

**1,057,038.**

2 SHEETS—SHEET 1.

Witnesses  
Otto E. Hoddick.  
C. H. Roesser.

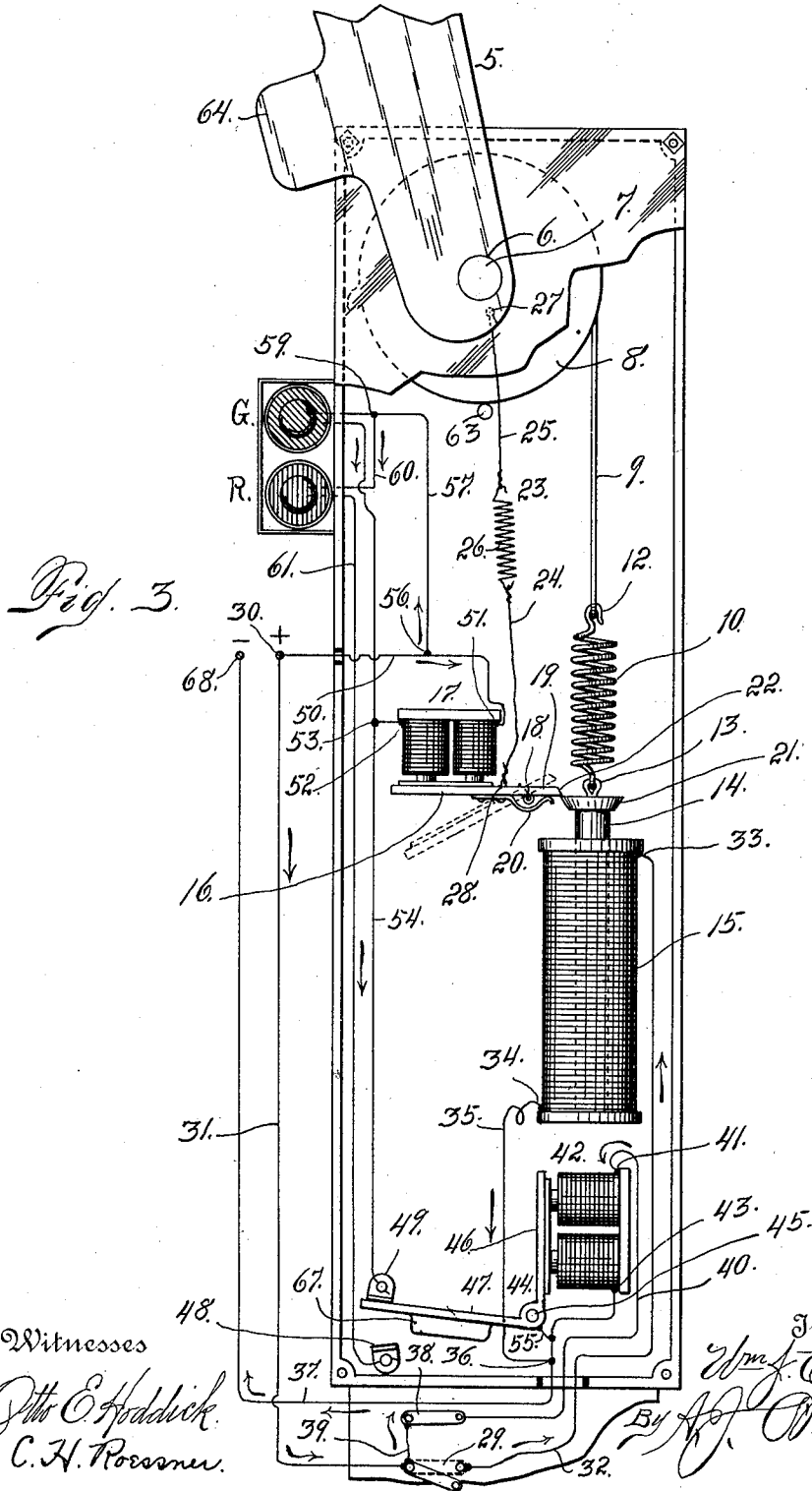
Inventor  
Wm. J. Cook.  
By A. J. O'Brien  
Attorney

W. J. COOK.  
RAILWAY SIGNALING APPARATUS.  
APPLICATION FILED APR. 22, 1911.

1,057,038.

Patented Mar. 25, 1913.

2 SHEETS—SHEET 2.



# UNITED STATES PATENT OFFICE.

WILLIAM J. COOK, OF DENVER, COLORADO, ASSIGNOR TO THE COOK RAILWAY SIGNAL COMPANY, A CORPORATION OF COLORADO.

## RAILWAY SIGNALING APPARATUS.

1,057,038.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed April 22, 1911. Serial No. 622,799.

*To all whom it may concern:*

Be it known that I, WILLIAM J. COOK, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Railway Signaling Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in railway signaling apparatus in which a semaphore arm and lights are employed for signaling purposes, my object being to provide a construction in which it is impossible to display a false safe light signal by reason of the failure of the semaphore arm to move to the danger position. In other words, even though the semaphore arm remains in the raised or safe position, the safe light will be extinguished and the red light turned on.

Heretofore, so far as I am aware, the cutting out of the safe light has been accomplished by the movement of the semaphore arm into the danger position, a portion of the said arm having colored glass inserted therein and being interposed between the safe light and the approaching train; while in my improved construction the semaphore arm will entirely obstruct from view the safe light signal whether or not the said signal operates as intended.

Having briefly outlined my improved construction I will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a view illustrating the invention, the casing containing the operating mechanism being broken away in front to disclose the elements within. In this view the parts are shown in the position to indicate danger. Fig. 2 is a sectional view of the casing in which the lights are located, taken on the line 2—3, Fig. 1, shown on a larger scale. Fig. 3 is a view similar to Fig. 1, but showing the parts in the safe position.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a semaphore arm pivoted at 6, being made fast to a spindle 7 to which is also secured a pulley wheel 8 with the periphery of which a cable 9 is connected, the extremity of the cable remote from the pulley being connected with a spiral spring 10 as shown at 12, the opposite extremity of the spring being connected as shown at 13 with a movable core 14 of a solenoid 15. When the solenoid core 14 is drawn into the coil due to the passage of current through the latter, the pulley 8 is actuated to raise the semaphore arm to the safe position or from the position shown in Fig. 1 to that shown in Fig. 3, and the core is locked in position to maintain the semaphore arm in the said position by an armature 16 of an electromagnet 17, the armature being jointed as shown at 18, the short arm 19 on one side of the joint being retained in the same plane as the body of the armature by a leaf spring 20. This armature serves to lock the core 14 in position to hold the semaphore arm in the safe position, only when the magnet 17 is energized whereby the body of the armature is held in the horizontal position. It will be understood that the pin which connects the two jointed parts of the armature also serves as a pivot upon which the entire armature is adapted to turn. However, when the magnet 17 is energized and the armature 16 is in the horizontal position, as soon as the core 14 is drawn downwardly into the solenoid coil 15, the beveled head 21 of the core acts upon the beveled extremity 22 of the armature part 19 and causes said part to move downwardly sufficiently to permit the head of the core to pass below the armature, in which event the member 19 will assume the horizontal position as soon as the core has moved past it. The outer extremity of the armature part 19 will then overlap the head 21 of the core and lock the latter in place, thus preventing the semaphore arm from falling until the armature 16 shall have been released by the deenergizing of the magnet 17.

Attention is called to the fact that in a structure of this class the solenoid or other motor employed for raising the semaphore arm to the safe position is usually energized momentarily only.

There is a connection 23 between the armature 16 and the inner extremity of the semaphore arm whereby as the magnet 17 is

deenergized and the armature assumes the dotted line position, (see Fig. 3), the armature is prevented from falling to a position beyond the magnetic influence. This connection as illustrated in the drawing consists of two wire members 24 and 25 connected by a spiral spring 26, one of the wire members being connected with the semaphore arm as shown at 27 and the other to the armature as shown at 28.

As illustrated in the drawing, the switch arm 29 is employed for making and breaking the circuit through the solenoid. This switch arm is intended to illustrate any suitable means for making and breaking the circuit through the solenoid, since it is not desirable in this application to show the apparatus in connection with make and break devices adapted to be operated momentarily or while the train is passing only, my only object in this application being to illustrate means whereby the safe light signal may be cut off from view by the semaphore arm if the said light signal should fail to go out when the semaphore arm falls to the danger position.

The circuit through the solenoid may be traced as follows: from the positive pole 30 of an electrical source through conductor 31 to the switch arm 29, thence from the said switch arm through a conductor 32 to one terminal 33 of the solenoid coil, thence from the opposite terminal 34 through a conductor 35 to a point 36 of a wire 37, thence through the last named wire to the negative pole 68 of the electrical source, completing the circuit. It may be assumed that the energization of the solenoid on the passage of the current through its coils is momentary only. At the same time that the circuit is closed through the solenoid, it is also closed through the magnet 17 by moving the switch arm 38 to the closed position, (see Fig. 3). The circuit may then be traced as follows: from the positive pole 30 of the electrical source through the conductor 31 to the switch arm 38, thence through a conductor 40 to one terminal 41 of an electromagnet 42, thence from the opposite terminal 43 of said magnet through the conductor 37 to the opposite pole 68 of the battery, completing the circuit. In this event the magnet 42 being energized, its angle-shaped armature 44 which is pivoted at 45, has one of its arms 46 brought into engagement with the cores of the magnet, while the other arm 47 is raised from a contact 48 to a contact 49. This places the magnet 17 in the circuit which may be traced as follows: from the positive pole 30 of the electrical source through a wire 50 to a terminal 51 of the magnet 17, thence from the terminal 52 of the same magnet to a point 53 on a conductor 54, thence through said conductor to a contact 49, thence

through the armature arm 47, thence through a short conductor 55 to the wire 37, and thence to the negative pole 68 of the source, completing the circuit. Hence, the magnet 17 being energized, its armature 16 will be held in the horizontal position and the armature bar 19 will be in position to engage the head 21 of the solenoid core, and lock the core in position to maintain the semaphore arm in the raised or safe location.

Attention is called to the fact that when the parts are in the position illustrated in Fig. 3, the circuit is closed through the green or safe light G and the circuit may be traced through said light as follows: from the positive pole 30 of electrical source through the conductor 50 to a point 56, thence through a conductor 57 to the green lamp G, thence from the said lamp through the conductor 54 to the contact 49, thence through the short conductor 55 and the conductor 37 to the negative pole of the source, completing the circuit. Under these circumstances the red light R is extinguished, the circuit being broken therethrough by reason of the position of the angle-shaped armature 44.

Now if it is desired to display the danger signals, the circuits will be broken through the magnet 42 and the magnet 17, in this event the armature 16 will drop to the dotted line position in Fig. 3, allowing the core of the solenoid to move upwardly in response to the downward movement of the semaphore arm which is normally counterbalanced to fall. At the same time the angle-shaped armature 44 will move away from the cores of the magnet 42 since the said armature is provided with a weight 67 attached to its arm 47. This movement of the said armature will bring the arm 47 thereof into engagement with the contact 48, thus closing the circuit through the red light, the said circuit being traced as follows: from the positive pole 30 of the electrical source through the conductor 50 to the conductor 57 to a point 59, thence through a conductor 60 to the red lamp, thence from the lamp through a conductor 61 to the contact 48, thence through the arm 47 of the angle-shaped armature 44, thence through the short conductor 55 to the conductor 37, and thence to the negative pole of the source, completing the circuit.

Referring now more particularly to the operation of the mechanism, it will be understood that if we assume the semaphore is in a raised position to indicate a clear track, the green lamp being also lighted, and if it is desired to throw the signals to the danger position or put them in a condition to indicate danger, the circuits will be broken through the electromagnet 17 and the electromagnet 42. Under these circumstances, if everything works properly, the

green lamp will be put out, the red lamp will be illumined and the semaphore arm will fall to a horizontal position, to indicate danger in harmony with the display of the red light. The semaphore arm is prevented from falling farther than the horizontal position by means of a lug 62 formed on the pulley 8 and arranged to engage a stop pin 63 with which the casing is provided. The semaphore arm is equipped with a projection 64 which, when the said arm is in a horizontal position is located in front of the green lamp and would hide the lamp if for any reason there should be a short circuit in the connections which would prevent the extinguishing of the lamp by the breaking of the circuit in the usual place. If, however, the semaphore arm should fail to fall to the danger position, the green lamp would nevertheless be extinguished and the circuit closed through the red lamp. This demonstrates conclusively that the dropping of the semaphore arm to the horizontal position is not necessary in order to change the light signals from safety to danger.

Having thus described my invention, what I claim is:

1. The combination with a semaphore arm counterbalanced to fall, of electromagnetic mechanism for supporting said arm in position to indicate a clear track, electric lights for respectively indicating a clear track and danger, means for breaking the circuit through the electromagnetic mechanism, whereby the semaphore arm is allowed to fall to the danger position and for breaking the circuit through one light and closing it through the other, and a projection upon said semaphore arm for covering the clear light signal when said arm is in the danger position.

2. The combination with a semaphore of two light signals, means for locking said semaphore in the safe position, an electromagnet for controlling said lock, and a sec-

ond electromagnet for controlling said first magnet and also for closing the circuit through one or the other of the said light signals according to whether or not said second magnet is energized.

3. The combination with a semaphore two light signals and a locking means for said semaphore, of two electromagnets and armatures therefor, the armature of the first magnet being adapted to control said locking means and the armature of the second magnet being adapted to control said first magnet and to close the circuit through one or the other of said light signals according to whether or not said magnet is energized.

4. The combination with a semaphore arm weighted to fall to danger position of light signals adapted to indicate either a clear track or danger means for causing both the semaphore and the danger light signal to indicate danger and for displaying the danger light signal though the semaphore arm fails to move to the danger position, and a second means connected with the semaphore arm for obstructing the clear track signal from view when the said arm falls to the danger position substantially as described.

5. The combination with a semaphore arm weighted to fall to danger position of a safety and a danger light, means for simultaneously maintaining said semaphore in the safety position and said safety light energized, and for simultaneously permitting the said semaphore to assume the danger position, extinguishing said safety light and energizing said danger light, a portion of said semaphore being adapted to cover said safety light when the semaphore is in the danger position.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. COOK.

Witnesses:

F. E. BOWEN,  
WILMA H. COON.