in the drawings, of two parallel horizontal bars which are carried upon the ends of ties, and between which one of the bars F F' is pivoted guided, and held in position when elevated at its inner end, nearest the switch, to be engaged and depressed by a rod or bar H, carried by the pilot of a locomotive and arranged to be projected therefrom on either side at the will of the engineer by means of a suitable operating connection (not shown) leading into the cab of the locomotive.

Those portions of the connections between the bars E E' and F F' and the rock-shaft D which do not pass over sheaves and are therefore not necessarily flexible may consist of rods, as shown in Figs. 1 and 2, and they are provided with spring or elastic couplings $e'\,e'$ to compensate for the lengthening and shortening of said connections due to their expansion and contraction by changes of temperature.

When the switch and its actuating connections are in the positions in which they are shown in Figs. 1 and 2, if a train or locomotive approaching on the main track from the right wishes to pass upon the side track the engineer moves the bar H to the left into position, as shown in Fig. 1, to engage with and depress the bar F'. As it passes over said bar the rock-shaft D is turned to the left and the switch is automatically shifted or closed for the side track, and the train or locomotive is thus enabled to pass thereon from the main track without stopping. The depression of the bar F' elevates the bars E and F into operative position, so that the switch may be restored to its original condition automatically by a train passing to the right over the bar E or, at the will of the engineer, by the engagement of the bar H on a locomotive passing to the left.

Referring to Figs. 3, 4, and 5, I is a switch-stand similar to those in common use. It is provided with a vertical shaft J, supported and adapted to turn in suitable bearings therein. At its lower end the shaft J is connected with the rock-shaft D by miter-gears j, and at its upper end it is provided with a spur gear or pinion j', which meshes with a larger gear k on a vertical shaft k', supported in the switch-stand and carrying at its upper end a target or signal K for indicating the position of the switch.

L is an arm or lever loosely mounted upon the upper end of the shaft J for manually turning the switch. It is provided, as shown in Fig. 4, with a dog l, which is adapted by engagement with the pinion j' to operatively connect said arm with the shaft J. A spring l' tends to throw and hold said dog out of engagement with the pinion j'. The outer end of the dog-rod is provided with an upturned slotted handle l^2, in which a ring l^3 is loosely held. When the switch is to be operated manually from the switch-stand, the handle l^2 is thrust inward against an upturned projection or handle l^4 on the outer end of the arm L, and the ring l^3 is then placed over said projection l^4, thereby locking the dog l in engagement with the pinion j'. The switch can now be turned by means of the arm L the same as with an ordinary switch stand or lever.

When not in use, the arm L is locked to one of the two staples M, which are loosely held in upright plates or projections on the top of the switch-stand, as shown in Fig. 5, with the staple passing between and separating the handle l^2 of the dog from the handle l^4 of the arm, thereby preventing the engagement of the dog with the pinion j' and its interference with the operation of the switch-shifting mechanism and signal by the bars E E' and F F'.

The screws or worms $d\,d$ are so arranged with reference to the nuts or boxes $c\,c$, in which they work, that when the switch-rails are shifted to their extreme positions in either direction the thread or spiral tongue of one of the screws or worms will pass out of its groove in the adjacent nut or box, as shown at the right in Fig. 3 and in Fig. 6, thereby locking the switch against displacement by a side thrust or lateral pressure upon its rails C, the end of the nut or box engaging with the end of the thread or tongue of the screw or worm.

The shifting mechanism herein shown and described is applicable to switches as at present constructed without change therein, and although I have for the purpose of illustration shown my improvements as applied to a point or split switch they are equally applicable to stub-switches.

Various changes in the minor details of the switch-shifting mechanism may be made without affecting its mode of operation or departing from the spirit and intended scope of my invention.

I claim—

1. The combination with switch-rails provided at or near their movable ends with nuts, of a rock-shaft provided with worms or screws adapted to engage with said nuts and when turned to open or close the switch, and vertically-movable tread-bars arranged one alongside of and approximately parallel with

the head of a rail of the switch or side track and the other alongside of and approximately parallel with the head of a rail of the main track and connected with said rock-shaft so as to turn it in opposite directions, one of said tread-bars being up when the other is down and the elevated bar being adapted and arranged to be depressed by the tread of the first wheel of a train or car passing over the adjacent rail, substantially as and for the purposes set forth.

2. The combination with switch-rails provided, at or near their movable ends with nuts or spirally-grooved boxes, of a rock-shaft provided with screws or worms adapted to engage with said nuts or boxes, and vertically-swinging bars pivoted at or near their farther ends on each side of and approximately parallel with the main track, and having flexible connections with sheaves on said rock-shaft for turning the same in opposite directions and opening or closing the switch, the depression of either bar raising the other, and the depression of one bar operating to open the switch, while the depression of the other bar operates to close the switch, substantially as and for the purposes set forth.

3. The combination with the rails of a railway-switch provided at their movable ends with nuts or spirally-grooved boxes, of a rock-shaft provided with screws or worms adapted to engage with said nuts or boxes, a switch-stand provided with a signal which is connected with said rock-shaft, and vertically-movable bars having operating connections with said rock-shaft and adapted when engaged by a part of a passing car or locomotive to open or close said switch and to shift said signal, substantially as and for the purposes set forth.

4. The combination in a railway with the main and switch rails of a rock-shaft arranged transversely to the track and provided with screws or worms which are adapted to engage with nuts or boxes on the bases of the switch-rails at or near their movable ends, vertically-movable tread-bars arranged one alongside of a switch-rail and the other alongside of a main-track rail and each connected by a chain or cable with a sheave on said rock-shaft, and pivoted bars or levers arranged on the opposite sides of said rock-shaft alongside of the main track and also connected by chains or cables with sheaves on said rock-shaft, substantially as and for the purposes set forth.

5. The combination with the main and switch rails of a railway-track, of a rock-shaft crossing the track underneath the switch-rails and provided with screws or worms which are adapted to engage with nuts or spirally-grooved boxes on the bases of the switch-rails at or near their movable ends, and vertically-movable levers or bars pivoted at or near their outer ends in stands or supports approximately parallel with the main track and on opposite sides thereof, and connected at or near their inner ends with sheaves on said rock-shaft by chains or cables passing over suitable guiding-sheaves, substantially as and for the purposes set forth.

6. The combination with switch-rails provided at or near their movable ends with nuts or spirally-grooved boxes, of a rock-shaft arranged transversely to the track and provided with screws or worms which are adapted to engage with said nuts or boxes and when turned to shift the switch-rails laterally, a switch-stand having a vertical shaft geared with said rock-shaft, and an arm for manually operating the switch loosely mounted upon said vertical shaft and provided with means for locking it therewith, substantially as and for the purposes set forth.

7. The combination with the rails of a railway-switch provided with nuts or spirally-grooved boxes, of a rock-shaft arranged transversely to said rails and provided with screws or worms which are adapted to engage with said nuts or boxes and to shift the switch-rails, a switch-stand having a vertical shaft connected at its lower end with said rock-shaft, an arm for manually operating the switch loosely mounted upon said vertical shaft and provided with means for locking it therewith, and a signal connected with said vertical shaft for indicating the position of the switch, substantially as and for the purposes set forth.

8. The combination with a railway-switch, of a rock-shaft arranged transversely to the switch-rails and provided with screws or worms which are adapted to engage with said rails and turn the switch, a switch-stand having a vertical shaft which is connected at its lower end by gears with said rock-shaft and is provided at its upper end with a gear or pinion and with an arm loosely mounted thereon and provided with a spring-retracted dog for engaging said pinion and locking the arm with said vertical shaft, means for locking said arm and dog in inoperative position, and a signal mounted on a shaft which is provided with a gear meshing with the pinion on said vertical shaft, substantially as and for the purposes set forth.

9. The combination with a railway-switch of a rock-shaft arranged transversely to the switch-rails and provided with screws or worms which are adapted to engage with said rails and to turn the switch in either direction, bars or levers pivoted at their farther ends to stands or supports on opposite sides of and parallel with the main track approaching the switch, in position to be engaged by a trip carried by a locomotive, and connected at their nearer ends with sheaves on said rock-shaft by flexible connections wound in opposite directions around said sheaves, substantially as and for the purposes set forth.

In witness whereof I hereto affix my signature in presence of two witnesses.

WILLIAM H. THORP.

Witnesses:
CHAS. L. GOSS,
M. L. EMERY.