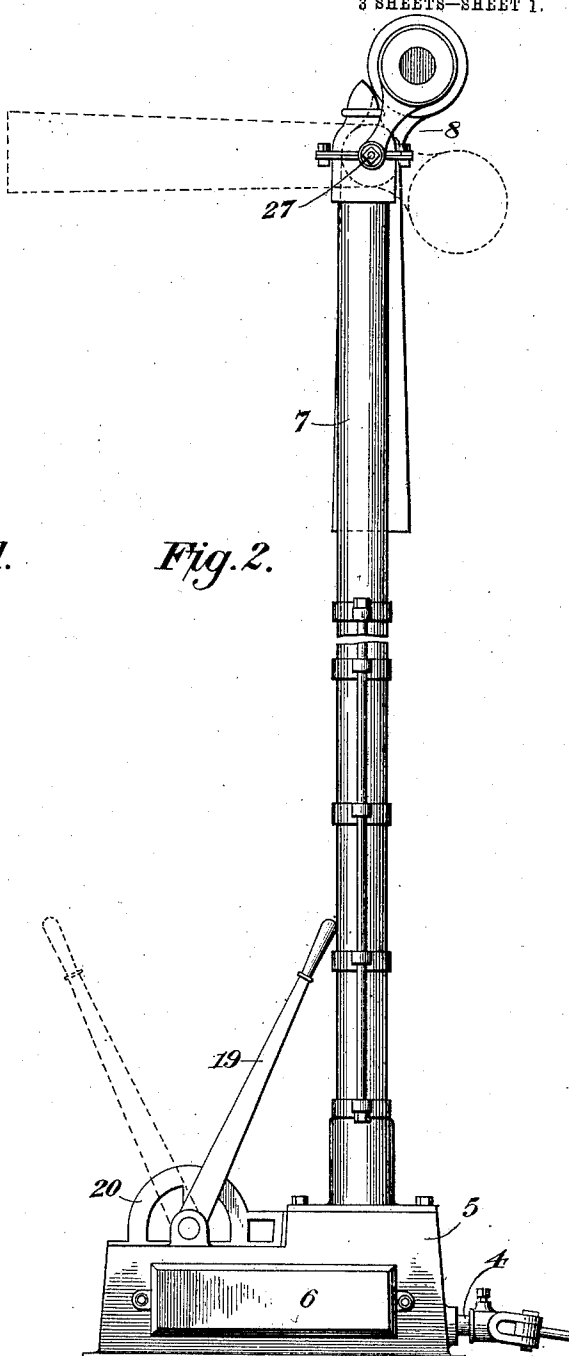
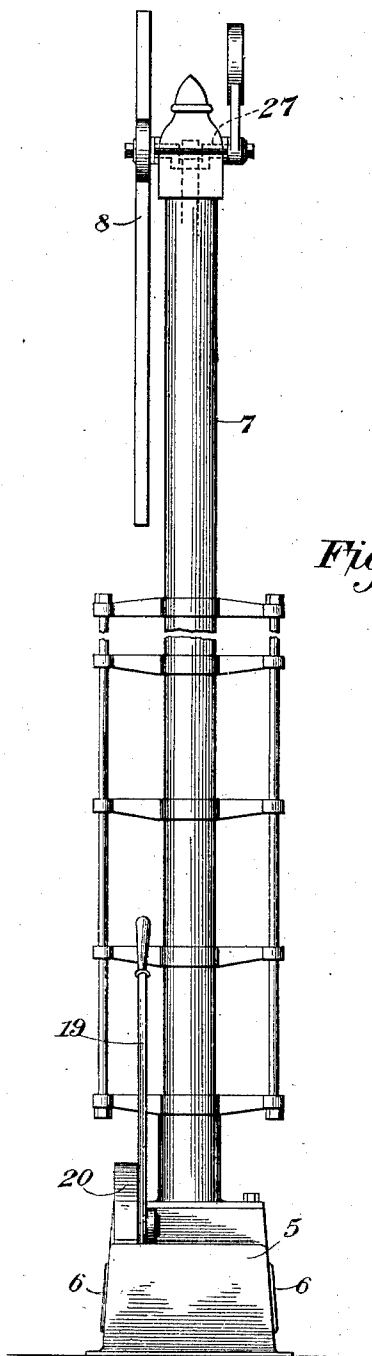


No. 868,800.

PATENTED OCT. 22, 1907.

C. E. NOWLIN.
SAFETY SWITCH AND SIGNAL.
APPLICATION FILED JUNE 25, 1907.

3 SHEETS—SHEET 1.



Witnesses
M. E. Fowler
James H. Mansfield

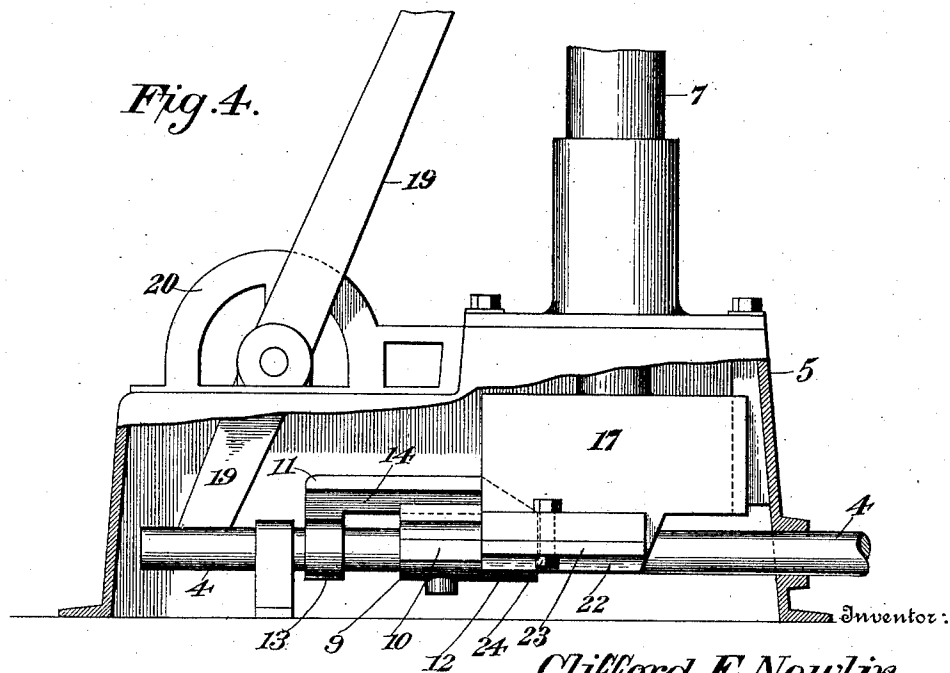
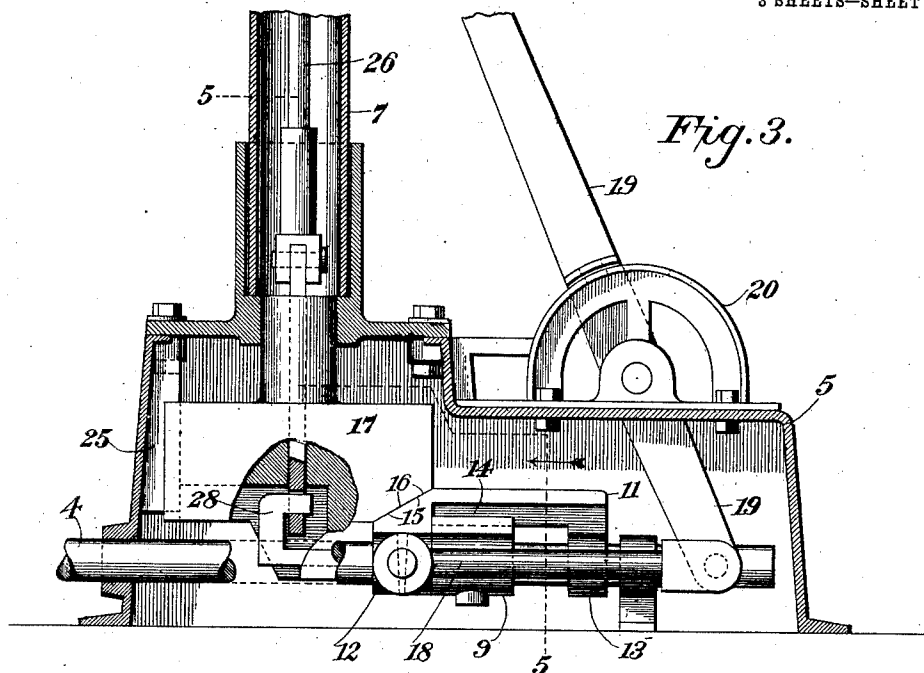
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3 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

CLIFFORD E. NOWLIN, OF BATTLE CREEK, MICHIGAN.

SAFETY SWITCH AND SIGNAL.

No. 868,800.

Specification of Letters Patent.

Patented Oct. 22, 1907.

Application filed June 25, 1907. Serial No. 380,776.

To all whom it may concern:

Be it known that I, CLIFFORD E. NOWLIN, of Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Safety Switches and Signals; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

The present invention relates to an improved main line safety switch stand and signal which operates in keeping with the established habits of trainmen and constitutes an effective safeguard against accidents at the switch where trains are running at high speed, and the invention aims to provide a simple and comparatively inexpensive device of this character which is positive in its operation and in which the various parts are readily accessible for repair.

A further object is to design a switch operating mechanism which holds the semaphore arm at "danger" until the switch is entirely closed, when it is instantly moved to "clear" position.

The invention also contemplates a construction in which the mechanism is but slightly damaged when a train runs through a closed switch, and in which the semaphore-arm remains at "danger" until the damage is repaired.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction, reference is to be had to the accompanying drawings, in which—

Figure 1 is a rear view of the improved safety switch and signal. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal sectional view through the casing, looking at the mechanism therein from one side. Fig. 4 is a similar view looking at the mechanism from the opposite side. Fig. 5 is a transverse sectional view through the casing, on line 5—5 of Fig. 3. Fig. 6 is a plan view of a portion of the track showing the mounting of the protector bar. Fig. 7 is a detail view of the bearings upon which the protector bar is mounted.

Corresponding and like parts are referred to in the following description and indicated on all the views of the drawings by the same reference characters.

The numerals 1 designate the rails of the main track and 2 the switch points which are rigidly connected by a bar 3, one end of which has an operative connection with the switch operating rod which is slidably mounted within the casing 5. This casing 5 is secured in any suitable manner to the ties upon one side of the track and is formed with removable side plates 6 which enable ready access to be had to the interior of the casing for the purpose of repairing the mechanism therein. Projecting upward from the casing is a tubular standard 7 having the semaphore 8 mounted thereon.

The switch operating rod 4 has a sleeve 9 rigidly connected thereto, the said sleeve being provided with a

laterally projecting locking lip 10 and also having a longitudinal groove formed in the upper portion thereof. A slide 11 is loosely mounted upon the operating rod 4 by means of a pair of arms 12 and 13 which embrace the sleeve 9, and the said slide is formed with a web portion 14 loosely received within the before mentioned groove in the upper portion of the sleeve. The forward end of the slide 11 has a wedge formation and is provided with an inclined surface 15 designed to engage a cooperating inclined surface 16 upon the lower portion of a locking block 17 mounted for a vertical sliding movement.

The forward arm 12 of the slide 11 is pivotally connected to a rearwardly extending arm 18 having the extremity thereof bifurcated to receive the lower end of the operating lever 19. This operating lever extends upwardly above the casing 5 and carries a perforated flange cooperating with a quadrant 20 in the usual and well known manner to enable the lever to be locked by means of an ordinary padlock at either extreme of its movement whereby any tampering with the switch is rendered practically impossible.

The locking block 17 is provided upon one side of the inclined or cam surface 16 with a downward extension 22 having a safety block 23 detachably connected to the lower face thereof by a bolt 24, the forward end of the said safety block carrying a hook member 28 which projects within a recess in the locking block 17 and engages a perforation in the lower extremity of a semaphore operating rod mounted within the tubular standard 7 and passing through the locking block. The block 17 is guided in its vertical movements by a guide rib 25 secured to the forward end of the casing and engaging a vertical groove in the said block, and the movements of the semaphore operating rod 26 are controlled by the block. It will be observed that the movement of the slide 11 is limited by the sleeve 9 and that when the switch is closed or in normal position the locking block 17 is lowered so that the safety block 23 is disposed directly in the path of the locking lip 10, the limited movement of the slide enabling the locking block 17 to be lifted previous to opening the switch so as to be held over the locking lip 10 when the switch is open.

A transverse shaft 27 is journaled at the upper end of the standard 7 and is provided with an intermediate crank portion engaging the upper end of the semaphore operating rod 26. Rigid with one end of the said shaft 27 is the semaphore casting 8, which is provided with the different colored lenses and a semaphore blade. The blade extends outward and upward from casting 8, while the opposite end of the shaft has rigidly fastened to it a corresponding casting for displaying the "clear" and "danger" signal lights. The semaphore lamp is fastened to the pole in the usual manner. This blade or semaphore arm, as it is sometimes called, is located at a much greater distance above the tracks. Having

the sky for a background, consequently it can be seen by the engineer at a greater distance than can the ordinary switch target.

As shown in the present instance an upright or downward vertical position of the semaphore blade indicates that the switch is closed and the track is clear; while a horizontal position of the semaphore blade indicates that the switch is open. When the locking block 17 is in a lowered position the semaphore is upright, while when the said locking block is elevated the semaphore blade is swung into a horizontal position.

When the switch is in normal or closed position as shown in Fig. 3 the cam surface 16 of the locking block is in engagement with the cam surface 15 of the slide and the sleeve 9 is adjacent the forward arm 12 of the said slide. In order to throw the switch from a closed to an open position the operating lever 19 is pulled rearwardly and the slide 11 thereby moved forward. This slide moves independently of the switch operating rod 4 until the sleeve 9 abuts against the rear arm 13 thereof and this limited movement enables the cam surface 15 of the slide to cooperate with the cam surface 16 of the locking block 17 to elevate the latter and lift the safety block 23 out of the path of the locking lip 10. The continued movement of the slide then causes the switch operating rod 4 to move longitudinally and throw the switch. From the foregoing description it will be apparent that the lifting of the locking block 17 operates through the rod 26 to move the semaphore 8 to the "danger" position.

When it is desired to close the switch the operating lever is swung in a reverse direction and the slide 11 withdrawn. It will be observed that the slide moves independently of the switch operating bar 4 until the sleeve 9 engages the forward arm 12 of the slide. The rod 4 is then drawn inwardly and the switch closed, the locking block 17 resting upon the locking lip 10 and being held in an elevated position until the lip slips from under the safety block 23, which is not until the switch is entirely closed. When the locking block drops the semaphore is moved to an upright or "clear" position and attention is directed to the fact that this is practically an instantaneous movement and does not take place until the switch is completely closed.

Should an engineer run through the switch when closed the operating rod 4 is forcibly drawn outward and the locking lip 10 caused to engage the safety block 23 and shear the bolt 24 by means of which it is attached to the locking block. The safety block is itself moved forward a sufficient amount to disengage the hook member 28 from the semaphore operating rod 26. The semaphore then assumes a "danger" position and maintains the same until the damage is repaired. Owing to the fact that the side plates 6 of the casing 5 are removable it will be obvious that access can be readily had to the interior of the casing to replace the bolt and repair the damage.

A protector bar 29 somewhat similar to those commonly employed is applied to the side of one of the rails and normally lies flush with the top of the rail. Should a switch point become loose however the protector bar is slightly elevated and engages the wheels of the rolling stock which force it down and hold the loose point in place until the last wheels of the train have left the bar. This prevents the switch points from becoming loose

and standing away from the rails sufficiently to wreck the train.

It will be observed that one end of the protector bar has an operative connection with a bell-crank-lever 30 which engages the switch operating rod 4. This protector bar 29 is supported upon upright links 31 having their lower ends pivotally mounted upon pivot studs 34, the extremities of which are received within corresponding sockets in complementary castings 32 and 33, the former fitting against one of the rails 1.

Having thus described the invention what I claim as new is:

1. The combination of a switch, a switch operating rod, a slide having a limited movement therewith and formed with a cam surface, a switch locking block movable at right angles to said slide and provided with a cooperating cam surface, and a signal controlled by the locking block.
2. The combination of a switch, a switch operating rod, a slide loosely mounted on said rod and provided with a cam surface, and means for causing the slide to move certain distances with the rod; with a vertically movable switch locking block formed with a cooperating cam surface and adapted to be operated by said slide.
3. The combination of a switch, a switch operating rod, a slide having a limited movement therewith and provided with a cam surface, a vertically movable locking block formed with a cooperating cam surface, and a signal controlled by the locking block.
4. The combination of a switch, a switch operating rod, a locking lip carried by the said operating rod, a movable locking block designed to rest upon the lip at a predetermined position of the switch, and means carried by the operating rod for elevating the locking block.
5. The combination of a switch, a switch operating rod, a locking lip carried by the said rod, a movable locking block designed to rest upon the lip at a predetermined position of the switch, and a signal controlled by the locking block.
6. The combination of a switch, a switch operating rod, a locking lip carried by the said rod, a movable locking block designed to rest upon the lip at a predetermined position of the switch, and a slide mounted upon the operating rod and serving to lift the locking block previous to moving the operating rod.
7. The combination of a switch, a switch operating rod, a sleeve rigid with the rod and carrying a locking lip, a slide mounted upon the rod and limited in its movements by the sleeve, and a movable locking block designed to rest upon the locking lip when the switch is open and to be elevated by the slide previous to opening the switch.
8. The combination of a switch, a switch operating rod, a sleeve rigid with the said rod and carrying a locking lip, a slide mounted upon the operating rod and limited in its movements by the sleeve, a movable locking block designed to rest upon the locking lip when the switch is open and to be elevated by the slide previous to opening the switch, and a signal controlled by the locking block.
9. The combination of a switch, a switch operating rod, a member rigid with the said rod and carrying a locking lip, a slide mounted upon the rod and limited in its movements by the said member and formed with a cam surface, a vertically movable locking block formed with a cooperating cam surface whereby it is elevated previous to throwing the switch, the said locking block being designed to rest upon the lip when the switch is open.
10. The combination of a switch, a switch operating rod, a member rigid with the said rod and carrying a locking lip, a slide mounted upon the rod and limited in its movements by the said member and formed with a cam surface, a vertically movable locking block formed with a cooperating cam surface whereby it is elevated previous to throwing the switch, the said locking block being designed to rest upon the lip when the switch is open, and a signal controlled by the locking block.
11. The combination of a switch, a switch operating rod, a member rigid with the said rod and carrying a locking lip, a slide mounted upon the rod and limited in its move-

ments by the said member and carrying a cam surface, a vertically movable locking block formed with a cooperating cam surface and designed to rest upon the lip when the switch is open, and a lever having an operative connection with the slide.

12. The combination of a switch, a casing, a switch operating rod slidably mounted upon the casing, a switch operating mechanism mounted within the casing, a vertically movable locking block cooperating with the switch operating mechanism, a standard projecting from the casing, a crank shaft mounted upon the standard, a semaphore applied to the said shaft, and a semaphore operating rod connecting the crank shaft and the locking block.

13. The combination of a switch, a switch operating mechanism, a locking block cooperating therewith, a safety block applied to the locking block, and means for severing the said safety block therefrom when the switch is forcibly opened.

14. The combination of a switch, a switch operating mechanism, a locking block cooperating therewith, a safety block applied to the locking block, means for severing the safety block therefrom when the switch is forcibly opened, a signal, and means for operating the signal when the safety block is severed.

15. The combination of a switch, a switch operating mechanism, a signal, a rod for operating the signal, a locking block cooperating with the switch operating mechanism, a safety block applied to the locking block and having a detachable connection with the signal operating rod, and means for severing the safety block from the locking block and disconnecting it from the signal operating rod when the switch is forcibly opened.

16. The combination of a switch, a switch operating rod, a locking lip carried by the operating rod, a movable locking block, a safety block applied to the locking block and normally in the path of the lip so as to be severed from the locking block when the switch is forcibly opened, and means for moving the locking block previous to throwing the switch.

17. The combination of a switch, a switch operating rod, a member rigid with the said rod and carrying a locking lip, a slide mounted upon the rod and limited in its move-

ments by the said member, a vertically movable locking block designed to be lifted by the slide previous to throwing the switch and to rest upon the locking lip after the switch has been thrown, and a safety block applied to the locking block and normally disposed in the path of the locking lip so as to be severed from the locking block should the switch be forcibly opened.

18. The combination of a switch, a switch operating rod, a member rigid with the said rod and carrying a locking lip, a slide mounted upon the rod and limited in its movements by the said member, a vertically movable locking block designed to be lifted by the slide previous to throwing the switch and to rest upon the lip after the switch has been thrown, a signal, a signal operating rod, and a safety block applied to the locking block and having a hooked connection with the signal operating rod, the said safety block being normally disposed in the path of the locking lip so as to be severed from the locking block and become disconnected from the signal operating rod should the switch be forcibly opened.

19. The combination of a switch, a switch operating rod, a member rigid with the said rod and carrying a locking lip, a slide mounted upon the rod and limited in its movements by the said member and formed with a cam surface, a vertically movable locking block provided with a cooperating cam surface whereby the locking block is elevated previous to throwing the switch, the locking block being designed to rest upon the locking lip when the switch is thrown, a signal, a signal operating rod, and a safety block applied to the locking block and having a detachable connection with the signal operating rod, the said safety block being normally disposed in the path of the locking lip so as to be severed from the locking block and become disconnected from the signal operating rod should the switch be forcibly opened.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

CLIFFORD E. NOWLIN.

Witnesses:

FAY B. GREEN,
JOHN H. STEPHENS.