

No. 725,008.

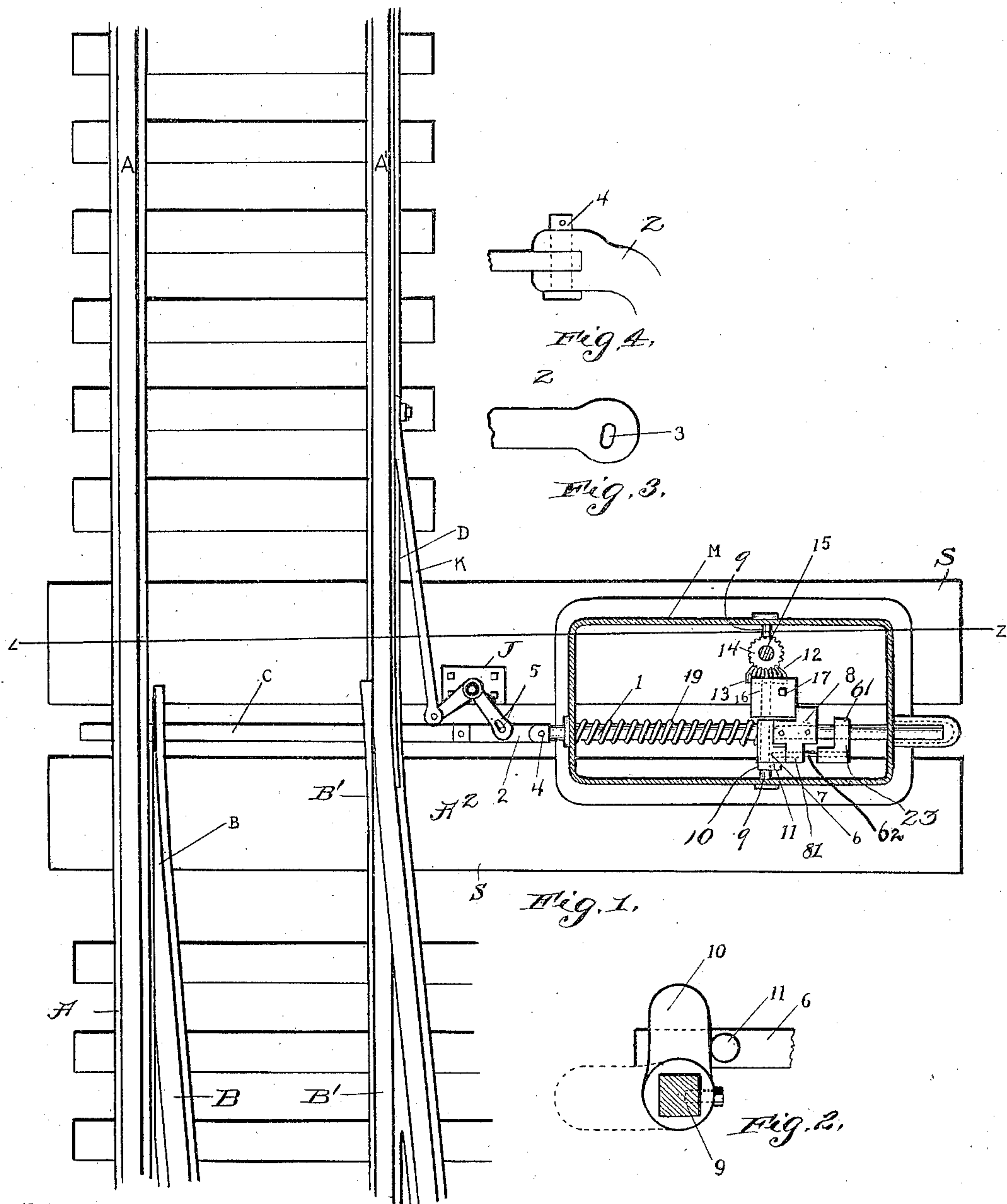
PATENTED APR. 7, 1903.

C. E. NOWLIN.  
RAILWAY SWITCH.

APPLICATION FILED AUG. 8, 1902.

NO MODEL.

3 SHEETS--SHEET 1.



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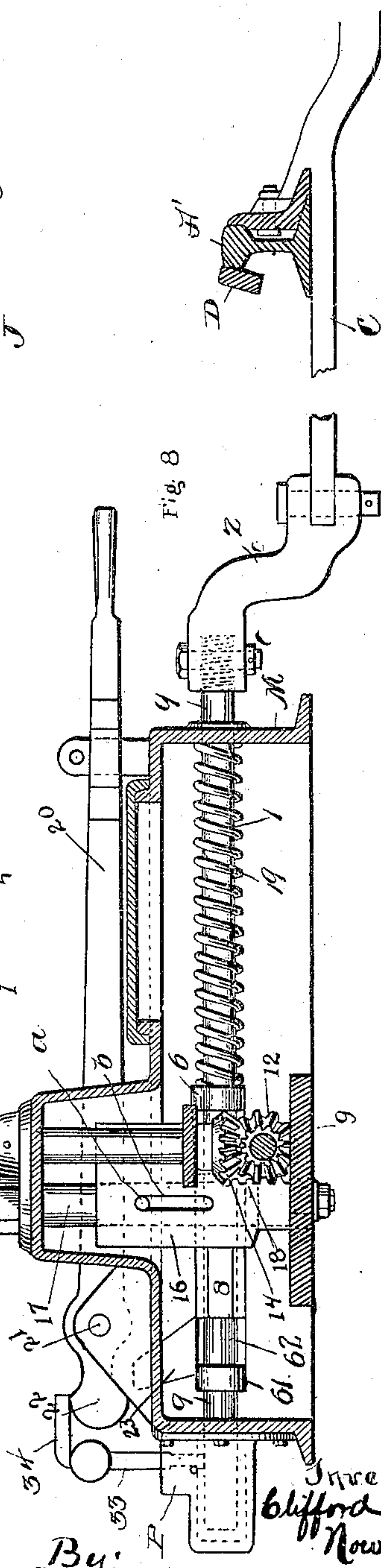
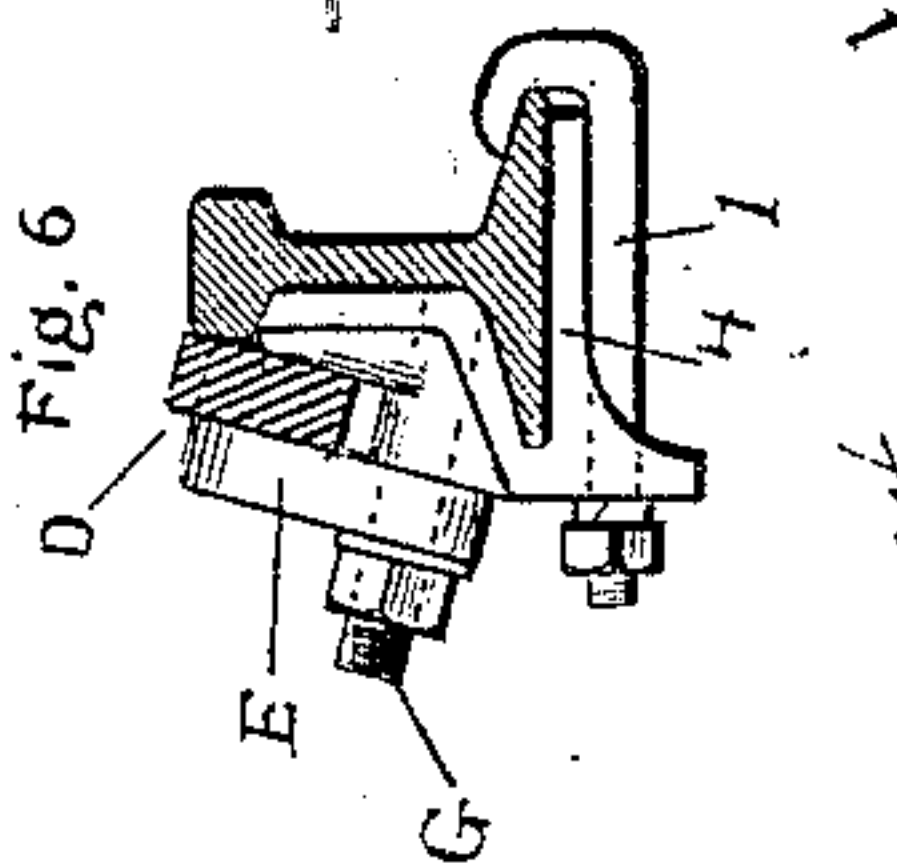
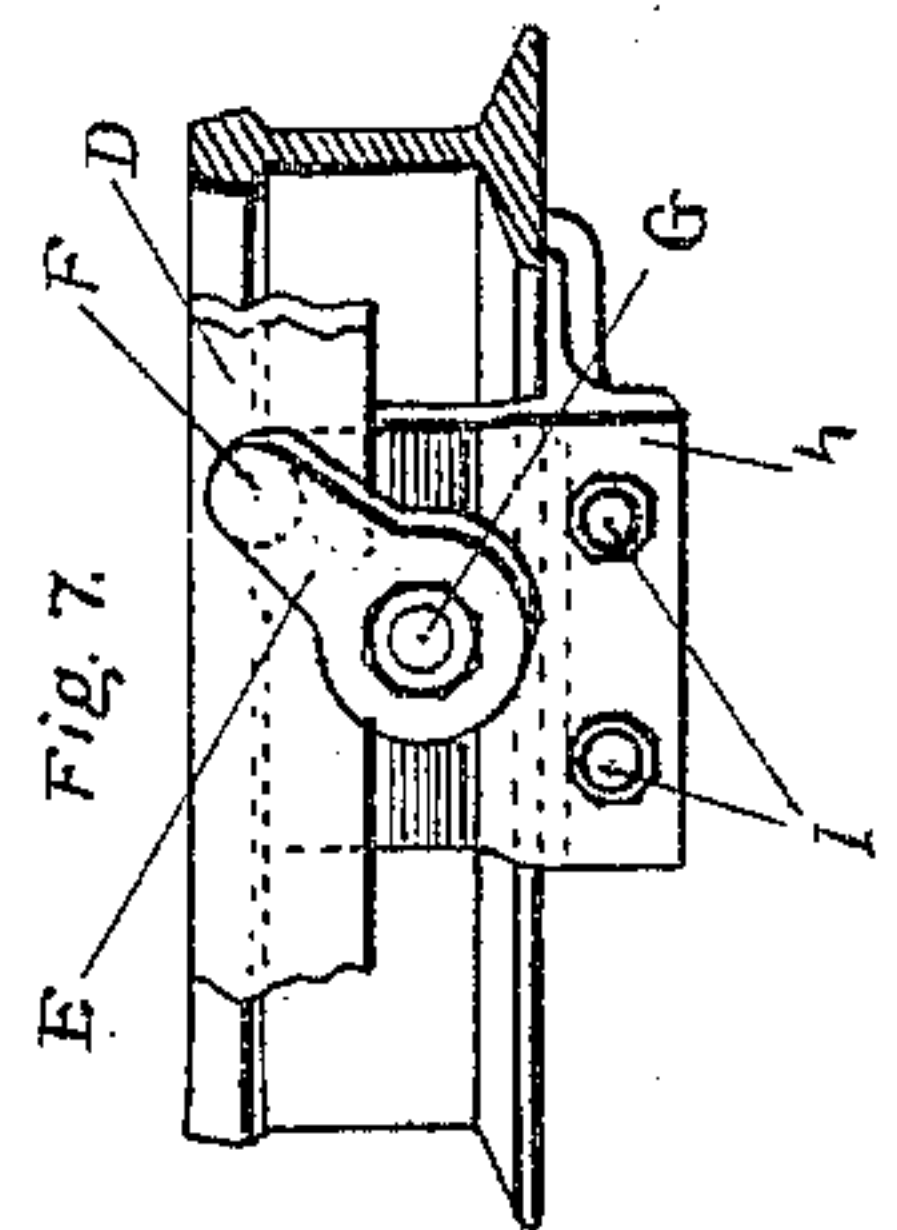
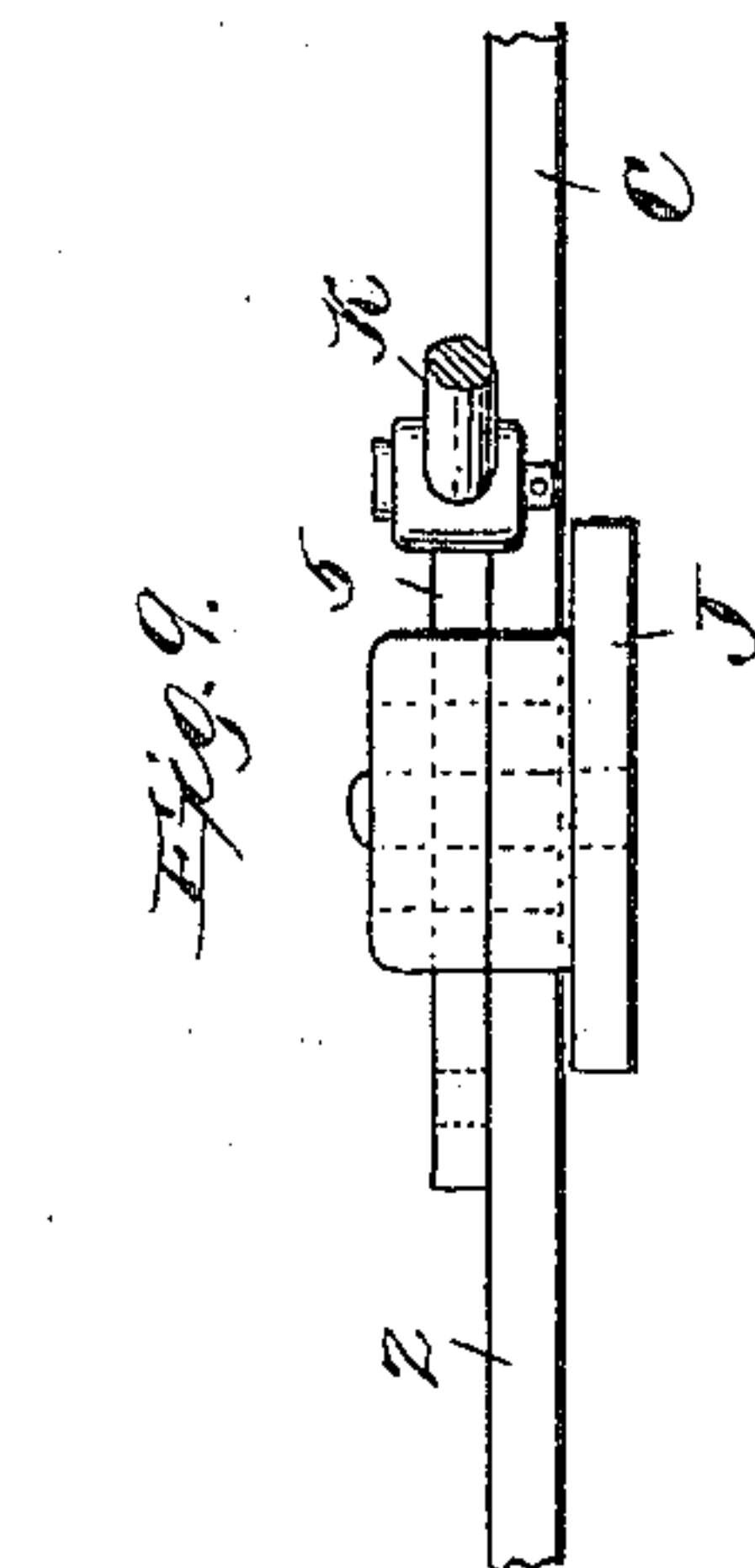
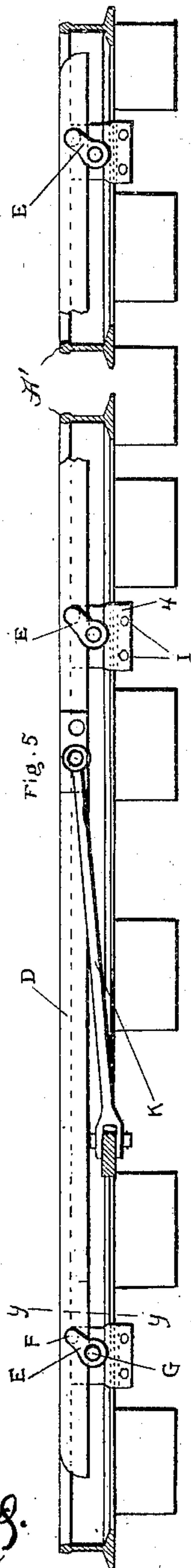
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3 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

CLIFFORD E. NOWLIN, OF BATTLECREEK, MICHIGAN.

## RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 725,008, dated April 7, 1903.

Application filed August 8, 1902. Serial No. 118,965. (No model.)

*To all whom it may concern:*

Be it known that I, CLIFFORD E. NOWLIN, of Battlecreek, in the county of Calhoun and State of Michigan, have invented certain  
5 new and useful Improvements in Railway-Switches; 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  
10 specification.

This invention is an improved railway-switch especially designed for railroad service; and its object is to provide a safety-switch in which the target or signal cannot be  
15 shifted to "clear" position until the switch-point is fully closed, the construction being such that the signal cannot change to "clear" until the switch-point is clear over to the main rail, neither can the switch lock until  
20 the switch-point is clear over to the main rail.

A further object is to so construct the switch that it will close automatically, allowing trains to pull out of sidings without stopping or  
25 slacking for brakeman to close switch.

The invention consists in the novel automatic self-locking switch and signal, as hereinafter described and claimed. The accompanying drawings illustrate an efficient embodiment of the invention, and the claims  
30 following the description define the several novel features and combinations of parts for which protection is desired, it being remarked that I do not restrict myself to the specific details of construction as shown and described.

Referring to the drawings, Figure 1 is a plan view of a portion of a railroad-track, siding, switch, and switch-operating devices, the latter being partly in section. Figs. 2, 3, and 4  
35 are details. Fig. 5 is a side elevation of part of track, showing the protector-bar. Fig. 6 is a section on line *yy*, Fig. 5; Fig. 7, a perspective view of parts shown in Fig. 6. Fig. 8 is an enlarged longitudinal sectional view through the switch closed. Fig. 9 is a detail.  
40 Fig. 10 is a view similar to Fig. 8 with switch open. Fig. 11 is a top plan view of Fig. 10; and Fig. 12 is a vertical transverse section on line 12 12, Fig. 10.

In said drawings, A A' designate the main-line rails, the latter being deflected at A<sup>2</sup> onto the siding.

B B' are the switch-rail points, B' forming

part of the main line when switch is closed. The points B B' are rigidly connected by a bar C, which extends to the switch-operating  
55 mechanism, which, with the switch-points, is supported upon two heavy timbers or sleepers S S, all the foregoing being constructed substantially as in the ordinary split switches commonly used on railroads. Bar C is con-  
60 nected at its end next the switch-operating devices to a link 2, which in turn is pivotally connected to the inner end of a shaft 1, journaled in a casing M, fastened to sleepers S, said shaft 1 lying transversely of the track  
65 and movable longitudinally in its bearings in casing M and being normally locked by block 16, hereinafter described. A stout coiled spring 19 is placed on the shaft between the inner end of casing M and a slide 6, loosely  
70 mounted on the shaft 1, as shown. This spring returns the switch closed to its normal position. On the shaft 1 are two adjacent slides 6 and 61, which are connected by a bar  
75 62. The slides have a forward-and-backward movement on shaft 1, limited by catch-block 8, which is fast to shaft 1, as shown. Slide 6 has a certain amount of longitudinal  
80 play on the shaft before it will bear against catch-block 8. Slide 61 has a projecting flange or arm 23, which is adapted to be engaged by the end of the switch-opening lever 20, as hereinafter explained.

A transverse rock-shaft 9 is journaled in casing M at right angles to and below shaft  
85 1 and is provided with an upstanding arm 10, which is adapted to be engaged by slide 6 or a pin 11 on said slide when the latter is moved inward toward the track, so as to rock shaft 9. On shaft 9 is keyed a pinion 13, which is  
90 adapted to mesh with a rack 18 on a vertically-movable locking-block 16, which is guided in its vertical movements on a bolt 17, secured in casing M, and is prevented from rotating on the bolt by a pin *a*, engaging a slot *b* in  
95 the block, as shown in Fig. 8, or by squaring the shaft, as in Fig. 10, or by other suitable means. It will be noted that when slide 6 is moved inward the locking-block will be elevated, and after shaft 1 moves outward the  
100 locking-block will descend by gravity and impart backward rotation to shaft 9.

Rock-shaft 9 controls the visual signal, which is supported on a vertical shaft 15,



journalled in the casing M adjacent to shaft 9, and has a bevel-gear 14 on its lower end meshing with a bevel-gear 12 on shaft 9, as shown, the signal being set to "danger" or  
5 "clear" by the rotations of shaft 9.

On shaft 1 intermediate the slides 6 and 61 is fixedly secured a catch-block 8, which when the switch is closed lies behind lock-block 16 and prevents the switch being opened  
10 until lock-block 16 is raised, and when said lock-block is raised and the switch opened catch-block 8 comes beneath lock-block 16 and upholds it in this position, showing danger-signal until switch is again fully closed.  
15 The block 8 has an extension 81 projecting between slides 6 and 61 and provided with an opening for the passage of bar 62 for the purpose of steadying slide 6 while doing its work, as shown. The slides 6 and 61 are sufficiently  
20 separated to enable them to be moved inward on the shaft 1 sufficiently to cause the raising of lock-block 16, as above described, before the slide 61 engages block 8 and shifts shaft 1 inward, opening switch, so that before the  
25 switch opens the danger-signal is set and must remain set until block 8 passes back from beneath lock-block 16, which block 8 cannot do until the switch is fully closed. The return of signal to clear position being  
30 controlled automatically by the gravital descent of lock-block 16, if any obstruction gets between the point B' and rail A', so as to prevent full closing of the switch, the block 16 will be held in uplifted position and the  
35 danger-signal remain set until obstruction is removed.

The link 2 is pivotally connected to one end of a bell-crank 5, pivoted on a plate J, the other arm of lever 5 being connected by  
40 rod K to the protector-bar D, which extends along and beside rail A and is supported on rocking arms E, pivoted on blocks I beside rail A', as shown. When the switch is thrown open, the bar D is shifted so as to lie in position to be depressed and held down by the  
45 treads of the car-wheels, so as to keep the switch open until the last car-truck has cleared the switch, so that it is not necessary for the switchman to hold the switch open after the first truck of the train runs onto  
50 protector-bar D. This switch-controlling protector-bar is not novel, *per se*, and its operation and mode of connection are well known. It is, however, useful in connection with my  
55 improved switch. Fig. 3 shows a slotted hole in the end of short bar 2. This is to allow for extra pressure which might be thrown onto protector-bar D from a channeled wheel passing thereover. This slotted hole will  
60 allow a side movement on pivot-pin 4, which will relieve the extra pressure on the protector-bar D.

The shaft 1 may be shifted inwardly to open the switch by means of the hand-lever 20, pivoted at 21 between ears M', projecting from  
65 the top of the casing M, as shown, its shorter arm 22 being adapted to enter the casing

through a slot M<sup>2</sup> in the top thereof and engage with the arm 23 on slide 6 and force slide 6 inward toward the main track until  
70 it engages catch-block 8 and moves shaft 1 inward, opening the switch. If desired, the switch can be locked "open" by means of the weighted bolt 33, which is guided in an opening in the top of the rear journal of shaft  
75 1 and is adapted to drop behind the end of shaft 1 when the latter is moved fully inward, thus locking the switch open and permitting the brakeman to release lever 20 before the car-trucks reach protector-bar D. The bolt  
80 33 has an inwardly-projecting lip 34 on its upper end adapted to be engaged by the short arm of lever 20 when the latter is lowered, and thus raise the bolt and disengage it from shaft 1. When lever 20 is thrown back to normal position, then the switch will close or resume its normal automatic operations.

Operation: The switch stands normally "closed," with the signal showing "clear" and lock-block 16 in lowest position. If it  
90 is desired to use the side track, lever 20 is unlocked (being normally secured in lowest position by a padlock) and its longer end raised, causing its shorter end 22 to enter casing M and engage arm 23 on slide 61 and  
95 force the latter inward, causing first the setting of the signal and raising of lock-block 16 and then moving shaft 1 and opening the switch. This movement of slide 61 causes lever 10 to turn shaft 9 one-quarter, which  
100 causes gear 13 to raise block 16 and permits catch-block 8 to slip thereunder, catch-block 8 not being moved, however, until lock-block 16 is raised and then moving under and upholding the lock-block, with the signal showing  
105 "danger." The brakeman then signals the engineer to move ahead, and when the forward trucks of the train reach protector-bar D the switch will be controlled by the train and held open until the last truck in train  
110 passes off from the protector-bar D. Then the switch will be closed by springs 19, acting against slide 6 and forcing it against block 8, thereby moving shaft 1 outward, and when switch is fully closed block 8 will have moved  
115 from beneath lock-block 16, which descends and resets the signal to "clear."

The switch is self-locking and self-closing, the hand-lever 20 being used only in "opening" the switch.

The signal cannot change to "clear" until the switch-point B is clear over to the main rail A. Neither can the switch lock until the point B' is clear over to the main rail A'.

The signal and locking mechanisms are so  
125 constructed that one cannot work independently of the other, so the trainman can be safely guided by the signal on the switch-stand which controls the switch-points, always giving the true condition of the switch.

In getting heavy trains out of sidings the engineer can pull out of side tracks without stopping or even slackening speed to enable the brakeman to close the switch, it being only  
130



necessary for the conductor or his brakeman to stand on the platform of the rear car and watch the switch close and look for the main lines as the last car passes off the protector-bar D. It is possible and has been often the case with the ordinary switches that when an obstruction has gotten in between the point and main rail the brakeman can spring the point sufficiently far to allow the lever to lock on the switch-stand, showing the signal "clear," while the switch-point is actually misplaced enough to wreck a train. With my improved switch such accidents could not occur, as the slightest obstruction would prevent the switch from locking, thus showing a danger-signal.

The lock-block 16 is sufficiently heavy to effect the changing of the signal when the switch is automatically closed for main line, and so long as said block is down the switch cannot be opened, said block barring any movement of catch-block 8, and until catch-block 8 moves clear of lock-block 16 after the switch has been opened the signal will remain at "danger." By properly adjusting the catch-block 8 on the shaft or connections between shaft 1 and the bar C it will be impossible for the switch to stand partially open or to be partially closed without the signal showing "danger."

The first operation that takes place when hand-lever 20 is moved to open the switch is the moving forward of slide 61 until it will bear against catch-block 8, and when the switch is fully open the locking device 33 will lock the switch open. As slide 6 is moved away from block 8 it compresses spring 19, and when the operator eases away on lever 20 slide 6 is returned by the spring to block 8 and presses against the same until the switch is closed and after it is closed.

Having thus described my invention, what I therefore claim as new, and desire to secure by Letters Patent thereon, is—

1. In combination, a split switch, a switch-operating shaft, a spring for normally retracting said shaft and closing switch, a catch on said shaft, a locking-block for said shaft, and means for raising said block prior to the opening of said switch, substantially as described.

2. In combination, a split switch, a switch-operating shaft, a spring for normally retracting said shaft and closing switch, a catch on said shaft, a vertically-movable locking-block for said shaft upheld by the catch when switch is open, and means for raising said block prior to the opening of said switch, substantially as described.

3. In a switch, the combination of a longitudinally-movable shaft, connections between said shaft and the switch, and springs for normally closing the switch, a block adapted to lock said shaft, a signal controlled by said block, means for actuating said shaft to "open" the switch, and devices whereby said block is moved to unlocking position and the

danger-signal displayed before the switch can be opened, and held in such position until the switch is closed, substantially as described.

4. In combination, a switch, a longitudinally-movable shaft, connections between said shaft and switch, and springs for retracting the shaft and normally closing the switch, a vertically-movable lock-block adapted to lock said shaft when lowered, a signal controlled by said block, means for actuating said shaft to "open" the switch, and devices whereby said block is raised before the switch can be opened, and held raised until the switch is closed, substantially as described.

5. In combination, a longitudinally-movable switch-actuating shaft, a spring for normally retracting said shaft to hold said switch closed, a locking-block beside the shaft adapted to lock it in "closed" position, a switch-signal, means for moving said lock-block and shifting said signal preparatory to opening the switch, and means controlled by the shaft for holding said block in unlocked position and keeping the signal at "danger" until the switch is closed, substantially as described.

6. In combination, a longitudinally-movable switch-actuating shaft, a spring for normally retracting said shaft to hold said switch closed, a catch on the shaft, a locking-block beside the shaft adapted to engage the catch and lock the switch in "closed" position, a switch-signal, gearing for raising said lock-block and shifting said signal, preparatory to opening the switch, said catch upholding said block and keeping the signal at "danger" until the switch is closed, substantially as described.

7. In a switch, the combination of a longitudinally-movable switch-operating shaft, a lock-block therefor, a rock-shaft and gearing for actuating said block, said block causing the return of the rock-shaft to normal position when switch is closed; with a slide, means for operating the slide, and connections whereby the slide first causes the raising of the lock-block and then shifts the shaft to open switch.

8. In a switch, the combination of a longitudinally-movable spring-retracted switch-operating shaft, a catch thereon, a lock-block therefor, a rock-shaft and gearing for actuating said block, and a signal actuated by said shaft, said block causing the return of the rock-shaft and signal to normal position when switch is closed; with a slide, means for operating the slide, and connections whereby the slide first causes the raising of the lock-block and then engages the catch and shifts the shaft to open switch.

9. In a switch, the combination of the longitudinally-movable switch-actuating shaft, a movable locking-block therefor, a transverse rock-shaft, gearing between said block and shaft, a sliding piece adapted to rock said shaft, and devices for causing said slide to



actuate the switch-shaft and open switch after the lock-block is raised, substantially as described.

10. In a switch, the combination of the longitudinal-movable switch-actuating shaft, a spring for retracting the same, a movable locking-block therefor, a transverse rock-shaft, gearing between said block and shaft, an arm on the rock-shaft, a sliding piece, adapted to engage said arm and rock said shaft, and devices for causing said slide to actuate the switch-shaft and open switch after the lock-block is raised.

11. In a switch, the combination of a longitudinal-movable shaft, connections between said shaft and switch-points, a catch on said shaft, and a locking-block beside the shaft adapted to engage the catch and lock the switch in "closed" position; with a slide and connections whereby said slide first raises the locking-block, and then actuates the switch-bar, said lock-block being upheld by the catch on switch-shaft until the switch is fully closed.

12. In a switch, the combination of a longitudinal-movable shaft, connections between said shaft and switch, a spring for retracting said shaft and closing the switch-points to their normal position, a catch on said shaft, and a locking-block beside the shaft adapted to lock the same in "closed" position; with a slide, connections whereby said slide first raises the locking-block, and then actuates the switch-bar, said lock-block being upheld by the catch on the switch-shaft until the switch is fully closed, and a signal controllable by and from said lock-block, substantially as described.

13. In a switch, the combination of a longitudinal-movable switch-actuating shaft, a lock-block therefor, a transverse rock-shaft, gearing between said shaft and lock-block, and means for rocking said shaft in opening the switch; with a switch-signal geared to said rock-shaft, and actuated by the positive movement thereof in one direction, and by the gravital movement of the block in the other direction, substantially as described.

14. In a switch, the combination of a longitudinal-movable switch-actuating shaft, a spring for retracting said shaft, a lock-block therefor, a slide, and means for actuating said slide; with a transverse rock-shaft, gearing between said shaft and lock-block, means for rocking said shaft by said slide so as to raise the locking-block before the switch-shaft is operated, and a switch-signal geared to said rock-shaft, and actuated by the movement of the slide in one direction, and by the gravital movement of the block in the other direction, substantially as described.

15. In a switch, the combination of a longitudinal-movable switch-operating shaft, a catch thereon, a slide loosely embracing said catch, a movable locking-block beside the shaft adapted to lock the same in closed position, a rock-shaft, a switch-signal operated thereby, gearing between said rock-shaft and

lock-block, means for rocking the shaft by the slide so as to set the signal to danger before the switch is opened, said catch underlying and upholding the lock-block in raised position and keeping signal at "danger" until switch is fully closed, substantially as described.

16. In a switch, the combination of a longitudinal-movable switch-operating shaft, a spring for retracting same and returning switch closed, a catch thereon, a slide loosely embracing said catch, a vertically-movable lock-block beside the shaft adapted to lock the same in closed position, a rock-shaft, a switch-signal operated thereby, gearing between said rock-shaft and lock-block, an arm on said shaft adapted to be engaged by said slide to rock the shaft, and set the signal to danger before the switch is opened, said catch underlying and upholding the lock-block in raised position and keeping signal at "danger" until switch is fully closed, and a lever for actuating said slide, substantially as described.

17. In a switch, the combination of the longitudinal-movable switch-actuating shaft, a movable locking-block therefor, a transverse rock-shaft, gearing between said block and shaft, a sliding piece adapted to rock said shaft, and devices for causing said slide to actuate the switch-shaft and open switch after the lock-block is raised, and a protector-bar beside the main-track rail and connections between said bar and switch-actuating shaft, whereby the switch is controlled by a passing train, substantially as described.

18. In a switch, the combination of the longitudinal-movable switch-actuating shaft, a spring for retracting same, a movable locking-block therefor, a transverse rock-shaft, gearing between said block and shaft, an arm on the rock-shaft, a sliding piece, adapted to engage said arm and rock said shaft, and devices for causing said slide to actuate the switch-shaft and open switch after the lock-block is raised, and a protector-bar beside the track-rail and connections between said bar and switch-actuating shaft, whereby the switch is controlled by a passing train substantially as described.

19. In a switch, the combination of a longitudinal-movable switch-operating shaft, a catch thereon, a slide loosely embracing said catch, a movable lock-block beside the shaft adapted to lock the same in closed position, a rock-shaft, a switch-signal operated thereby, gearing between said rock-shaft and lock-block, means for rocking the shaft by the slide so as to set the signal to "danger" before the switch is opened, said catch underlying and upholding the lock-block in raised position and keeping signal at "danger" until switch is fully closed, a protector-bar beside the track-rail and connections between said bar and the switch-actuating devices whereby the switch is controlled by a passing train, substantially as described.

20. In combination, the switch-operating



shaft, the pivoted lever and connections for actuating said shaft to open the switch, a bolt for locking said shaft when the switch is opened, and devices for disengaging said bolt 5 by said lever, when the switch is closed, substantially as described.

21. In combination, the longitudinally-movable spring-retracted switch-operating shaft; a lever pivoted beside the shaft, devices actuated by the short arm of the lever for moving said shaft and opening the switch, a vertically-movable weighted bolt for locking said shaft when the switch is open, and a finger on the bolt adapted to be engaged by the short 15 arm of the lever when the switch is closed thereby releasing and upholding the bolt in unlocked position, substantially as described.

22. In combination, a split switch, a switch-operating shaft, a spring for normally retracting said shaft and closing the switch, a catch 20 on said shaft, a locking-block for said shaft,

and means for raising said block prior to the opening of said switch; with a bolt for locking the shaft when the switch is "open," substantially as described.

23. In a switch, the combination of a longitudinally-movable shaft, connections between said shaft and the switch, a spring for normally closing the switch, means for locking said shaft when the switch is closed, a signal 25 controlled by said means, a lever for actuating said shaft to "open" the switch, and a weighted bolt controlled by said lever whereby said shaft is locked when the switch is opened, substantially as described. 30

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses. 35

CLIFFORD E. NOWLIN.

In presence of—

COL. F. BOND,

KATE C. BOND.