

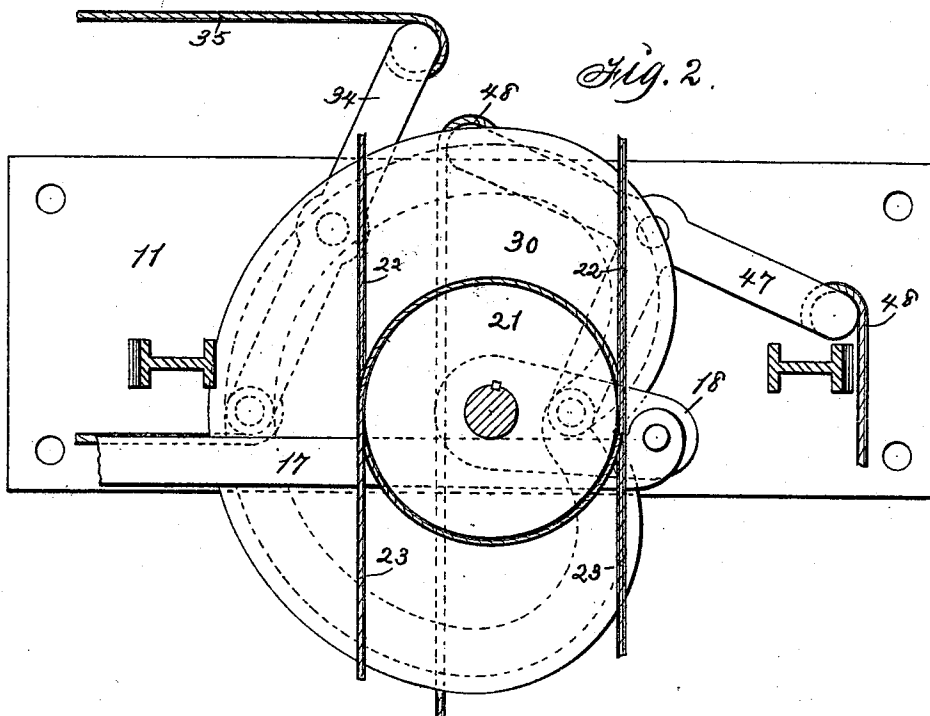
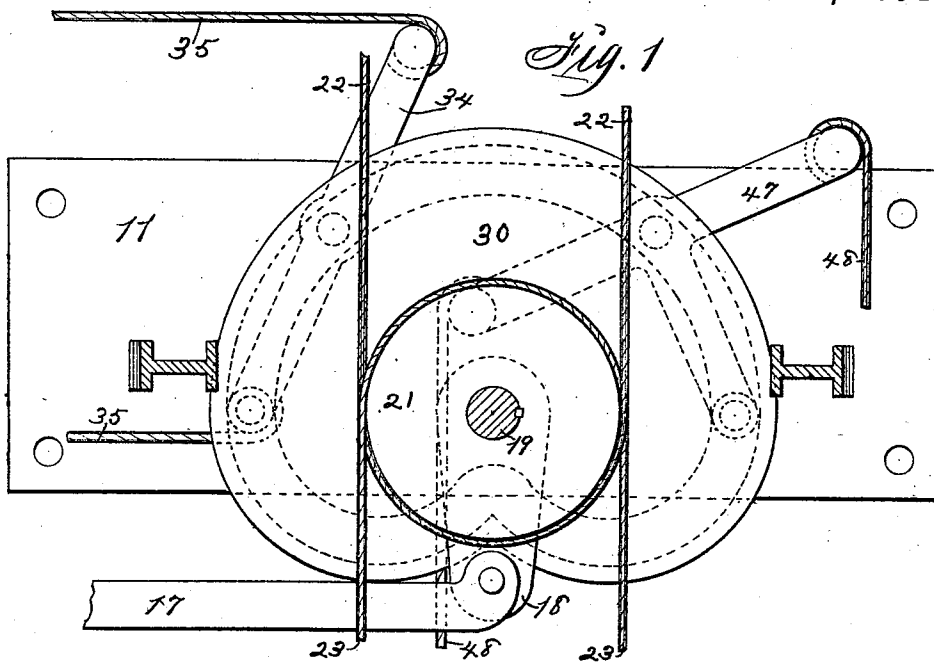
(No Model.)

5 Sheets—Sheet 1.

L. C. NORTON & L. A. DEVINE.
RAILWAY SWITCH AND SIGNAL APPARATUS.

No. 517,392.

Patented Mar. 27, 1894.

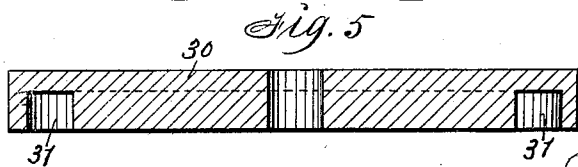
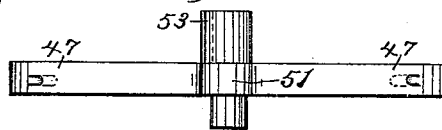
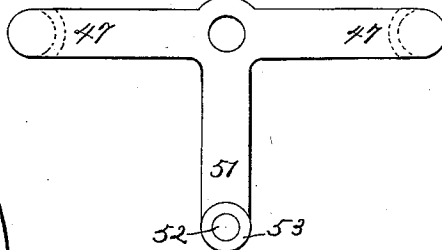


Witnesses: } Inventors: *Emuel C. Norton* and *Laurence A. Devine*,
J. A. Sweet, } *By Thomas G. Orwig*, Attorney.
W. A. Ballard.

5 Sheets—Sheet 2.

No. 517,392.

Patented Mar. 27, 1894.



Witnesses:
J. Sweet,
W. A. Ballard.

Inventors:

By Thomas G. Orwig, Attorney,

Samuel C. Norton,
Lawrence A. Devine
Thomas G. Orwig, Attorney.

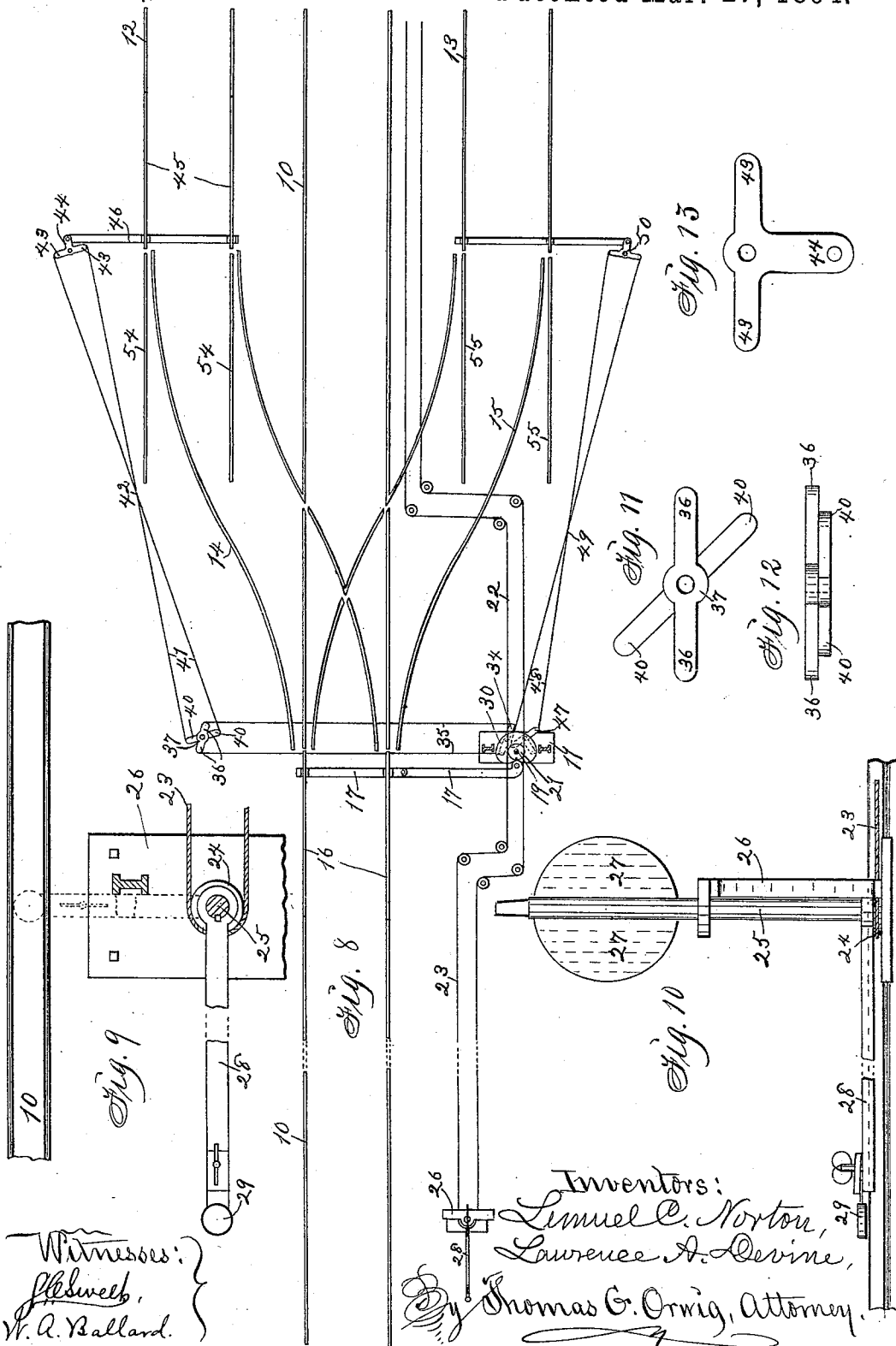
(No Model.)

5 Sheets—Sheet 3.

L. C. NORTON & L. A. DEVINE.
RAILWAY SWITCH AND SIGNAL APPARATUS.

No. 517,392.

Patented Mar. 27, 1894.



Witnesses:
J. A. Ballard.
W. A. Ballard.

Inventors:
Lemuel C. Norton,
Lawrence A. Devine,
By Thomas G. Orwig, Attorney.

(No Model.)

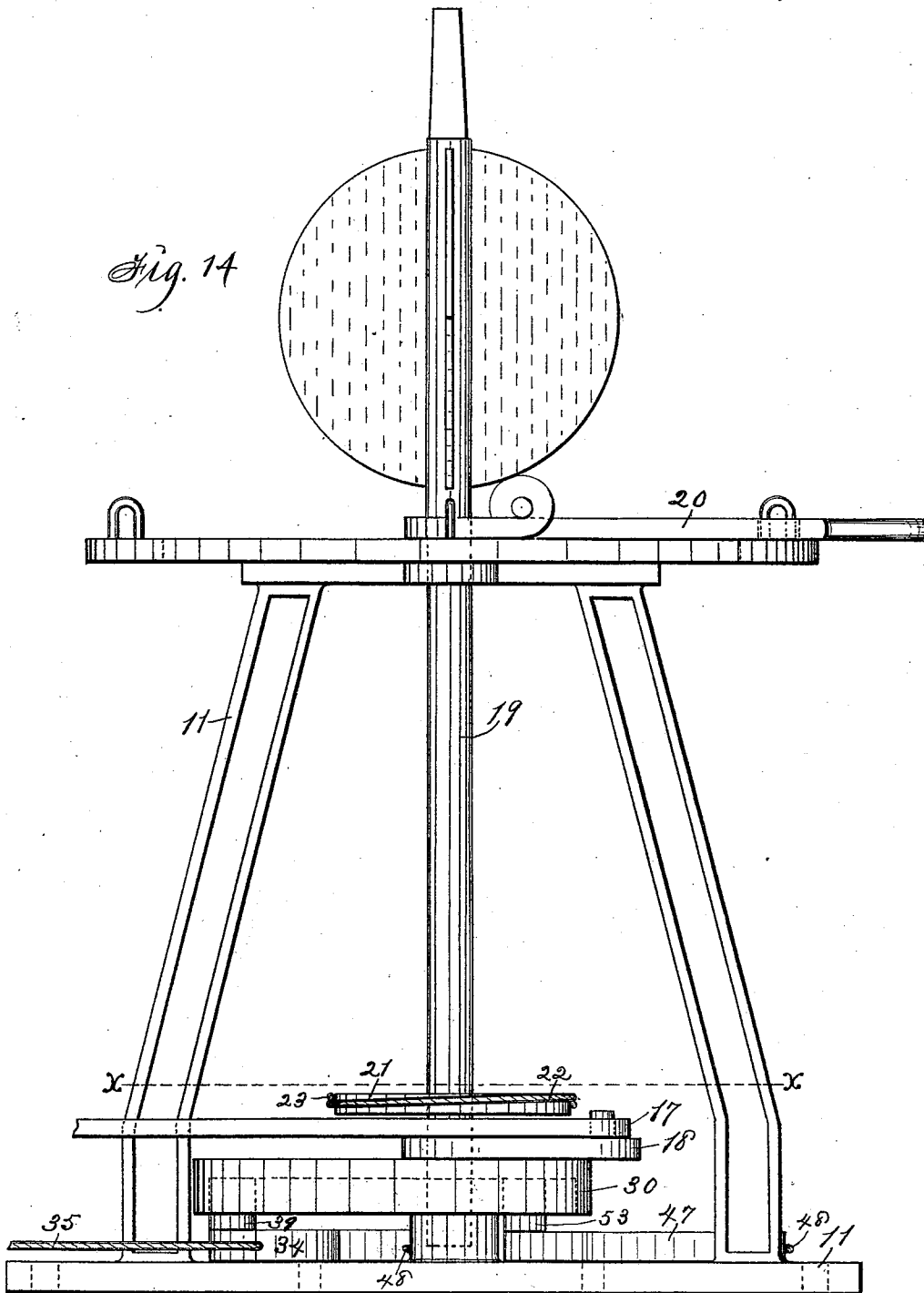
5 Sheets—Sheet 4.

L. C. NORTON & L. A. DEVINE.

RAILWAY SWITCH AND SIGNAL APPARATUS.

No. 517,392.

Patented Mar. 27, 1894.



Witnesses: } Inventors: Lemuel C. Norton and Lawrence A. Devine,
J. A. Ballard. } By Thomas G. Orwig, Attorney.

L. C. NORTON & L. A. DEVINE.
RAILWAY SWITCH AND SIGNAL APPARATUS.

No. 517,392.

Patented Mar. 27, 1894.

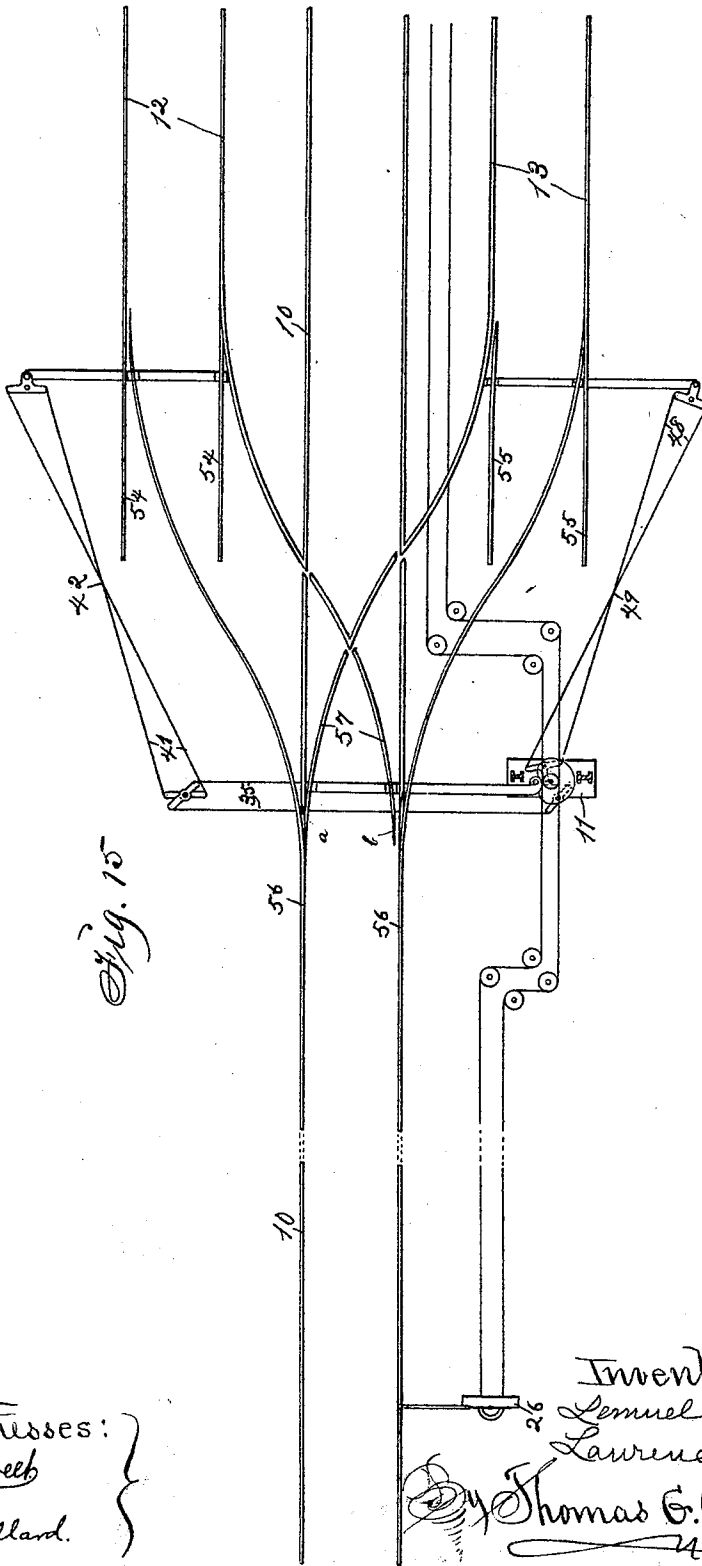


Fig. 15

Witnesses:
J. H. Sweet
W. A. Ballard.

Inventors:
Lemuel C. Norton,
Laurence A. Devine,
By *Thomas G. Orwig, Atty.*

UNITED STATES PATENT OFFICE.

LEMUEL C. NORTON AND LAWRENCE A. DEVINE, OF COUNCIL BLUFFS,
IOWA; SAID NORTON ASSIGNOR TO J. NORTON, OF SAME PLACE.

RAILWAY SWITCH AND SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 517,392, dated March 27, 1894.

Application filed August 21, 1893. Serial No. 483,711. (No model.)

To all whom it may concern:

Be it known that we, LEMUEL C. NORTON and LAWRENCE A. DEVINE, both citizens of the United States of America, and residents of Council Bluffs, in the county of Pottawattamie and State of Iowa, have jointly invented a new and useful Railway Switch and Train Signal Apparatus, of which the following is a specification.

10 The objects of our invention are to provide means to operate a two-throw-or-more split rail or end switch connection from one switch stand by one lever from a cam movement attached to the ordinary switch shaft and from
15 the action of levers from said cam grooves; to provide means for operating said two-throw-or-more throws split rail or end switch; to provide means for determining to the engineer the relative positions of switches and
20 the main line of a railway; to provide means for conjunctively operating a switch, visual signals, and sound signals; to provide means for preventing free cars upon a side track from interfering accidentally with the passage of
25 cars on the main line, and to provide means for preventing trains pulling out from side tracks after using same and not closing switches.

Our invention consists in the construction, arrangement and combination of different elements, hereinafter set forth, pointed out in our claim and illustrated by the accompanying drawings in which—

Figure 1 is a transverse sectional view of the switch stand on the line x, x of Fig. 14, showing the parts in one position. Fig. 2 is a transverse sectional view on the line x, x of Fig. 14 showing the parts in a different position. Fig. 3 is a transverse sectional view on the line x, x of Fig. 14 showing the parts in a third position. Fig. 4 is a bottom face view of the cam. Fig. 5 is a transverse sectional view on the line $x-x$ of Fig. 4. Fig. 6 is a plan view of one of the levers, and Fig. 7 is an edge view of the same. Fig. 8 is a plan view showing the apparatus applied to one end of an "end rail" switch. Figs. 9, 10, 11, 12, and 13 are detail views, showing the construction of separate parts of the apparatus.
50 Fig. 14 is a side elevation of the switch stand.

Fig. 15 is a plan view showing the apparatus applied to one end of a "split rail" switch.

In the construction of the device as shown the numeral 10 designates the main line of railway, and 11 a switch stand located adjacent thereto.

The numerals 12, 13 designate respectively side tracks arranged parallel to the main line and connected thereto at either end by means of converging switches 14, 15 respectively, said switches converging to the main line at the same point, opposite to the switch stand.

Since both ends of the side tracks and their respective switches are identical in construction with each other one end portion of each side track and the switches connected thereto only will be described and illustrated.

The cross-overs 14, 15, are rigidly secured, and immovable, as is also that portion of the main line between said cross overs, and a section 16 of the main line is positioned in a common manner to be moved laterally across the lines of the said cross-overs and at will establish a continuous track with either of said cross-overs or the main line. A draw rod 17 connects the otherwise free ends of the rails in the section or switch 16 and extending laterally from the said section is pivotally connected to a crank arm 18 rigidly secured to and extending horizontally from the mast 19 vertically positioned in the switch stand 11. The mast 19 is provided with the usual lever 20, whereby it may be rotated, and means for locking said lever to the stand, and has also a series of visual signals of common form fixed to its top and adapted to display differently colored lights or plates according to the position of the switch, the plates or lights differentiating coincident with the rotation of the mast. Mounted upon the mast 19, immediately above the crank arm 18 is a drum, 21, connected to a signal placed at a considerable distance so that an incoming train will have notice of the condition of the outgoing or opposite switch by means of visual signals. Also mounted on the drum 21 is an endless cable 23, which cable 23 also extends around a drum 24 mounted on the mast 25 in a signal stand 26 located at considerable distance from the switch stand 11. The mast 25 has secured to

its top vari-colored plates 27 or lights forming a visual signal, said plates or lights differentiating in position coincident with the rotation of the mast 25, (Figs. 9 and 10) to the outer end of which signal arm is detachably connected a torpedo 29, or other explosive signal. Rigidly mounted upon the mast 19, is a cam plate 30, (Figs. 1, 2, and 3) having the concentric groove 31, and the eccentric grooves 32, 33, having communication with the concentric groove formed in and opening downward from said cam plate, said grooves being shown in dotted lines. Pivoted upon the switch stand, 11, beneath the cam plate, 30, is a lever, 34, the pivotal point being at the center of the said lever. Cables 35, 35, connect the ends of the lever 34 with two of the arms 36, 36, of a lever 37, said latter lever being fulcrumed on a suitable support (not shown) on the opposite side of the tracks from the switch stand 11, the cables extending in parallel lines beneath and across the tracks. An upwardly extending stud 38, having an antifriction roller 39, (dotted lines) is formed on one end of the lever 34, the said anti-friction roller 39 being positioned within, and adapted to be acted upon by the grooves in the cam plate. Arms 40, 40, on the lever 37 are connected by means of cables, 41, 41, crossed at 42, to arms 43, 43 formed on a T-shaped lever fulcrumed on a suitable support (not shown) in proximity to the junction of the cross-over 14 with the side track 12, the laterally extending arm 44 on the said lever being pivotally connected with laterally movable switch rails 45, 45, by means of a draw rod 46, said draw rod 46 also connecting the said rails together. The lever 37 is shown in detail in Figs. 11 and 12, and the T-shaped lever is shown in detail in Fig. 13. By these means the end rail switches are operated and it is obvious that by the arrangement of parts as described in the following paragraph, that the devices are thereby adapted to operate the split rail switches.

Fulcrumed on the switch stand 11 beneath the cam plate 30 is a T-shaped lever (Figs. 6 and 7) having the arms 47, 47 connected, by means of cables 48, 48, crossed at 49, to the T-shaped lever 50 located in proximity to the junction of the cross over 15, with the side track 13, said lever 50 being in construction and connections identical with the T-shaped lever on the opposite side of the tracks therefrom. A laterally extending arm 51 is formed and extends at right angles from the arms 47, 47, and is provided at its outer end with an upwardly extending stud 52, having the antifriction roller 53 mounted thereon and seated within the grooves in the cam plate. Stub tracks 54, 55, are provided at each side of the main line 10 and parallel therewith, said stub tracks forming continuations of the side tracks 12, 13, respectively, at certain times, the outer ends of the said stub tracks having no communication with the main line.

It will be observed by reference to Fig. 8

that the main line is open for the passage of trains thereon, and Fig. 1 shows the relative position of the cam and levers at this time. When it is desired to run a train into the side track 13, the mast 19 is rotated in the usual manner, thus operating the crank arm 18, which crank arm acting through the medium of the draw rod 17 moves the switch 16 of the main line laterally and into alignment with the cross-over 15. Simultaneously therewith the cam plate 30 is rotated and the eccentric groove 33 therein acts upon the T-shaped lever through the roller 53, stud 52, and arm 51, and rotates said lever, thus causing the cables 48, 48, crossed as shown, to rotate the T-shaped lever 50 and bring the side switch 13 into alignment with the cross-over 15, the cam plate and levers assuming the positions shown in Fig. 2. Simultaneously therewith the drum 21 is rotated and the endless cable 22 is caused thereby to rotate the drum 21 on the switch stand 11 at the opposite end of the siding (not shown) the cables 23, 23, also being caused, by the rotation of said drums, to operate the signal stands 26, and change the visual signals thereon and at the same time swing the signal arms 28, carrying the torpedoes 29, toward the main line thus positioning the said torpedoes upon the adjacent rail, where they are adapted to be exploded by contact with the wheels of a moving train and render to the engineer of said train full knowledge that a side track is open regardless of the direction from which the said train approaches.

When it is desired to run a train upon the side track 12, the mast 19 is rotated in a reverse direction, and the cam plate and levers assume the position shown in Fig. 3, the action of the levers and cables being just the reverse of that just described.

It will be observed that owing to the relative construction and arrangement of the eccentric grooves and the concentric groove, the levers acting upon one switch remain idle during the operation of the levers acting upon the remaining switch.

It will be observed that by the employment of the stub tracks in the event of idle cars upon the side tracks becoming loosened and traveling along the same, said cars will run upon said stub tracks and be prevented thereby from obstructing the passage of trains upon the main line.

In the plan view shown in Fig. 15 split-switches are employed, the rails of the main line being cut, and the outer rails 56, 56, being continuous. Movable tongues 57 (two in number) are provided, which tongues are specifically designated as *a*, *b*, and rigidly connected to the switch-bar 17 in such a manner as that when the tongue *a* is in contact with the continuous rail 56, adjacent thereto, the tongue *b* will be at a distance of approximately four inches from the rail 56, adjacent to said tongue *b*, and the train will be shunted into the siding 13. When the tongues *a*, *b*,

are shifted so as to bring the tongue *b* into contact with the rail 56, adjacent to said tongue *b*, the tongue *a* will be in a position approximately four inches from the rail 56, adjacent thereto, and the train will be shunted into the siding 12. When it is desired that the train shall continue on the main line the tongues are shifted into a position midway between the extremes of movement thereof (so that each tongue is about two inches from the adjacent rail) and when in this position the train will naturally take the direct line of advancement on the main line.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent of the United States therefor, is—

A switch and signal apparatus comprising the following elements in combination: the main line of track having movable sections; the side tracks converging to the main line; a switch stand located at each end of the side tracks, having a rotatable mast; a crank arm

fixed to and horizontally extending laterally from each mast; a draw rod connecting the rails of the movable sections of the main line, and connecting said movable sections to the crank arm on the adjacent switch stand; a cam mounted on each mast; a lever located adjacent to each of said masts and engaging respectively with the respective cam on said mast; cable connections between said levers and other levers located at a considerable distance from the switch stands; a drum mounted on each mast; cable connections between said drums; signal stands; drums located in said signal stands; and endless-cable connections between said drums on the signal stands and the drums on the switch stands, as set forth.

In testimony whereof we hereunto have set our hands in the presence of two witnesses.

LEMUEL C. NORTON.

LAWRENCE A. DEVINE.

In presence of—

C. G. SAUNDERS,

O. D. WHEELER.