

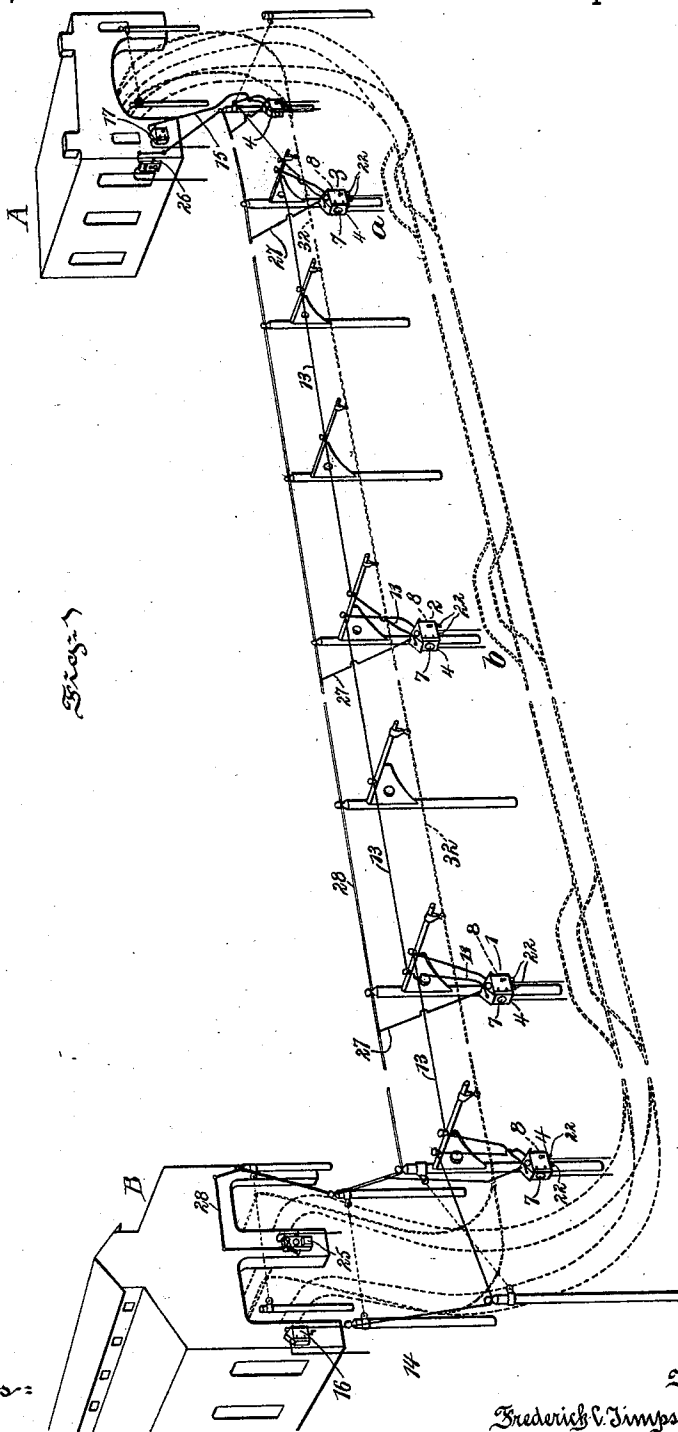
(No Model.)

3 Sheets—Sheet 1.

F. C. TIMPSON & R. F. RANKIN.
SIGNALING SYSTEM FOR RAILWAYS.

No. 568,644.

Patented Sept. 29, 1896.



Witnesses:

W. J. Jackson.

K. M. Gilligan

Inventors:

Frederick C. Timpon & Rankin.

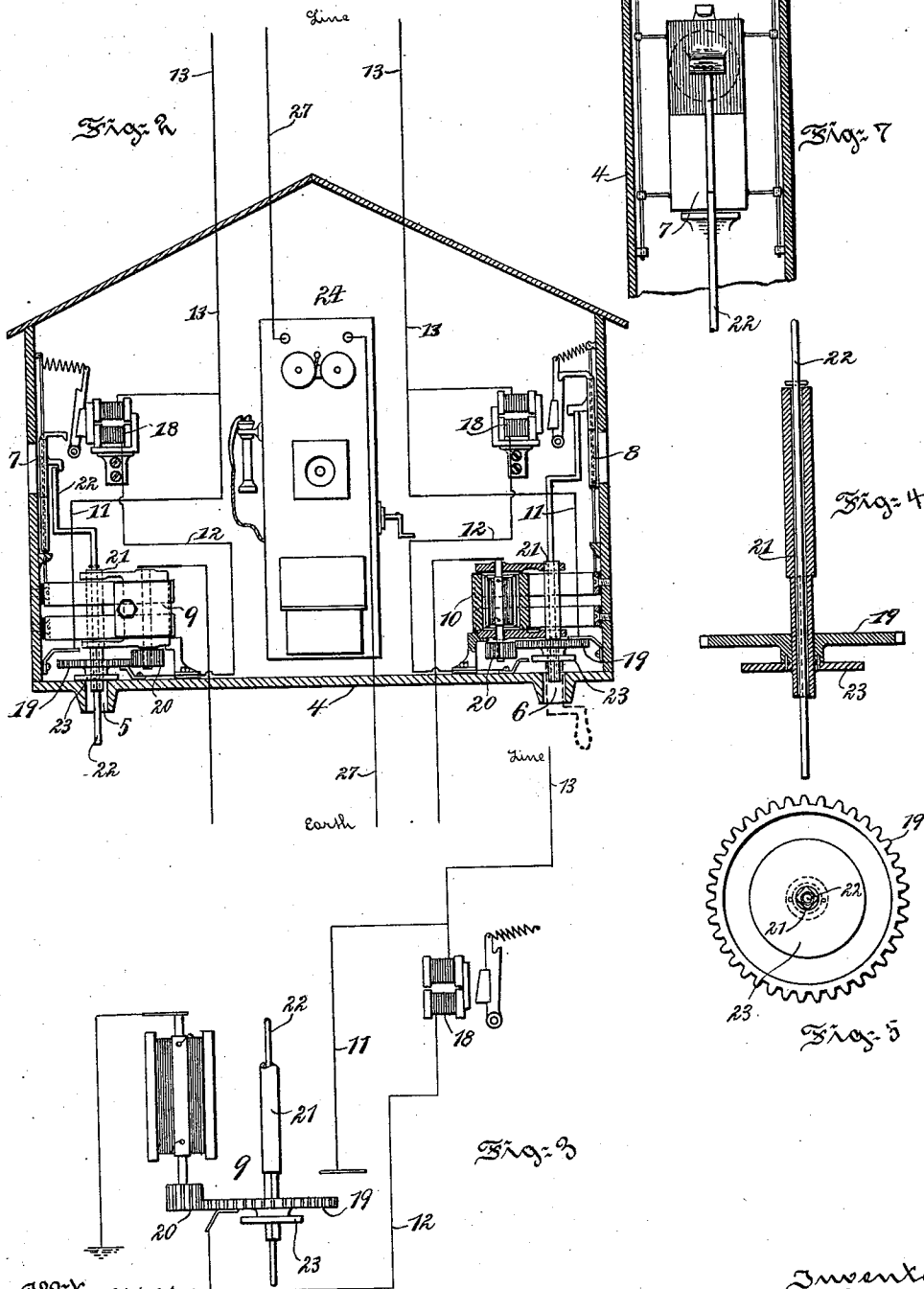
By Augustus B. Skouffron.

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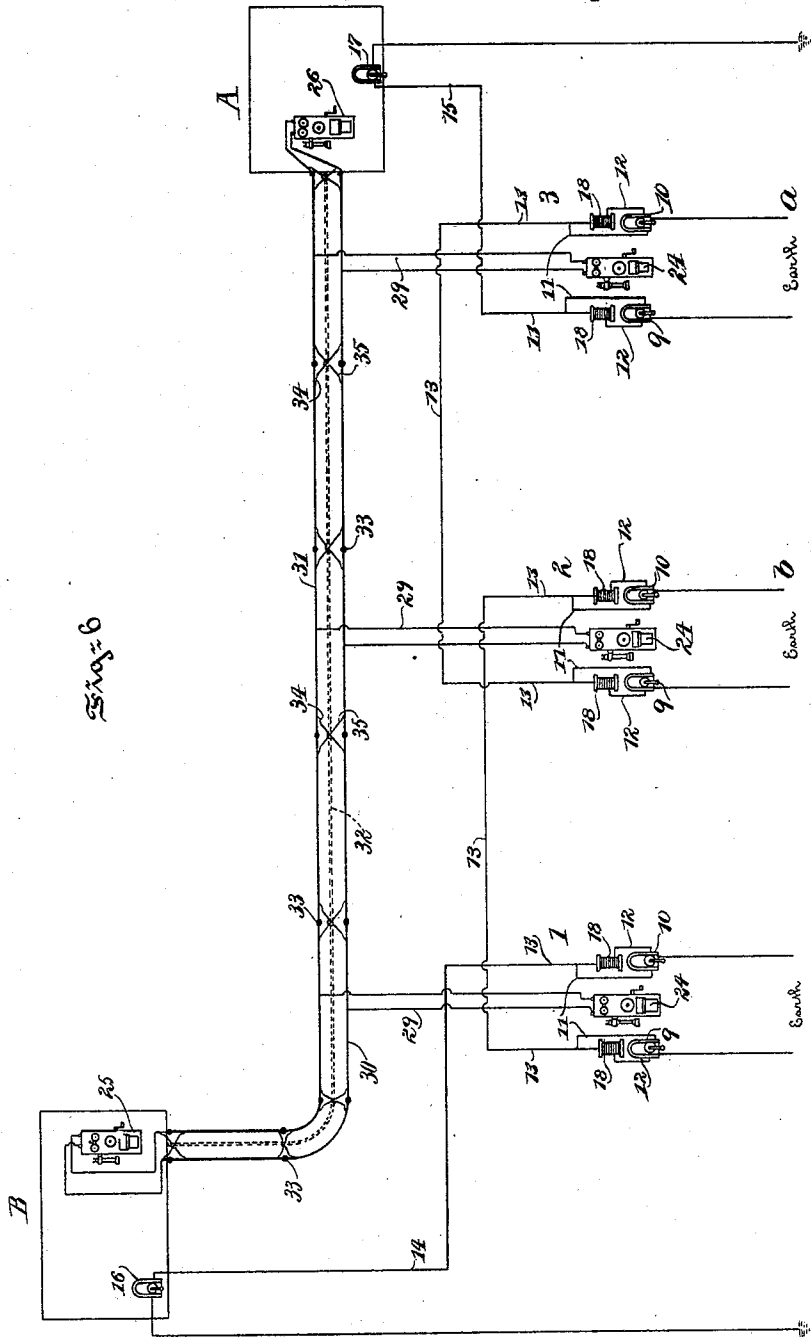
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SIGNALING SYSTEM FOR RAILWAYS.

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Patented Sept. 29, 1896.



Witnesses:

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UNITED STATES PATENT OFFICE.

FREDERICK C. TIMPSON AND RANSOM F. RANKIN, OF PHILADELPHIA,
PENNSYLVANIA, ASSIGNORS OF ONE-THIRD TO AUBREY H. GILLING-
HAM, OF SAME PLACE.

SIGNALING SYSTEM FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 568,644, dated September 29, 1896.

Application filed December 14, 1895. Serial No. 572,199. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK C. TIMPSON and RANSOM F. RANKIN, citizens of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved System of Signaling for Electric and other Railways, of which the following is a specification.

The principal objects of our present invention are, first, to provide a complete, efficient, and reliable system of intercommunication between the terminals and intermediate points, such as turnouts, along a line of railway, and, second, to provide comparatively inexpensive and simple means whereby signals may be set and controlled for the purpose of preventing collisions.

Our invention consists of the improvements hereinafter described and claimed.

The nature, characteristic features, and scope of our invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a perspective view illustrating features of our invention in application to a single-track railway. Fig. 2 is a sectional view, drawn to an enlarged scale, of one of the signaling-stations shown in Fig. 1. Fig. 3 is a diagrammatic view illustrating the circuits of the apparatus located at the signaling-station. Figs. 4 and 5 are detail views drawn to an enlarged scale and illustrating parts of the apparatus of the signaling-station. Fig. 6 is a diagrammatic view illustrating a slightly-modified arrangement of the parts shown in Fig. 1; and Fig. 7 is a detached view of the inside of the drop, signal, or semaphore.

In the drawings, 1 2 3 are signaling-stations, of which there may be any number and which are preferably located at turnouts. Each station comprises a housing, such, for example, as 4, provided with keyholes 5 and 6. At each station there are visible drops, signals, or semaphores 7 and 8, arranged so as to be visible from opposite directions along the line. Each drop, signal, or semaphore may be differently colored at its top and bottom, Fig. 7, so as to indicate when in depressed position that the line is blocked and

when in elevated position that the line is clear. At each station there are also magneto-machines 9 and 10 for operating the visible drops, signals, or semaphores at the next signaling-stations in the series.

The circuits for the visible drops, signals, or semaphores are as follows, reference being had to Fig. 6: from earth or other return through the magneto 9, and thence by branch 11 or 12, as will be hereinafter described, to line 13, to branch 11 or 12, as will be hereinafter described, and through magneto-machine 10 of station 2 to earth or other return. The circuits for the remaining signaling-stations are the same as above described. However, at the first and last stations wires, as 14 and 15, may be led to earth or other return through magneto-machines, as 16 and 17, disposed at offices, car-barns, or the like.

18 are electromagnets whose armatures normally hold the visible drops, signals, or semaphores in elevated position for indicating that the line is clear. However, when energized these electromagnets attract their armatures and permit the visible drops, signals, or semaphores to come into depressed position for exposing their upper portions and indicating that the line is blocked. These electromagnets are interposed in the branch 12, and are therefore energized when the circuit is closed through this branch and are not energized when the circuit is closed through the branch 11, as will be hereinafter more fully explained.

The circuit may be transferred from the magneto-machine to either of the branches 11 or 12 by affording the wheel 19 a range of sidewise motion upon its shaft and by providing for shifting it into contact with one or the other of the terminals or contacts of the branches 11 and 12.

As shown in Fig. 3, the circuit would be from earth, through the magneto 9, to the branch 12, through the electromagnet 18, and thence to line 13. However, by shifting the wheel 19 upward in said figure it contacts with the terminal of the branch 11, so that the circuit in such case would be from earth, through the magneto, to the branch 11, and thence to line without including the electromagnetic signaling device. The required

shifting of the wheel 19 is made possible by splining or otherwise mounting it, so as to slide sidewise on its shaft and increasing the width of the pinion 20. As shown in the drawings, the shaft 21 of this wheel 19 is squared and passes through a square opening in the wheel. Moreover, this shaft 21 is made tubular for the reception of a rod 22, that may be moved endwise, so as to afford means for resetting the visible drop, signal, or semaphore. The squared end of this shaft 21 is disposed opposite one of the keyholes of the housing 4, so that a suitable crank or key may be inserted through the keyhole and into engagement with the shaft for the purpose of turning it. The rod 22 projects below the end of the shaft 21, so that when the crank is to be applied to the squared end of the shaft 21 the rod 22 is necessarily pushed upward by the crank into position for setting the visible drop, signal, or semaphore. At the same time the crank contacts with the hub of the wheel 19 and pushes it upward into contact with the terminal of the branch 11.

It may be remarked that the hub of the wheel 19 may be provided with a washer or flange 23, and serves normally to close the keyhole, thus preventing the ingress of insects and other undesirable things. If the crank is rotated, current is generated by the magneto-machine and passes from earth, through the branch 11, to line 13. At the other end of the line 13, for example, at station 2, the current is by way of the branch 12, electromagnet 18, magneto-machine 10 to earth, it being understood that at this station the wheel is not raised, and therefore closes the branch 12 through the electromagnet and interrupts the branch 11. Under these circumstances the electromagnet at the station 2 is energized, and thus causes its visible drop, signal, or semaphore to come into depressed position.

From the foregoing it is apparent that there are two magneto-machines 9 and 10 and their complementary visible drops, signals, or semaphores 7 and 8 at each station, and the squared portions of the shafts of these magneto-machines may be made of different sizes, and thus adapted to be turned by different keys or cranks, as will be hereinafter described. At each signaling-station there may be a telephone instrument 24, and telephone instruments, as 25 and 26, may be located at the terminals of the line, for example, at the car-barns, power-houses, or the like. As shown in Fig. 1, these telephone instruments are interposed in legs 27, led off to ground from a telephone line-wire 28. As shown in Fig. 6, these telephones are in loops 29 from a metallic or closed circuit comprised of the guard-wires 30 and 31, which are frequently disposed parallel to and slightly above the trolley-wire 32. When this arrangement is availed of, the guard-wires are divided into sections insulated from each other, as at 33, and use is made of wires 34 and 35, insulated from each

other and crossed over and connected with the guard-wires. By this arrangement the deleterious effects, such as would arise from the inductive action of the trolley-wire, are obviated and excellent communication can be had through the telephones.

The mode of operation of our improved system of signaling may be described as follows: For the purposes of description it will be assumed that cars are traveling at the same time in opposite directions along different portions of the line and pass each other at and by means of turnouts. Under these circumstances it is of course desirable that a car going in one direction should wait at a turnout until a car going in the other direction has passed. It will be further assumed that the attendants of the cars proceeding, for example, from A to B are provided with cranks adapted to the shafts 21 of the magneto-machines, which are located on the side of the signaling-stations nearest the point A, such magneto-machines being designated 10 in Fig. 6. The attendants upon the cars traveling from B to A are provided with keys or cranks adapted for operating the magneto-machines designated 9 at each of the stations. For the sake of a further explanation it will be assumed that a car traveling from A to B has reached the turnout *a* and that the attendant finds the drop 8 thereat in position for indicating that the line is clear. He therefore decides to proceed toward the turnout *b*. Under these circumstances he first applies his key or crank to the magneto-machine 10 at turnout *a*, and by its proper manipulation generates current which causes the visible drop, signal, or semaphore 7 at turnout *b* to drop into position for showing that the line is blocked, and thus indicating to the attendant upon a second car that may be approaching from B toward the turnout *b* the fact that the first car is about to proceed or is proceeding from turnout *a* to turnout *b*. Under these circumstances the second car remains on the turnout *b* until the first car has passed, and the attendant in charge of the second car meanwhile applies his crank or key to the magneto-machine 9 at turnout *b*, and thus causes the drop, signal, or semaphore 8 at turnout *a* to drop, so as to prevent a third car traveling from A toward B from passing the turnout *a* until the second car has arrived at turnout *a*.

It may be remarked that when the attendant applies his key to the magneto-machine 9 at turnout *b* he resets the drop 7, as has been already described.

From the foregoing description it will be apparent that we have provided an effective block system whereby the proper operation of the road at all points is insured without danger of undue delay to travel. It may happen that in case of accident or for other reason the superintendent at one of the terminals A or B may desire to communicate with the attendants upon one or more of the cars or that the attendants may desire to

communicate verbally with each other. In the former case the superintendent makes use of the telephone at the terminals A or B and rings his bell a number of times corresponding with the number of the attendant with whom he desires to converse. Consequently when this attendant hears his number he opens the box at the signaling-station and responds by means of the telephone located thereat to the superintendent. Clearly any of the attendants while at the signaling-stations corresponding with the various turnouts may use the telephone for communication either with the superintendent or with another attendant upon his arrival at a signaling-station corresponding with another turnout.

It will be obvious to those skilled in the art to which our invention relates that modifications may be made in details without departing from the spirit thereof. Hence we do not limit ourselves to the precise construction and arrangement of parts hereinabove set forth and illustrated in the accompanying drawings; but,

Having thus described the nature and objects of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A system of signaling for electric and other railways comprising the combination of, a railway having turnouts, signaling-stations located at each turnout and respectively provided with two magneto-machines and two electromagnetic signaling devices, line-circuits connecting each station with the next and respectively having branches at the near side of one and the far side of the other of each pair of stations and whereof one branch is through the electromagnetic device and magneto-machine and whereof the other branch is through the magneto-machine, cranks or keys for said magneto-machines, mechanism operated by said cranks or keys for resetting said electromagnetic signaling devices, and means operated by said keys for opening one and closing the other of said branches to cut the electromagnetic signaling devices into and out of circuit, substantially as described.

2. A system of signaling comprising the combination of, signaling-stations respectively provided with two magneto-machines and two electromagnetic signaling devices, line-circuits connecting each station with the next in pairs and including the magneto-machine at the near side of one and the far side of the other of each pair, mechanism for resetting said electromagnetic signaling devices, and means for cutting the electromagnetic signaling devices into and out of line, substantially as described.

3. A system of signaling comprising the combination of, signaling-stations respectively provided with two magneto-machines and two electromagnetic signaling devices

and a telephone, circuit connections for said telephones, line-circuits connecting each station with the next in pairs and including the magneto-machine at the near side of one and the far side of the other of each pair, mechanism for resetting said electromagnetic signaling devices, and means for cutting the electromagnetic signaling devices into and out of line, substantially as described.

4. The combination with the guard-wires disposed above and on opposite sides of an electric-railroad trolley-wire, of, means for utilizing said guard-wires as telephone-circuits which comprise insulations, as 33, interposed in the guard-wires for maintaining their mechanical continuity and described relation to the trolley-wire and for dividing them electrically, crossover-wires disposed between and bridging the guard-wires at the insulations, and telephone instruments in circuit with the guard and crossover wires, substantially as described.

5. In a system of signaling for electric and other railways, the combination of, the terminals of two branches of a line-circuit, an electromagnetic signaling device interposed in one of said branches, and a magneto-machine having its sidewise-movable wheel interposed between said terminals and adapted to contact with one of said terminals to receive current through the signaling device from line and with the other of said terminals to send current to line without traversing said signaling device, substantially as described.

6. In a system of signaling for electric and other railways the combination of, a line-circuit, a magneto-machine having a tubular shaft, an electromagnetic signaling device, and a rod mounted in said shaft and adapted to extend into range of a key or crank and to reset said signaling device, substantially as described.

7. In a system of signaling for electric and other railways, the combination of the terminals of two branches of a line-circuit, a housing provided with a keyhole, an electromagnetic signaling device interposed in one of said branches, a magneto-machine having its sidewise-movable wheel interposed between said terminals and adapted to receive current through the signaling device from line and to send current to line without traversing the signaling device, and a washer mounted so as to slide on the shaft of the magneto-machine and adapted to normally close the keyhole, substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

FREDERICK C. TIMPSON.
RANSOM F. RANKIN.

Witnesses:

A. B. STOUGHTON,
K. M. GILLIGAN.