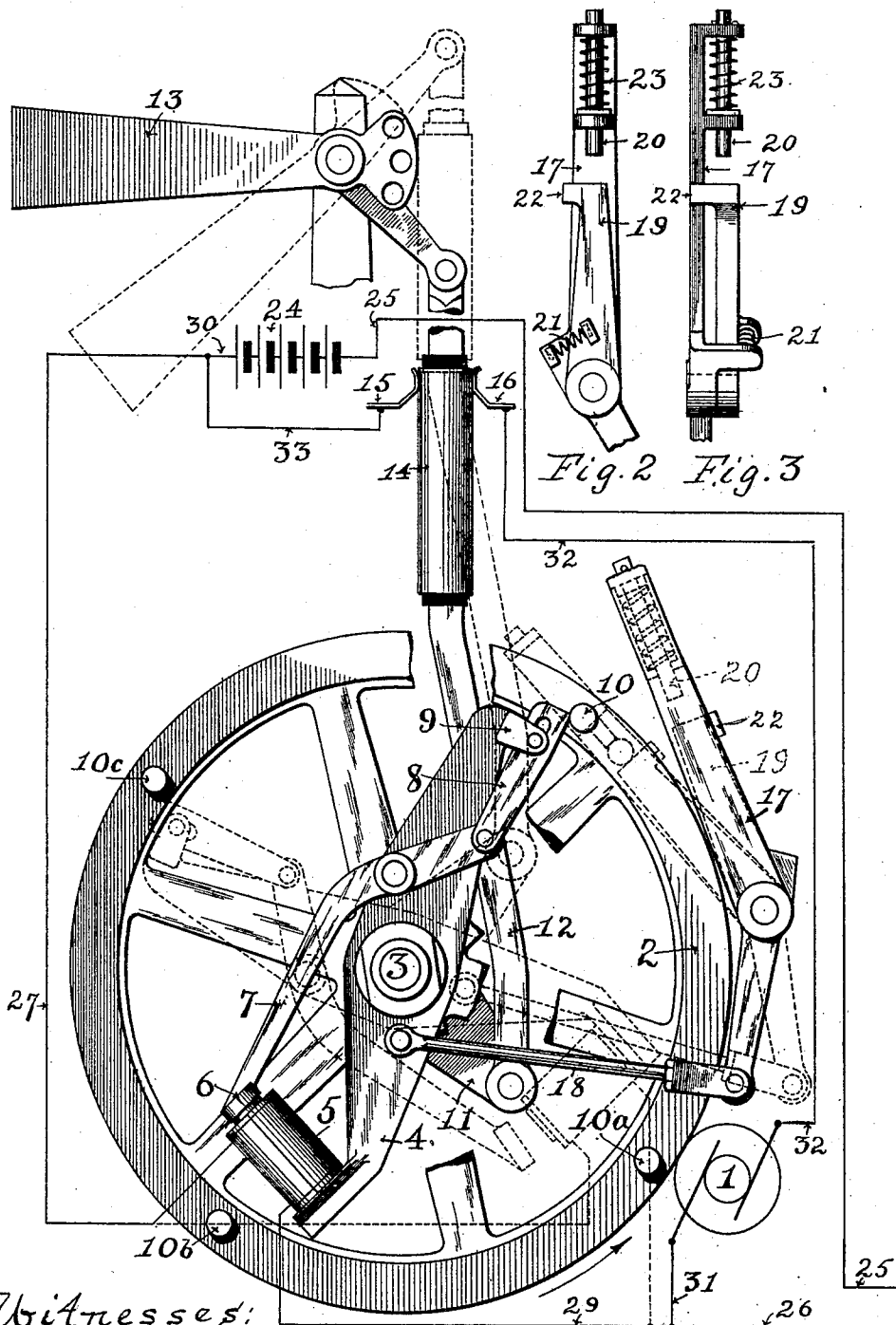


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 APPARATUS FOR OPERATING RAILWAY SIGNALS.  
 APPLICATION FILED OCT. 11, 1906.

969,281.

Patented Sept. 6, 1910.



Witnesses:

A. W. Macomber.  
 C. A. Kelly.

Fig. 1

Inventor:  
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 by Macomber & Kelly  
 attys

# UNITED STATES PATENT OFFICE.

WINTHROP K. HOWE, OF BUFFALO, NEW YORK, ASSIGNOR TO GENERAL RAILWAY SIGNAL COMPANY, OF BUFFALO, NEW YORK, A CORPORATION OF NEW YORK.

## APPARATUS FOR OPERATING RAILWAY-SIGNALS.

969,281.

Specification of Letters Patent.

Patented Sept. 6, 1910.

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*To all whom it may concern:*

Be it known that I, WINTHROP K. HOWE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Apparatus for Operating Railway-Signals, of which the following is a specification.

My invention relates to signals and more particularly to apparatus for operating signals of the "slot" type, in which the energy employed is electricity.

The object of my invention is to provide a simple and effective signal apparatus, and to provide means for definitely stopping and holding the signal blade against vibration when it goes to the proceed position.

Referring to the drawings herewith, Figure 1 is a diagrammatic elevation of my apparatus. Fig. 2 is a rear view of the stop mechanism, and Fig. 3 is a side view of the same.

I will first indicate the principal parts of the apparatus, and then describe its operation by describing a movement from stop to proceed and from proceed to stop.

1 is a motor which is geared to a gear-wheel 2. The gear-wheel 2 is mounted to rotate upon the shaft 3, which shaft is mounted in bearings upon the frame of the machine, which are not shown in the drawing. Rigidly mounted upon the shaft 3 is a double arm 4. This arm 4 has mounted upon one end the slot magnet 5 which co-operates with its armature 6. The armature 6 is mounted upon a lever 7 which is of the bell crank type and which is pivoted to the arm 4. Pivoted to the opposite end of the lever 7 is a bolt 8, and this bolt 8, by means of a slot is secured to a lug 9 upon the double arm 4 in such manner that the bolt 8 may be moved longitudinally and may also rotate over a small arc of a circle. Rigidly secured to the face of the gear-wheel 2 are pins or stops 10, 10<sup>a</sup>, 10<sup>b</sup> and 10<sup>c</sup>. These pins 10, 10<sup>a</sup>, etc., are symmetrically arranged upon the face of the gear 2 and are so positioned, and the bolt 8 is of such length that, when the armature 6 is attracted by its magnet 5, the end of the bolt 8 will lie in the path of rotation of the pins 10, 10<sup>a</sup>, etc., and when the armature 6 moves away from the magnet 5 the bolt 8 will be drawn out of the path of rotation of said pins.

Rigidly mounted upon the shaft 3 is a

crank 11, which is pivoted to the lower end of the semaphore rod 12. The semaphore rod 12 is connected pivotally in the usual manner to the semaphore blade 13. Mounted upon the rod 12 is a contact piece 14 which is capable of making electrical connection between the brushes 15 and 16 at all times excepting when the signal is at the proceed position, as will hereafter more fully appear.

Pivoted to the frame of the machine is a double arm or lever 17. The lower member of this arm is connected pivotally by a connecting rod 18 to the double arm 4. Mounted upon the upper member of the double arm 17 are two stops, 19 and 20. The stop 19 is pivoted to the arm 17 and is held normally parallel therewith by means of a compression spring 21, and is prevented from passing the parallel position by means of a lug 22 on the arm 19 which strikes against the side of the arm 17. The stop 20 is mounted in lugs upon the arm 17 and is held down to its work by a spring 23. The stops 19 and 20, and the arm 17, are so positioned that when, by the movement of the connecting rod 18, the stops 19 and 20 are moved in toward the pins 10, 10<sup>a</sup>, etc., the said stops 19 and 20 will lie in the path of rotation of said pins, as will hereafter more fully appear.

24 is a source of electric energy, and 25 and 26 are conductors which lead to an apparatus for closing the circuit of the machine, as, for example a controller, relay or instrument. The means for closing the circuit being well-known, is not shown in the drawings.

The apparatus is shown in the normal or stop position in full lines and in the reverse or proceed position by the broken lines. I will now describe a movement of the apparatus from normal to reverse and from reverse to normal. Assuming that the circuit controller has been closed and the wires or conductors 25 and 26 have been put in electrical connection current will flow from battery 24 through wire 25 to the controller, through the controller back through wires 26 and 29, magnet 5, and wires 27 and 30 back to battery. This will energize the magnet 5, causing it to attract the armature 6, and through the bell crank lever 7 projects the bolt 8 into the path of rotation of the pin 10 as shown in Fig. 1. Since the magnet 5

is of comparatively high resistance, current will also flow from battery through the path above described back to wire 26 and from wire 26 will flow through wire 31, armature 5 and field of the motor 1, wire 32, brush 16, contact 14, brush 15, and wire 33 back to battery. This will energize the motor 1 and cause it to rotate the gear 2 in the direction of the arrow. The pin 10 will strike against the bolt 8, and since the bolt 8 is held by the energized condition of the magnet 5, the arm 4 will be compelled to rotate with the gear 2. Since both the arm 4 and the crank 11 are geared upon the shaft 3, the rotation of the arm 4 will cause the crank 11 to raise the rod 12 and through it move the semaphore blade 13 to the proceed position. At the same time that this movement is taking place, the connecting rod 18 will move the double arm 17 and swing it in such direction that the stops 19 and 20 will move into the path of the pins 10, 10<sup>a</sup>, etc., (in this case 10<sup>a</sup>); and just as the movement is completed, the stop 19 being yieldingly held by the spring 21, the stop 19 will snap in behind the pin 10<sup>a</sup> so that said pin will lie between the faces of the two stops 19 and 20. Just as this position is reached the contact piece 14 will pass above the brushes 15 and 16 and current will be cut off from the motor 1. The momentum acquired in the movement will be met by the engagement of the stop 20 against the pin 10<sup>a</sup>, and the pin 10<sup>a</sup> will immediately recede and rest upon the face of the stop 19, thus preventing any vibration of the semaphore blade. So long as the magnet 5 remains energized, the two stops will be held in the position just described and, to all intents and purposes, the signal will be locked at the proceed position.

The movement from proceed to stop is as follows: When the circuit is broken by opening the controller or otherwise so that the magnet 5 is deenergized, the armature 6 will be free to move away from the magnet and the pressure of the bolt 8 against the pin 10<sup>a</sup> will swing the lever 7 so that the armature will be moved away from the magnet and in so doing the bolt 8 will be moved out of the path of rotation of the pin 10<sup>a</sup>. Immediately this happens, the double arm 4 will be free to rotate back to its original position, and in such rotation, the connecting rod 18 moving in the opposite direction will swing the arm 17 in the opposite direction withdrawing the stops 19 and 20 from the path of rotation of said pins. In this manner the semaphore blade will move to the stop position and the mechanism will

be in position for the next movement, that is to say, upon the next movement when the magnet 5 is again energized, the bolt 8 will engage the pin 10<sup>a</sup>, and when the signal reaches the full proceed position the stops 19 and 20 will engage the pin 10<sup>b</sup>. In this manner the movement of the gear 2 will be intermittently in one direction and the movement of the arm 4 will be intermittently reciprocatory.

Having thus described my invention what I claim is:

1. The combination with a source of energy, a signal, its operating mechanism, a motor, and mechanism driven thereby; of a slot magnet, means actuated by the energization of said slot magnet for connecting said motor driven mechanism with said signal mechanism, a stop for holding said motor driven mechanism against reverse movement when the signal has reached the proceed position and means actuated by said signal mechanism for throwing said stop into action upon the completion of said movement.

2. The combination with a source of energy, a signal, its operating mechanism, a motor and mechanism driven thereby; of a slot magnet, means actuated by the energization of said slot magnet for connecting said motor driven mechanism with said signal mechanism, a back stop for holding said motor driven mechanism against reverse movement when the signal has reached the proceed position and means actuated by said signal mechanism for moving said back stop into action when the slot magnet is energized and out of action when the slot magnet is deenergized.

3. The combination with a source of energy, a motor, a signal, its operating mechanism and mechanism driven by the motor; of a slot magnet and a stop mechanism for holding the motor driven mechanism against vibration when the signal reaches the proceed position comprising a rear stop for absolutely preventing the movement of the signal toward normal, a front stop for overcoming the momentum of the signal when it reaches the proceed position and means for moving said stops into action when the slot magnet is energized and out of action when the slot magnet is deenergized.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

WINTHROP K. HOWE.

Witnesses:

F. L. DODGSON,  
S. M. DAY.