

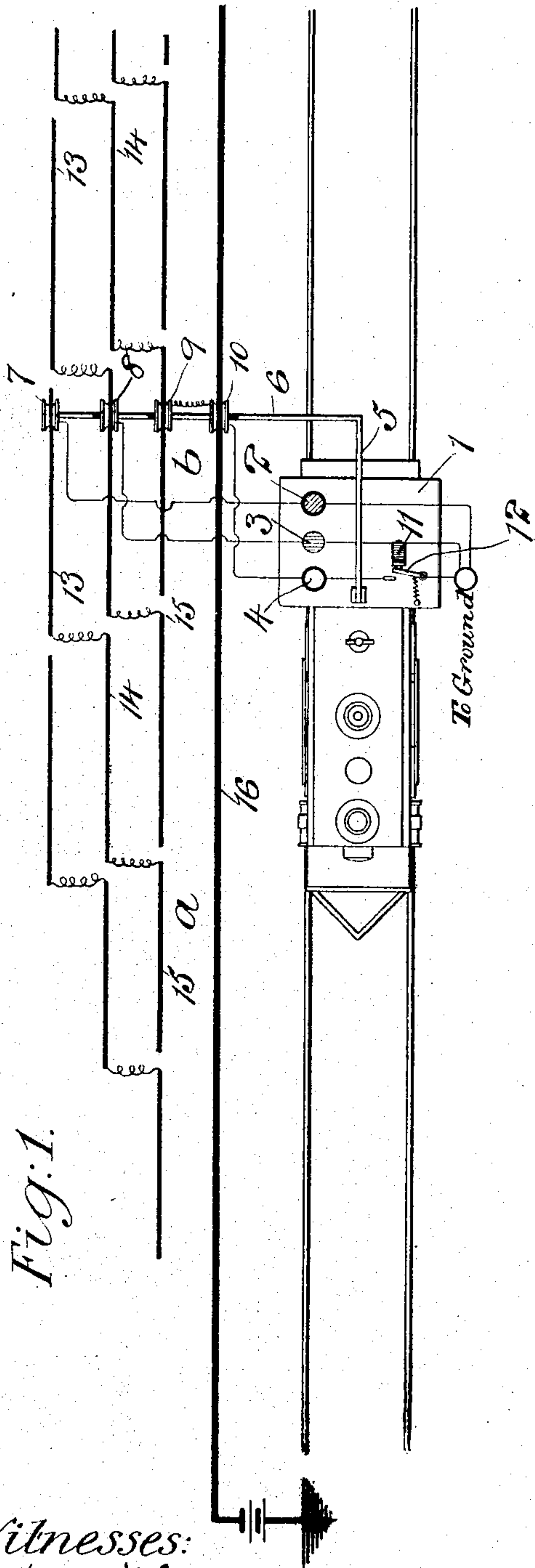
No. 765,311.

PATENTED JULY 19, 1904.

S. FRIEDMAN.  
SIGNAL SYSTEM.

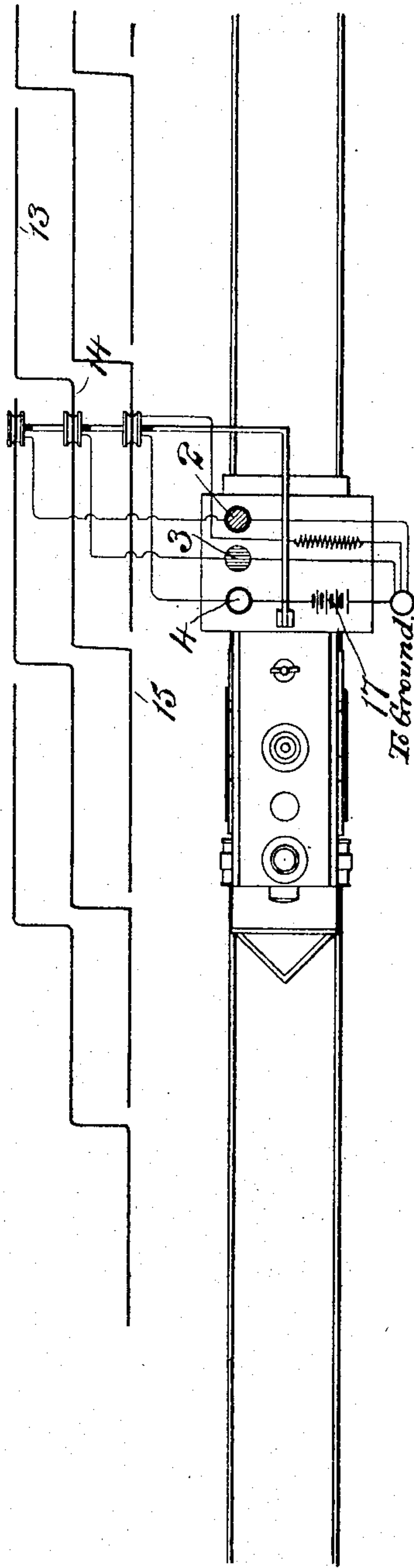
APPLICATION FILED JUNE 23, 1902.

NO MODEL.



Witnesses:  
Henry Thorne  
Fred O'Leary

*Fig. 2.*



Inventor:  
Samuel Friedman  
by attorneys  
Merritt Seward

# UNITED STATES PATENT OFFICE.

SAMUEL FRIEDMAN, OF NEW YORK, N. Y.

## SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 765,311, dated July 19, 1904.

Application filed June 23, 1902. Serial No. 112,768. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL FRIEDMAN, a citizen of the United States, and a resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Signal System, of which the following is a specification.

My invention relates to a signal system, and more particularly to a signal system for use in tunnels or wherever the ordinary block-signal is liable to become wholly or partially obscured by smoke, steam, or mist, with the object in view of setting in the cab of the locomotive or within the immediate and convenient sight of the engineer the several signals ordinarily used to indicate caution, danger, and safety.

My invention contemplates the arrangement of a series of gangs of wires, preferably but not necessarily overhead, with which trolleys carried by the locomotive engage in succession as the train moves along the track and which serve to complete circuit through a similar set of trolleys carried by a preceding or succeeding locomotive whenever two trains approach each other to within a distance where absolute safety requires that a cautionary signal or danger-signal, one or both, be set.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a diagrammatic plan view of the system, and Fig. 2 is a similar view of a modified form.

In my preferred form (represented in Fig. 1) I have provided for maintaining a white light in the cab of the locomotive so long as the way is clear, while showing a green light as the danger-point is approached, and finally the setting of a red light and simultaneously therewith the extinguishing of the white light when the danger-point is reached. Referring to this arrangement of my invention last outlined, 1 represents the cab of a locomotive in which there are located a green electric lamp 2, a red electric lamp 3, and a white electric lamp 4. A trolley staff or pole carried by the locomotive (denoted by 5) is provided with a branch 6, extending transversely across the line of track and carrying trolley-wheels 7, 8,

9, and 10, the trolley-wheel 7 being electrically connected with the green lamp, the trolley-wheel 8 being electrically connected with the red lamp, and the trolley-wheel 10 electrically connected with the white lamp. The trolley-wheel 9 is electrically connected with the trolley-wheel 10, and the trolley-wheels 7, 8, and 9 are insulated from one another. The wire leading from the red lamp to ground is intercepted by a coil 11 for the purpose of energizing an electromagnet whenever the red-lamp wire is energized, the armature 12 of said magnet being connected with or itself forming a part of the electric circuit leading to the white lamp and being normally held in position to close the circuit to the white lamp—as, for example, by ordinary spring tension—the tension being such that it may be overcome by the attractive force of the electromagnet energized by the wire leading to the red lamp, so that when the red lamp is lighted it will simultaneously break circuit to the white lamp by withdrawing the armature out of its normal position.

The trolley-wheels 7, 8, 9, and 10 are arranged to engage wires arranged consecutively in series as follows: The wire with which the trolley-wheel 7 engages is denoted by 13, the wire with which the trolley-wheel 8 engages is denoted by 14, the wire with which the wheel 9 engages is denoted by 15, and the wire with which the wheel 10 engages is denoted by 16. The wire 16 extends continuously along the line of track to be protected and is energized in the present instance by suitable battery-power, so that as the trolley-wheel 10 moves along the wire 16 it will make circuit through the white light unless the said circuit be broken by the energizing of the circuit leading to the red lamp. The wire 15, with which the trolley-wheel 9 engages, is spaced laterally from the wire 16 and receives its supply of electricity from the wire 16. The wire 15 is interrupted at intervals, which for convenience I will call a “block” or “section,” so that the wire 15 becomes a series of disconnected sections arranged in alinement in position to be consecutively engaged by the wheel 9.

The wire 14, with which the trolley-wheel



8 engages, is spaced laterally from the wire 15, and it, like the wire 15, is interrupted at intervals corresponding to a block or section, so that it becomes a series of disconnected sections in alinement and in position to be consecutively engaged by the wheel 8.

The wire 13, with which the trolley-wheel 7 engages, is spaced laterally from the wire 14, and it, like the wires 14 and 15, is interrupted at intervals corresponding to a block or section, so that it becomes a series of disconnected sections in alinement and in position to be consecutively engaged by the wheel 7.

The positions of the sections of wires 13, 14, and 15 are such that a section of the wire 14 begins at the point where a section of the wire 13 terminates and a section of the wire 15 begins where a section of the wire 14 terminates, and a section of the wire 13 is electrically connected with the next preceding section of the wire 14, and this in turn is electrically connected with the next preceding section of the wire 15, so that these three block-sections of wire may be energized by a connection of the wire 15 with the wire 16 through trolleys 9 and 10. The alined wires must be spaced far enough apart to prevent their being bridged by the trolley-wheels as they pass from one wire to the next.

The operation is as follows: Assuming a locomotive to be located at *a* and an overtaking locomotive to be located at *b*, the locomotive at *a*, bridging the wires 15 and 16 by means of electrically-connected trolleys 10 and 9, energizes the preceding sections of the wires 15 and 13, so that the locomotive at *b* will have electric connection through its green lamp to ground, lighting the green lamp and indicating to the engineer that caution must be taken, as there is a train on the second block ahead.

If now the train at *b* moves forward cautiously until the section of the wire 14 completes circuit through its red lamp to ground, it will set the red or danger signal, which will indicate that the train is on the block immediately before it and it must stop. This red signal will be emphasized by the immediate shutting out of the white light by the breaking of the circuit by the movement of the armature of the magnet.

As soon as the train at *a* moves forward the train at *b* will receive simultaneously its green and white signals and will lose its red and may move on until again warned.

In the modified form of my invention the electric energy may be supplied from a battery 17, carried within the cab, which may supply the circuit through the white lamp to the wire 15, and the wire 16 may be dispensed with.

It is obvious that the number of different

signals included in a series might be increased or diminished by increasing or diminishing the number of wires and that the lengths of sections might be increased or diminished to suit purposes in hand without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. A signal system comprising a series of independent gangs of wires, the individual members of a gang being electrically connected spaced laterally and arranged consecutively, a set of trolleys spaced laterally to correspond with the members of a gang, electric lamps of different colors connected with the trolley, one with each, and means for energizing the gang of wires, the connections being such that when one member of a gang is in engagement with one of the trolleys, the electric circuit will be completed through a trolley of another set engaged with another member of the gang of wires and through the lamp connected with the trolley, to the ground.

2. A signal system comprising a series of independent gangs of wires, the members of a gang being electrically connected, laterally spaced from one another and consecutively arranged, sets of trolleys carried by moving vehicles along the series, electric lamps of different colors connected with the trolleys, an energized wire extending continuously along the series of gangs, a white lamp connected with a trolley engaged with the line-wire, a colored lamp connected with a trolley engaged with one member of a gang and means for breaking the circuit through the white lamp when the circuit through the colored lamp is completed.

3. A signal system comprising a series of independent gangs of wires, the members of a gang being electrically connected laterally spaced from one another and consecutively arranged and the corresponding members of succeeding gangs being arranged in alinement, means for energizing the gangs, sets of trolleys arranged to simultaneously engage members of succeeding gangs, and electric lamps of different colors connected with the different trolleys of a set, whereby the position of a preceding train is indicated to the engineer of a following train whenever the trains approach within a predetermined distance.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 10th day of June, 1902.

SAMUEL FRIEDMAN.

Witnesses:

FREDK. HAYNES,  
C. S. SUNDGREN.