

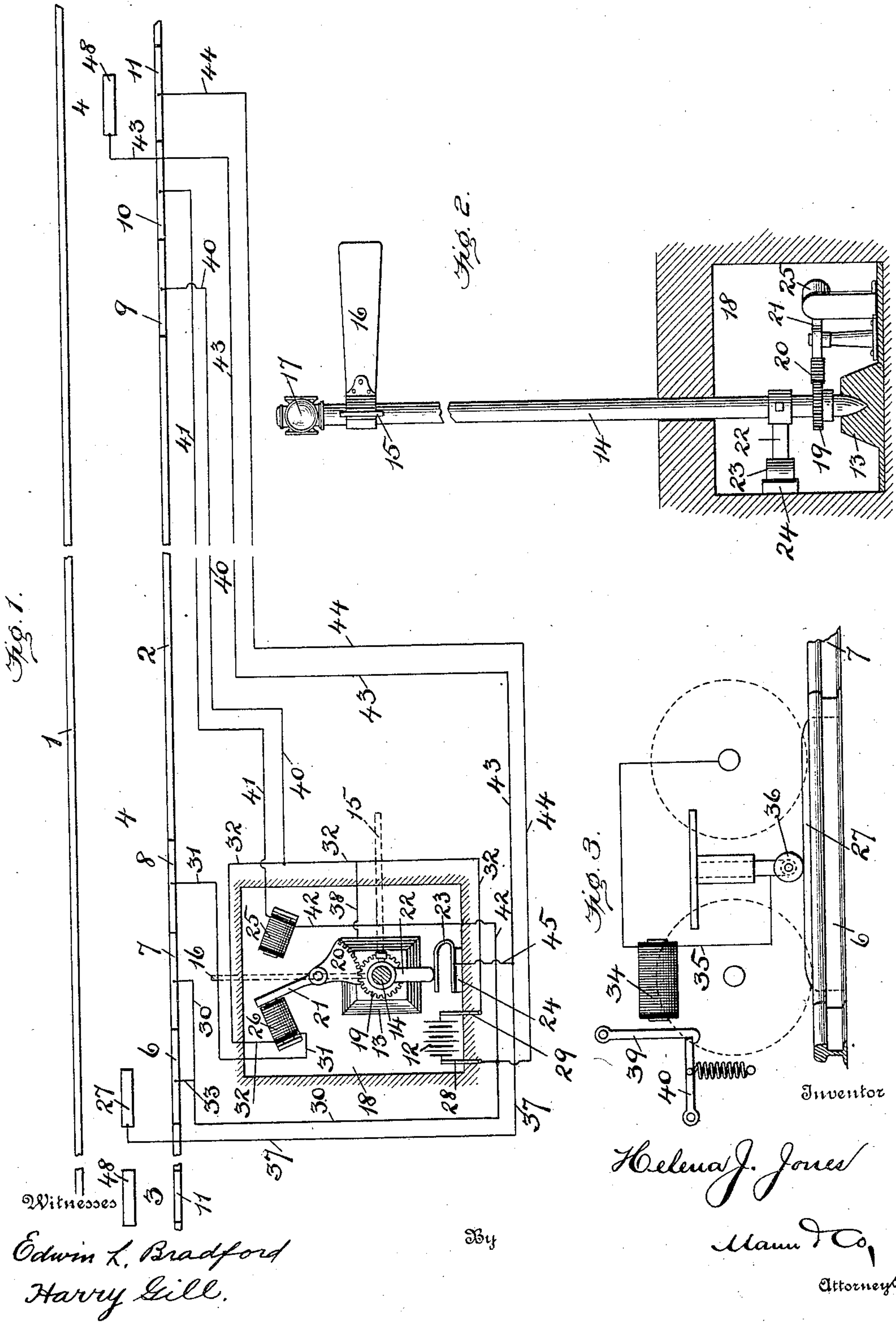
No. 869,785.

PATENTED OCT. 29, 1907.

H. J. JONES.

ELECTRICALLY OPERATED SIGNAL FOR RAILROADS.

APPLICATION FILED MAY 13, 1907.





# UNITED STATES PATENT OFFICE.

HELENA J. JONES, OF BALTIMORE, MARYLAND.

## ELECTRICALLY-OPERATED SIGNAL FOR RAILROADS.

No. 869,785.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed May 13, 1907. Serial No. 373,375.

*To all whom it may concern:*

Be it known that I, HELENA J. JONES, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Electrically-Operated Signals for Railroads, of which the following is a specification.

This invention relates to improvements in electrically-operated signals for railroads.

One object of the invention is to provide an improved arrangement of block signals for railroads which will be automatically operated by the movement of the trains when entering and leaving a block and the operation of which will be effected automatically without in any way depending upon the usual signal of operators or the engineer.

Another object of the invention is to provide an arrangement of devices which may be operated automatically in connection with the signals so as to effect the operation of the air brakes on a train that enters a block when the signal is in the danger position and during the presence of another train in the same block.

The invention may also be as readily applied to guard a train when approaching a misplaced switch, crossing or a draw-bridge.

The improved invention is designed to cause the setting of a danger signal at the entering end of a block as the train passes in, and to maintain such danger signal until it leaves the other end of the same block.

The invention consists in the novel construction, combination and arrangement of the devices and the electric circuits connected therewith as will hereinafter be described and particularly pointed out in the claims.

The accompanying drawings illustrate the invention in which,—

Figure 1 shows a diagrammatic view of the device as applied to a railway track. Fig. 2 shows a detail side elevation of the signal mechanism, and Fig. 3 illustrates a diagrammatic view of the connections on the locomotive or other vehicle.

In illustrating the invention I have shown such mechanism and electric circuits connecting the same to operate the signal at the entrance end of the block and to also guard the other end of the same block in case a locomotive should attempt to enter said latter end during the presence of a train in the block. In case of a double track road where trains travel in one direction only on a track, the form of device and connections as shown will be sufficient, but in case of a single track road the devices and connections will merely be duplicated,—portions of one rail being used for operating the signal at one end of the block for trains going in one direction and to guard the opposite end of the block and the other rail being utilized for operating the signal for trains traveling in the opposite directions.

In carrying out the invention for a double track road the rail 1, may be continuous and secured to the cross-

ties in the usual manner, while the rail, 2, is to be provided in each block with a plurality of insulated sections.

In the present instance the drawing illustrates portions of two blocks which are designated by numerals 3 and 4.

Adjacent the entrance to block, 4, the rail, 2, is provided with short rail sections, 6, 7, and 8, which sections are insulated from each other and the sections 6 and 8 of which are both insulated from the rail 2. At the opposite or outlet end of the said block, 4, the rail, 2, is further provided with short rail sections, 9 and 10. Thus it will be seen that each block is provided with insulated rail sections at both ends and the signal devices are arranged so that there is no connection whatever between the signal of a given block and the signals of the blocks at either side of said given block as will presently be clearly shown.

All of the short rail sections are of such length that the locomotive, motor or car will lap over from one section onto another or next adjoining section for the purpose of completing a circuit as will presently be described.

A battery, 12, is suitably located with respect to the two ends of the same block and this battery is to supply sufficient current to energize suitable electro-magnets to operate the signals.

It is to be understood that the signal mechanism may vary in construction, and any suitable construction that will permit of being operated by magnets, may be employed, but in the present instance, this device comprises a suitable metal base, 13, in which the lower end of a vertical shaft, 14, is mounted so as to revolve therein. The upper end of this shaft is provided with the signal arms or blades, one of which, 15, will be white and the other, 16, red. For night signaling a lamp, 17, mounted on top of the shaft may be employed.

The base, 13, and lower end of the shaft, 14, are preferably located in a suitable receptacle, 18, such as a well or box to protect them and other coacting devices from the elements.

A gear, 19, is mounted on the lower end of the shaft and a segment gear, 20, is pivotally mounted so as to mesh with and operate the shaft-gear so as to impart a partial rotation to said shaft as will presently be described. This segment gear is provided with a laterally-projecting arm, 21.

Above the gear, 19, the shaft carries an arm, 22, and the outer end of this arm when the shaft is rotated so that the red signal arm, 16, is displayed to indicate danger or a closed block, will contact with a yielding contact plate, 23, on a stationary conductor plate, 24. When however the white signal, 15, is displayed the arm, 21, will be out of electrical engagement with the contact plate, 23.

Within the well or receptacle, 18, are two electro-magnets, 25 and 26,—one at each side of the arm, 21, of



the segment gear, and the purpose of each magnet is to attract the arm, 21, as either magnet becomes energized, so as to move the said arm in the direction of the energized magnet and thus cause the signal shaft to be partly rotated.

At the entrance to the block, 4, I provide a short contact plate, 27, and this plate is to be connected electrically to the contact plate, 24, in the well, 18, so as to effect an operation of a suitable valve on the locomotive to operate the air brakes as will be hereinafter explained.

At the outlet end of the same block, 4, I provide a contact plate, 48, which latter plate has position adjacent to an insulated rail section, 11.

Supposing the block, 4, to be clear; a train upon entering will first pass over the rail section, 6, without establishing a circuit. Because the signal mechanism at such time is in the safety position, but when the locomotive laps over sections 7 and 8, a circuit will be established as follows.—from section, 7, through wire, 30, to the wire, 28, of the battery; then from rail section, 8, through wire, 31, to the danger magnet, 26, and from the latter through wire, 32, to the battery wire, 29. It will thus be understood that when the locomotive laps over the rail sections, 7 and 8, it closes the circuit just described and energizes the magnet, 26, which latter will draw the arm, 21, and thus rotate the vertical shaft to the position shown in Fig. 1 and while in this position the red or danger arm, 16, of the signal will be displayed. This position of the signal will be maintained so long as the train remains in the block, 4, and it will be noted that when in this position the arm, 22, will be in contact with the spring plate, 23. If while in this position a second train should enter the block, 4, another circuit will be established which will cause the operation of the air brakes on the second train and thus cause said second train to be stopped. This latter circuit would be as follows.—from wire, 28, of the battery through wire, 30, to wire, 33, to rail section, 6, through the wheels of the locomotive to a magnet, 34, in the cab through wire, 35, to a contact roller or brush, 36, depending from the locomotive, then back through plate, 27, wire, 37, to plate, 24, then through spring plate, 23, arm, 22, shaft, 14, base, 13, and by wires, 38 and 32, to battery wire, 29. By energizing the magnet, 34, on the locomotive a trip catch, 39, will be operated to permit the valve arm, 40, to drop and by the shifting of the valve cause a venting of the train pipe and thus operate the air brakes in the well known manner. If on the other hand, only the one train has passed into the block, 4, the signal devices and circuits will remain as first described until the train is about to leave the other end of the block, at which time the wheels of the locomotive will establish a circuit through the rail sections, 9 and 10, and a circuit will be established that will change the signal at the entrance end of the block to safety and permit another train to enter,—this latter circuit will be through wire, 40, that runs from section, 9, back to the wire, 32, and battery wire 29, and from rail section, 10, through wire, 41, to safety magnet 25, and by wire, 42, from said safety magnet back to battery wire, 28. When the magnet, 25, is thus energized the arm, 21, will be drawn toward said latter, magnet and the vertical shaft will be revolved so as to swing the white arm,

15. to the open block or safety position. Now let it be presumed that a train has passed into the block, 4, and the signal has been set to danger, as shown in Fig. 1, and while the train is still in the block another train enters the opposite end of the block. In such an event a circuit would be established by the locomotive through the rail section, 11, and wire, 44, to the battery wire, 28, and from the rail section, 11, through the wheels of the locomotive to magnet, 34, on the locomotive which would become energized and operate the brakes through the wire, 35, roller 36, contact plate 48, then through wire, 43, to wire, 45, and to plates, 24, and 23, arm 22, shaft, 14, base, 13, wire, 38, to wire, 32, and back to battery wire, 29. By this latter circuit the air brakes on the train entering the exit end of the block, 4, would be applied.

It will thus be seen that in my invention each block signal and its connections are separate and independent from the signal devices in the blocks at each side of it and therefore the failure of a signal in one block would in no way interfere with the signal in the adjoining blocks.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is,—

1. A railway block signal comprising a plurality of insulated rail sections at one end of the block, a signal operating arm at the same end of the block; an electro-magnet at one side of the said arm; direct electrical connection between one of said rail sections and said magnet; a direct electrical connection between said magnet and the source of electrical energy; a direct electrical connection between another rail section at the same end of the block and the source of energy whereby a circuit to set the signal may be established by connection entirely at the operating end of the block; a second magnet at the same end of the block as said operating arm; connections between said latter magnet and the source of energy, and means at the distant end of the said block and in electrical connection with said latter magnet whereby to energize said latter magnet to change the said signal arm.
2. A railway block signal comprising a plurality of insulated rail sections at the entrance to a block; a source of electrical energy; a magnet in electrical connection with one of said rail sections; a connection between another of said rail sections and the source of energy; a signal device operated by said magnet to set the danger signal and to make an electrical connection between the signal and source of energy; a contact plate also at the entrance to the block; a connection between said contact plate and the signal device during the period that the signal is in the danger position, and electrically operated devices carried by the motor vehicle for operating the air brakes said devices being operated only by a current that can pass through the signal device while the latter is set in the danger position.
3. A railway block signal comprising a pair of magnets at the entrance end of a block; a signal device having an operating arm movable between said magnets; a source of electrical energy; insulated rail sections; connections between said rail sections, magnets and source of energy for setting the danger signal as a train enters one end of the block; a contact plate at the other end of the block; connections between said contact plate and the source of energy, and electrically-operated devices on the motor vehicle for operating the brakes through the said contact plate during the period that the danger signal at the opposite end of the block is set.

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

HELENA J. JONES.

Witnesses:

CHAS. B. MANN,  
HARRY GILL.