

No. 788,385.

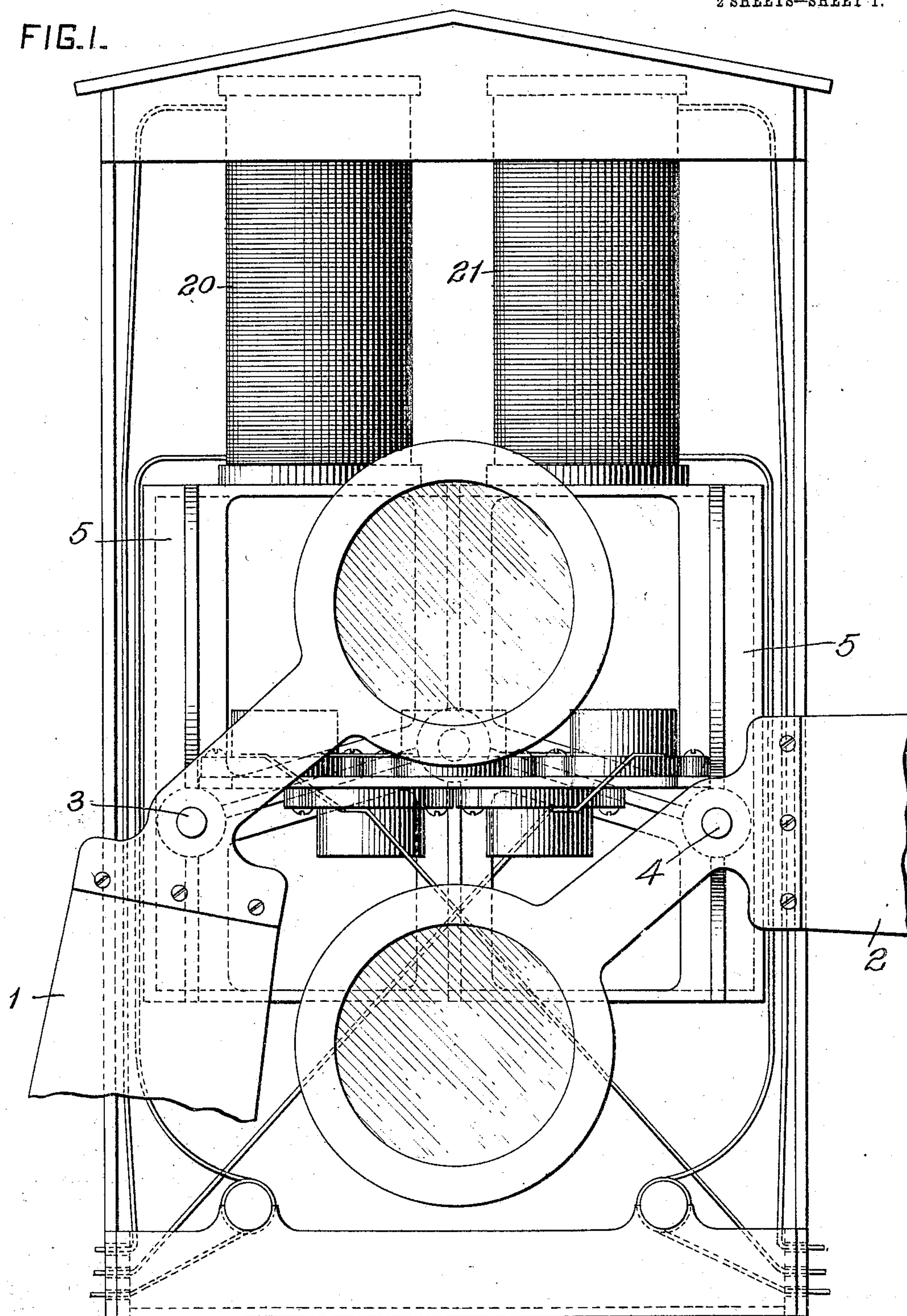
PATENTED APR. 25, 1905.

J. C. WALDO.  
SIGNAL MECHANISM.

APPLICATION FILED OCT. 19, 1903.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

*Herbert Bradley*  
*J. H. Kirchner*

INVENTOR

*James C. Waldo*  
*by Christy and Christy*  
ATT'YS

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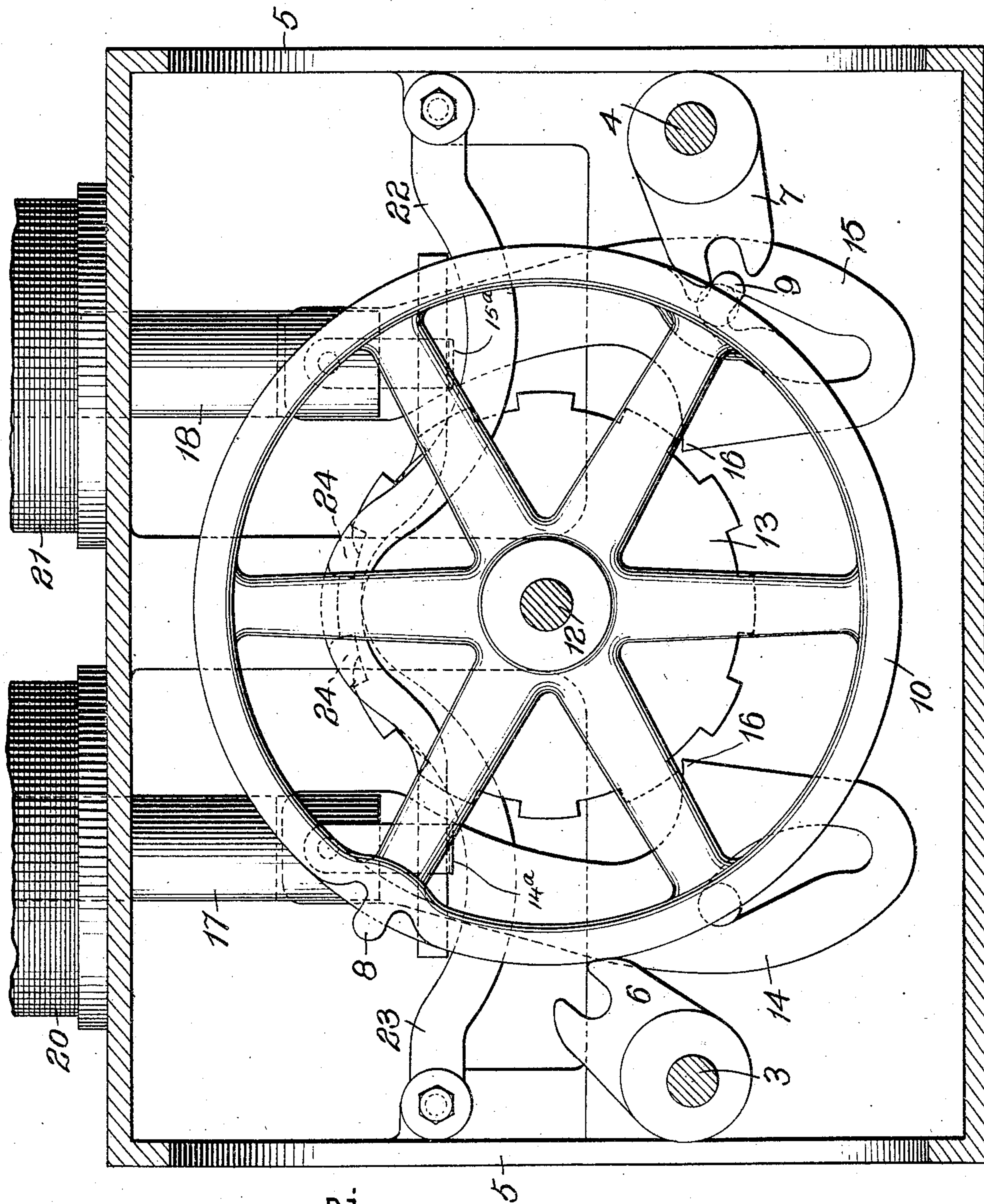


FIG. 2.

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# UNITED STATES PATENT OFFICE.

JAMES C. WALDO, OF SHARPSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO JOHN J. FORSTER, OF AVALON, PENNSYLVANIA.

## SIGNAL MECHANISM.

SPECIFICATION forming part of Letters Patent No. 788,385, dated April 25, 1905.

Application filed October 19, 1903. Serial No. 177,687.

*To all whom it may concern:*

Be it known that I, JAMES C. WALDO, a citizen of the United States, residing at Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Signal Mechanism, of which improvements the following is a specification.

The invention described herein relates to certain improvements in signal-operating mechanism especially applicable for use on electric railways.

It is customary in lines to have a single track and turnouts at intervals where cars can pass one another. At certain times of the day more cars will be passing in one direction than the other. Hence provision must be made whereby an opposing car may be given an indication of clear track.

The invention described herein has for its object a construction of mechanism whereby the signals are operated positively from "clear" to "danger," and vice versa.

It is a further object of the invention to provide for setting the signal in the proper position by the first car of a series and its maintenance in such position with the last car of such series has passed a given point.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a front elevation of my improved signal, the front of the casing being removed. Fig. 2 is a front elevation of the operation of the signals, the front of the casing and other portions being removed.

In the practice of my invention the semaphore-blades 1 and 2 are secured upon shafts 3 and 4, mounted in suitable bearings on the frame 5. On the same shafts are secured arms 6 and 7, each provided with a notch or recess for engagement with toes or projections 8 and 9 on the periphery of a wheel 10. The arms 6 and 7 are so constructed as regards length as to bear upon the periphery of the wheel at all times and when being turned or shifted by the projections 8 and 9 will move inwardly, the points of the notches projecting into re-

cesses 10 on each side of the projections 8 and 9. By reason of this construction the semaphore-blades are securely locked in either of the positions to which they are shifted by the bearing of the arms upon the periphery of the wheel 10.

On the shaft 12, carrying the wheel 10, is also mounted a toothed wheel 13, and on opposite sides of this wheel are mounted movable heads 14 and 15, each provided with a tooth 16, adapted to engage the teeth of the wheel 13. These heads are loosely connected to operating-rods 17 and 18, which can be shifted by any suitable form of motor—such, for example, as solenoids 20 and 21—which have their cores formed by the rods 17 and 18. This mechanism as regards the toothed wheel and the operating-heads is substantially similar to the construction shown and described in application Serial No. 177,684, filed October 19, 1903. In order to prevent any accidental movement of the shaft 12 and the parts carried thereby, levers 22 and 23 are mounted on the frame of the machine and provided with teeth 24, adapted to engage the teeth on the periphery. These teeth are so constructed as to permit the rotation of the wheel in one direction, but to lock it against movement in the opposite direction, so that when both the levers are down no movement of the wheel or parts operated thereby can be effected. The lever 22, which has its tooth so arranged as to prevent movement of the wheel while in engagement therewith in a direction to be actuated by the head 14, is adapted to be raised by suitable means on the head 14 when the latter is moved upward by these solenoids, thus releasing the wheel. The same construction is found in regard to the head 15 and the lever 23 with its tooth. Convenient means for shifting the levers 22 and 23 consist of loops 14<sup>a</sup> and 15<sup>a</sup> on the heads 14 and 15, engaging the ends of the levers, as shown in Fig. 2.

In order to give the proper indication at night, the short ends of the semaphore are provided with colored lenses, red and green, which will when the signals are properly shifted pass in front of a white lens in the



front of the box or case. It is preferred to employ electric lights for illuminating the lens, said lights being arranged in connection with other lights to form suitable resistances  
5 in the light-circuit.

In the practice of my invention two of the signals, as shown, will be arranged at each end of each turnout of the line, and a signal at one turnout will be connected to the red  
10 signal at the next turnout. By this arrangement a car passing onto one turnout will set behind it a green or caution signal, indicating to a following car that the track ahead is occupied, and at the next succeeding turnout  
15 the red signal will be displayed, indicating to a car moving in the opposite direction that the gauntlet between the two turnouts is occupied. After a signal has been once set by a car it will not be affected by succeeding cars  
20 moving in the same direction; but the signal mechanism may operate after shifting the signal one step forward or in the same direction as the first impulse for each car. Hence it will be necessary in order to restore the sig-  
25 nals to normal or clear position for all the cars which have operated the signal mechanism at one turnout to operate it in reverse direction at the next turnout, the signal itself being shifted only by the last car.

30 I claim herein as my invention—

1. In a signal apparatus, the combination of two signal-oscillating shafts, and means for operating said shafts in succession but in opposite directions, substantially as set forth.

35 2. In a signal apparatus, the combination of two signal-oscillating shafts, means for operating said shafts in succession but in opposite directions, and means for positively locking the shafts when shifted, substantially as  
40 set forth.

3. In a signal apparatus, the combination of two signal-operating shafts, a disk provided with means for engaging both shafts and mechanism for imparting step-by-step movements to said disk, substantially as set forth. 45

4. In a signal apparatus, the combination of two signal-operating shafts, each provided with a notched arm, a disk provided with teeth arranged to engage the notches in said arms, said arms normally resting on the periphery  
50 of the disk and thereby locking the shaft as against accidental rotation, substantially as set forth.

5. In a signal apparatus the combination of two signal-operating shafts, a disk provided  
55 with means for engaging said shafts, a ratchet-wheel mounted on the shaft with the disk and two reciprocating heads arranged on opposite sides of the wheel and provided with teeth for engagement with the wheel, substantially as  
60 set forth.

6. In a signal mechanism of the character stated, a rotatable member, lock devices co-operating therewith to hold said member from rotation, a semaphore operable by said rota-  
65 table member, electromagnetically-operating means adapted on its initial movement to release the lock devices and upon further movement to impart rotary motion to said rotatable member, said electromagnetically-operat-  
70 ing means and said rotatable member having a ratchet-and-pawl connection, for the purposes specified.

In testimony whereof I have hereunto set my hand.

JAMES C. WALDO.

Witnesses:

DARWIN S. WOLCOTT,  
F. E. GAITHER.