

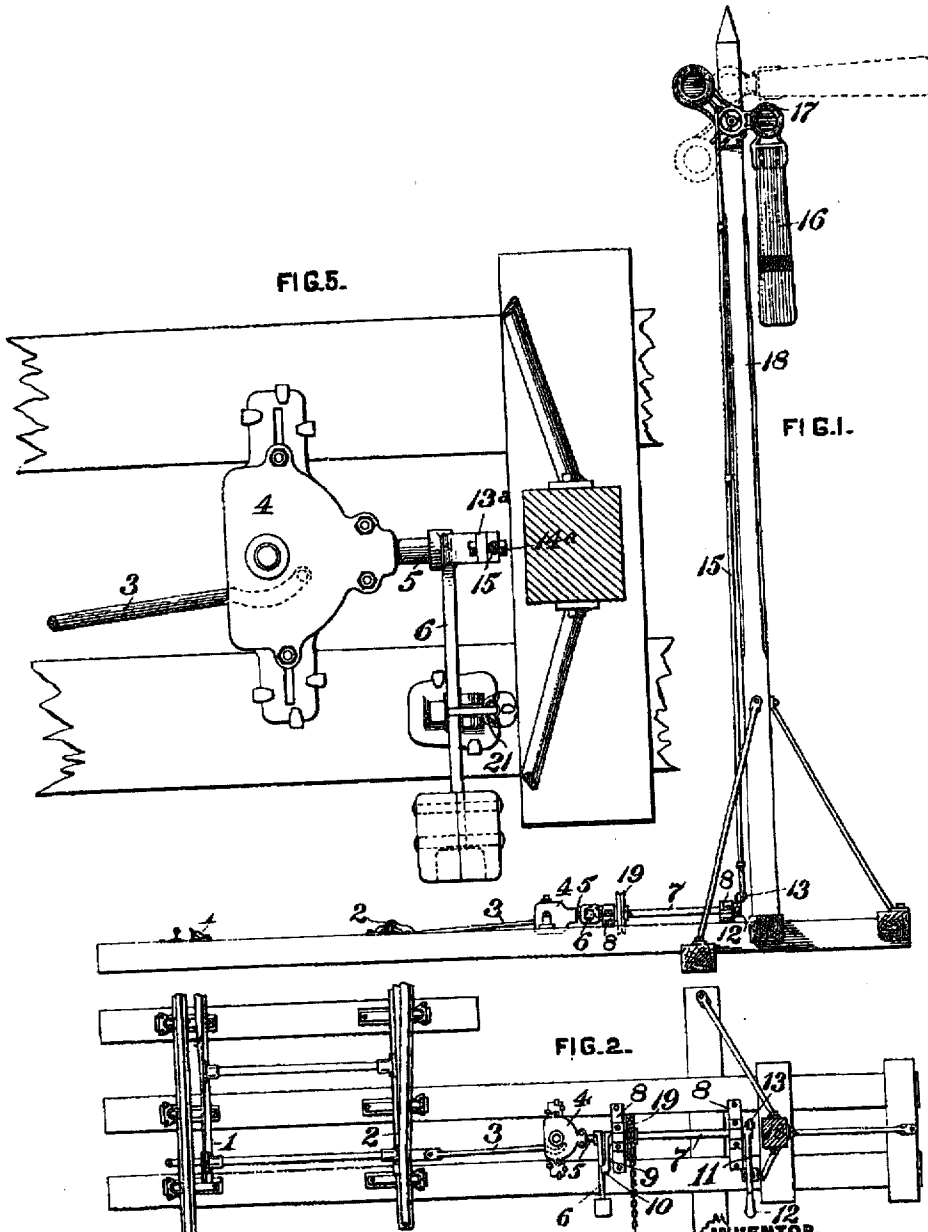
(No Model.)

2 Sheets—Sheet 1.

A. K. MANSFIELD.
SWITCH AND SIGNAL APPARATUS.

No. 546,172.

Patented Sept. 10, 1895.



WITNESSES:
J. E. Gaither.
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(No Model.)

2 Sheets—Sheet 2.

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FIG. 4.

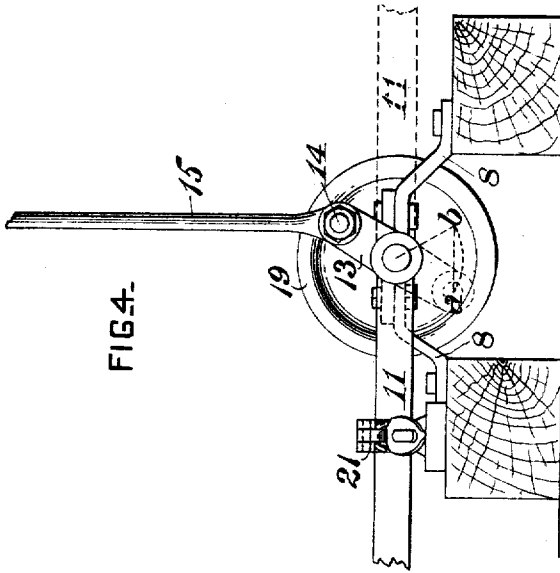
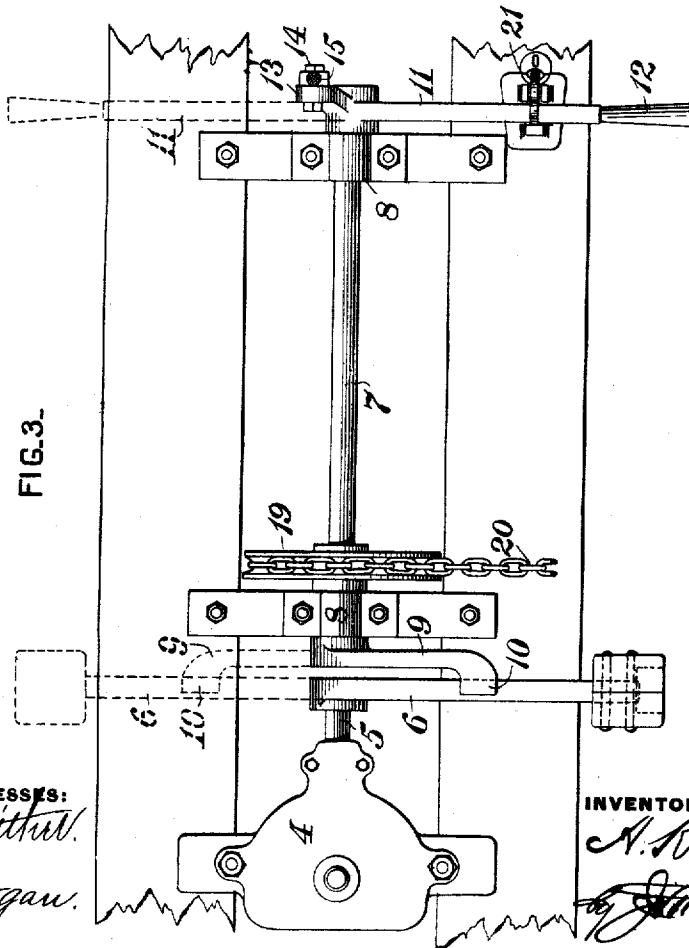


FIG. 3.



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UNITED STATES PATENT OFFICE.

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SWITCH AND SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 546,172, dated September 10, 1895.

Application filed May 9, 1895. Serial No. 548,704. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. MANSFIELD, of Salem, in the county of Columbiana and State of Ohio, have invented a certain new and useful Improvement in Switch and Signal Mechanism, of which improvement the following is a specification.

The object of my invention is to provide an improvement in switch and signal mechanism for railroads; and to this end it consists in new and improved mechanism for operating a switch-signal and in the combination of such mechanism with means for operating a switch, whereby the movement of the signal into position to indicate "safety" effects the setting of the switch to clear the main line or necessitates such setting of the switch in advance of the movement of the signal, and whereby the setting of the switch for the siding can be effected only after or coincidently with the movement of the signal into position to indicate "danger."

My invention further consists in certain novel constructions and combinations, all as hereinafter fully set forth.

While the application of my invention is not limited to any particular form of switch-operating mechanism, I have shown it in combination with a switch-stand and switch-lever the construction and arrangement of which are similar to that shown in Letters Patent No. 227,372, granted to me May 11, 1880.

In the accompanying drawings, which illustrate an application of my invention, Figure 1 is a view, in elevation, showing my improvement in connection with a switch-stand and switch and a semaphore-signal which is secured to a pivoted lever mounted on an upright standard or post; Fig. 2, a plan view of the construction shown in Fig. 1; Fig. 3, a plan view of my improvement shown in connection with a switch-stand, the construction being the same as that shown in Fig. 2, but on a larger scale; Fig. 4, an end elevation of the construction shown in Fig. 3; and Fig. 5, a plan view showing a modification.

The rails 1 and 2 of the split switch shown in Figs. 1 and 2 are connected, by means of a link or rod 3, with the switch-stand 4, from which projects a horizontal shaft 5, having a

weighted lever 6 secured thereon, as shown in my Letters Patent before referred to.

When the switch-lever 6 is in the position shown in Figs. 1, 2, and 3, the switch is set for the main track, and in order to set the switch for the siding the switch-lever must be moved through an angle of one hundred and eighty degrees. As described in the patent referred to, when the switch-stand and switch-lever 6 are employed without my improvement, the movement of the lever and switch may be effected by moving the lever 6 directly by hand, or they may be moved automatically by the action of the front wheels of an engine or car on the rails of the split switch.

In the construction shown in Figs. 1, 2, and 3 of the drawings, I employ, in addition to and in connection with the switch stand and lever 6, a shaft 7, which is mounted in bearings 8 and provided, at the end next to the switch-lever, with an arm 9, from the free end of which an interlocking lug or pin 10 projects into the path of the lever 6. If preferred, the arm 9, instead of being provided with a pin or lug 10, may be bent so as to project into the path of the lever 6, or the arm 9 may be located alongside of the lever 6, the object of such arrangement being that when the lever 6 is moved from the position shown in full lines in Fig. 3 to the position shown in dotted lines the arm 9 will be moved by and with the lever 6, unless the arm 9 has been moved before or in advance of the lever 6. The same construction and arrangement will permit the lever 6 to be moved back from the position shown in dotted lines to the position shown in full lines in Fig. 3 without moving the arm 9; but the arm 9 cannot be so moved without moving the lever 6, unless the lever 6 has been moved in advance of the arm 9.

On the end of the shaft 7 opposite to that on which the arm 9 is fixed a signal-lever 11 is secured, the end of the signal-lever being provided with a handle 12. A short arm 13 on the lever 11 is connected, by means of a bolt or pin 14, to the lower end of a vertical connecting-rod 15, which extends upward alongside of the post 18 and is connected at its upper end to one arm of a pivoted sema-

phore-lever 17, to the other arm of which the blade 16 of the semaphore-signal is secured.

A pulley 19 may be mounted on the shaft 7 and provided with a connection 20, leading to a distant signal.

The shaft 7, if preferred or if more convenient, may be made shorter or may be mounted in a single bearing, and in case the latter construction is employed the arm 9 may be dispensed with and the lever 11 may be provided with a lug or projection adapted to engage with the switch-lever.

The angular position of the short arm 13 of the signal-lever relative to the long arm is such that when the long arm is in a horizontal position on either side of the shaft 7 the arm 13 will be approximately on a dead-center. The advantage of this construction is that when the signal-lever is in a horizontal position, which is the only position in which it will be required to remain for any length of time, any thrust or pull on the rod 15, due to the weight of the rod or parts to which it is connected or to any other cause, will not be sufficient to rotate the shaft 7 and shift the lever 11, on account of the short leverage with which it acts on the shaft 7.

In Figs. 1, 2, 3, and 4 of the drawings the angular position of the short arm 13 relative to the long arm of the signal-lever 11 is such that while the long arm of the signal-lever is moved through an angle of one hundred and eighty degrees in changing from the horizontal position which it occupies when the signal indicates "safety" to the horizontal position which it occupies when the signal indicates "danger," the movement of the short arm 13 effects the full movement of the signal from "safety" to "danger" before the full movement of the signal-lever is completed. This will be clearly understood by inspection of Fig. 4. When the long arm of the lever is shifted from the position shown in full lines to the position shown in dotted lines, the center of the pin or bolt 4 will be on the horizontal line *a b*, and the semaphore arm 16 will occupy a horizontal position indicating "danger;" but the semaphore-arm reaches this position when the center of the pin 4 is moved to the point *b*, or when the arm 13 has moved through an angle of about one hundred and twenty degrees or about two-thirds of its whole movement. The further movement of the arm 13 to the position indicated by dotted lines is necessary only because the long arm of the lever is moved into the horizontal position shown by dotted lines; but the latter part of the movement of the arm 13 has practically no effect on the semaphore-blade.

When the parts are in the positions indicated by full lines in Figs. 1, 2, 3, and 4, the switch is set for the main line and the signal indicates "safety," as shown in Fig. 1. If it is desired to set the switch for the siding the signal-lever, being unlocked, may be shifted to the position shown by dotted lines, and this movement will shift the semaphore to the

"danger" position, as shown by dotted lines in Fig. 1. The switch-lever 6 may then be thrown over to set the switch for the siding. Instead of shifting the signal-lever and signal first, and afterward shifting the switch, the signal-lever, signal, and switch may be all moved together, the signal-lever being first unlocked by simply throwing over the switch-lever from the position shown in full lines to the position shown in dotted lines. In making this movement the switch-lever 6 comes in contact with the projecting lug 10 on the arm 9 and moves the arm 9, lever 11, and semaphore-blade 16 into the positions shown in dotted lines. The switch is then set for the siding and the signal indicates "danger."

The return movement of the switch-lever 6 to set the switch for the main line may be effected without shifting the signal-lever and signal by throwing the switch-lever alone; but the signal cannot be set for "safety" unless the switch-lever is at the same time thrown to set the switch for the main line, or unless the switch-lever is so operated in advance of the movement of the signal-lever.

Each movement of the signal-lever 11 to operate the semaphore 16 will also operate the pulley 19, and the indication given by the distant signal will coincide with that given by the semaphore 16.

The locking device 21, by which the signal lever 11 is locked in the "safety" position, also locks the switch and switch-lever in the "safety" position, so that the switch cannot be set for the siding without first unlocking the lever 11.

In Fig. 5 of the drawings I have shown a construction in which the switch-lever 6 is provided with a short arm 13^a, which is connected, by means of a bolt or pin 14^a, with the lower end of the rod 15, and the lever 11 is dispensed with. By means of this construction the lever 6 serves as both a switch and a signal-lever, and is more directly connected with the signal than in the construction shown in Figs. 1, 2, 3, and 4, and the movement of the signal is always coincident with the movement of the switch-lever and switch. As shown in Fig. 5, the short arm 13^a stands in a vertical position when the lever 6 is in a horizontal position, and it is therefore exactly on a dead-center relative to the rod 15 when the signal is at either the "safety" or "danger" position, and no change in the position of the parts can be effected by the weight of the rod 15 or the parts of the signal to which it is connected.

If preferred, the arm 13^a, (shown in Fig. 5,) instead of being in an exactly vertical position when the switch-lever is in a horizontal position, may be so located relative to the lever 6 that it will be slightly inclined to the vertical when the switch-lever is in a horizontal position, for the purpose already described in referring to the arm 13 and signal-lever 11. (Shown in Figs. 1, 2, 3, and 4.)

It will be obvious that instead of the pulley 19 a lever may be mounted on the shaft 7 and connected to the distant signal.

I claim as my invention and desire to secure by Letters Patent—

1. In a switch and signal mechanism, the combination, with a switch operating lever and a signal operating lever, of a shaft on which the signal operating lever is secured, an arm on the shaft which is provided with a lug or projection extending into the path of the switch operating lever, an arm on the signal operating lever, and a rod which is connected at one end to the arm on said lever and at the other end to a pivoted semaphore signal, substantially as set forth.

2. In a switch and signal mechanism, the combination, with a switch operating lever and a signal operating lever, of a shaft on which the signal operating lever is secured, an arm on the shaft which is provided with a lug or projection extending into the path of the switch operating lever, a pulley or its equivalent mounted on the shaft and provided with connections to a distant signal, an arm on the signal operating lever, and a rod which is connected at one end to the arm on said lever and at the other end to a pivoted semaphore signal, substantially as set forth.

3. In a signal operating mechanism, the combination, with a signal operating lever and a pivoted semaphore signal, of a rod pivotally connected at one end to the semaphore signal and at the other end to an arm on the signal operating lever, the angular position of the arm relative to the lever and the rod being such that in shifting the signal from the safety position to the danger position, the arm will move the signal to the danger position before the lever has made its full movement, substantially as set forth.

4. In a switch and signal mechanism, the combination, with a switch operating lever and a signal operating lever, of a shaft on which the signal operating lever is secured, an arm on the shaft which is provided with a lug or projection extending into the path of the switch operating lever, an arm on the signal operating lever, and a rod which is connected at one end to the arm on said lever and at the other end to a pivoted semaphore signal, the position of the arm on the signal operating lever being such that when the signal is at danger the axis of the shaft and the connection between the arm and the rod are in substantially the same vertical plane with the rod, substantially as set forth.

5. In a signal operating mechanism, the combination, with a signal operating lever and a pivoted semaphore signal, of a rod pivotally connected at one end to the semaphore signal and at the other end to an arm on the signal operating lever, the lever being adapted to move through an angle of one hundred and eighty degrees in shifting the signal from the

safety position to the danger position, or, from the danger position to the safety position, substantially as set forth.

6. In a signal operating mechanism, the combination, with a pivoted semaphore signal and a signal operating lever which occupies a substantially horizontal position when the signal is at safety or danger, of an arm on the lever which is in a vertical, or approximately vertical, position when the signal is at safety or danger, and a rod pivotally connected at one end to the semaphore signal and at the other end to the arm on the signal operating lever, whereby the lever is adapted to move through an angle of one hundred and eighty degrees in shifting the signal from one position to the other, substantially as set forth.

7. In a signal operating mechanism for railroads, the combination, with a semaphore signal, of an operating lever which is adapted to move through an angle of one hundred and eighty degrees in a vertical plane parallel to the track, an arm on the lever which is in a vertical, or approximately vertical, position when the lever is at either extremity of its movement, and a rod connected at one end to the semaphore signal and at the other end to the arm on the lever, substantially as set forth.

8. In a switch and signal mechanism, the combination, with a signal operating lever and a switch operating lever, of a semaphore signal, an arm secured to the signal operating lever, a rod connected at one end to the semaphore signal and at the other end to the arm on the signal operating lever, a locking device for directly locking the signal operating lever, and means whereby the locking of the signal operating lever indirectly effects the locking of the switch lever, substantially as set forth.

9. In a switch and signal mechanism, the combination, with an automatically operated split switch, of a signal mechanism, and means between the switch mechanism and the signal mechanism whereby the signal may be shifted from the safety position to the danger position by the automatic movement of the switch, and which permits the automatic setting of the switch for the main line without moving the signal from the danger position, substantially as set forth.

10. In a signal operating mechanism, the combination, with a switch and signal operating lever and a pivoted semaphore signal, of a rod pivotally connected at one end to the semaphore signal and at the other end to an arm on the operating lever, the lever being adapted to move through an angle of one hundred and eighty degrees in shifting the switch and signal, substantially as set forth.

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Witnesses:

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LOUISE GOSHEN.