

(No Model.)

L. H. McCULLOUGH.
FIRE TELEGRAPH SYSTEM.

No. 316,474.

Patented Apr. 28, 1885.

Fig. 1.

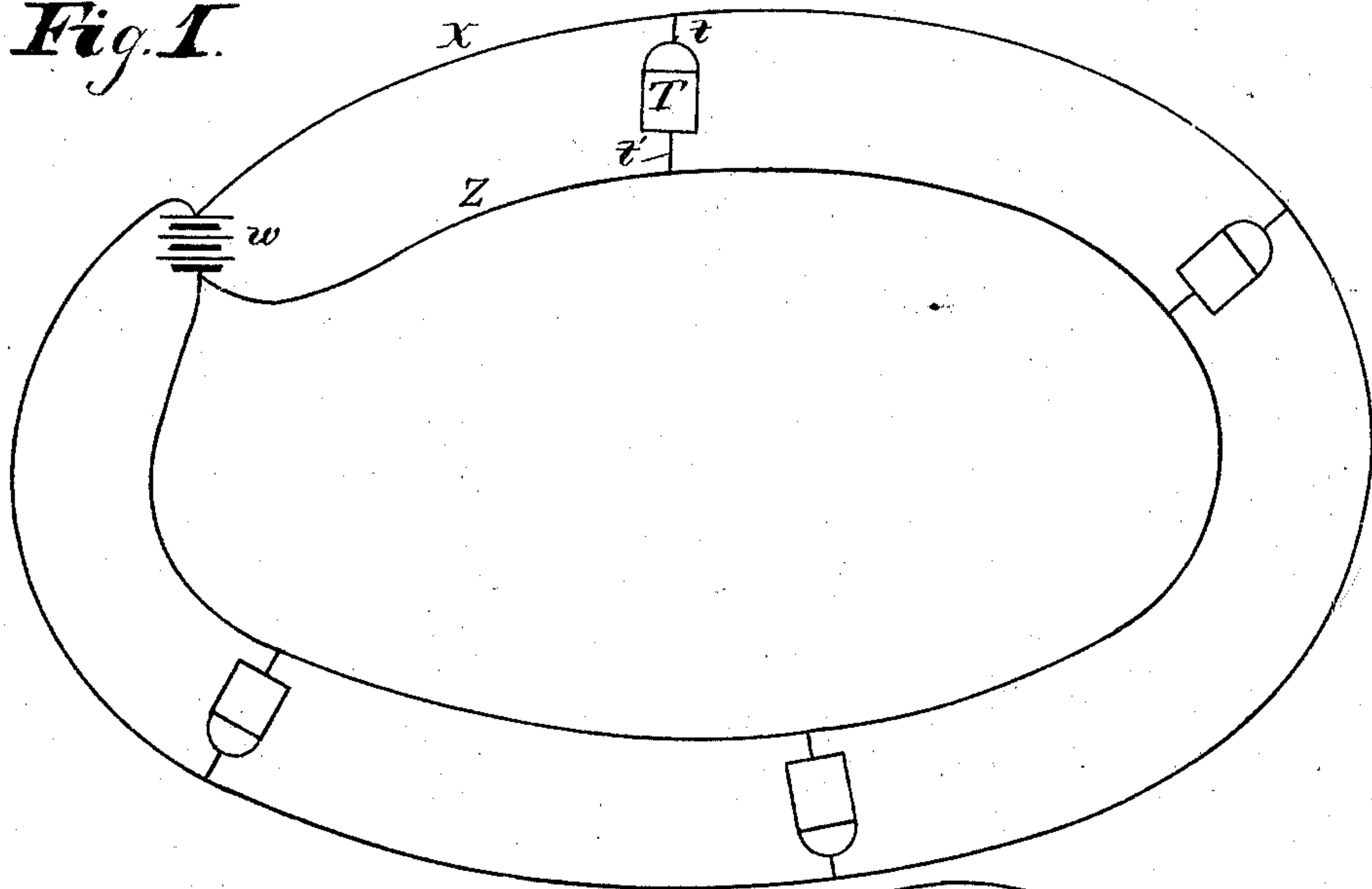
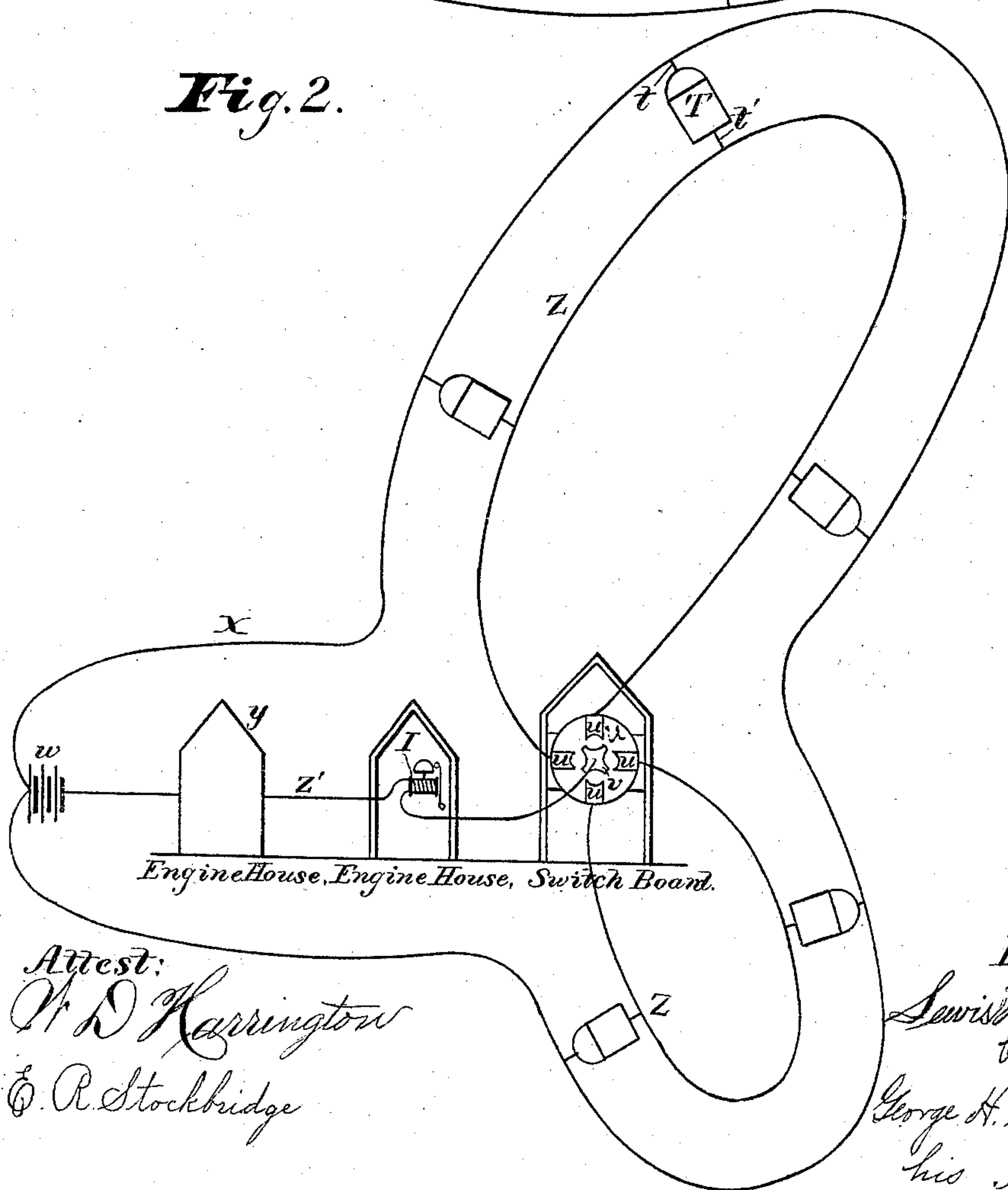


Fig. 2.



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UNITED STATES PATENT OFFICE.

LEWIS H. McCULLOUGH, OF RICHMOND, INDIANA, ASSIGNOR TO THE RICHMOND FIRE ALARM COMPANY, OF SAME PLACE.

FIRE-TELEGRAPH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 316,474, dated April 28, 1885.

Application filed July 31, 1884. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. McCULLOUGH, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Fire-Telegraph Systems; and I do hereby 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.

My invention relates to fire-telegraph systems; and it consists of improvements in the arrangement of fire-telegraph circuits whereby certain serious defects in the existing systems are obviated.

It is well known that in cities and villages—that is, in those places where fire-alarm telegraph systems are most likely to be used—telephone, telegraph, and other wires in large numbers are suspended in close proximity to one another, and that it is not uncommon for one of them to fall upon or be blown against another. This usually results in a derangement of one or both the systems to which the wires belong, which derangement is more or less complete according to the character of the circuits employed. Besides this, other frequent causes of disturbance are the falling of loose wires across both wires of a loop and actual breaks in the line-wires.

In most of the fire-telegraph systems now in use the circuit employed is a closed metallic circuit. I am aware, however, that an open earth-circuit has been used, and also a closed earth-circuit. Now, in case of an actual break in the line either of these circuits becomes inoperative, the first wholly so, and the last two as to all the signal-boxes beyond the point of rupture. Moreover, in the common closed metallic-circuit system, if electric connection is made between the sides of a loop by a wire falling across it, or in any other way, all the boxes beyond are cut out and no notice thereof is given. A defect of the open earth-circuit, besides the one already mentioned, is that the contact of its wire with a telephone or telegraph wire has the effect of shutting out all the signal-boxes between the point of contact and ground.

I employ an open metallic circuit, and in

practice I arrange my signal-boxes in multiple relation to one another by making a "half-connection" to every box from each of two wires, one of which runs from the positive pole of the battery back to the same pole again, and the other of which runs similarly from and back to the negative pole of the battery. A circuit-maker in each box makes the necessary closures of the circuit when an alarm is sent in. By this arrangement it is effected that a signal will be made, even though the line should be broken or otherwise defective at a single point between two stations, and in case of two or more defects in the line only that box or those boxes will be cut out which lie between the extreme defective points. Moreover, an accidental ground caused by contact with a telephone or telegraph wire or otherwise will have no effect whatever on my apparatus, while in case of a crossing of a loop, as above described, one stroke of the gongs at the different engine-houses will give notice of the disturbance, and measures can be taken to remove its cause.

The arrangement of the circuits will be more clearly understood by reference to the accompanying drawings, in which—

Figure 1 shows schematically my arrangement of circuits, and Fig. 2 illustrates the same as applied to a city system.

Fig. 1 shows the arrangement of the signal-boxes and the circuits, and needs no special description. Referring to Fig. 2, from one pole of the battery W, I lead a wire, Z', through a series of engine-houses, F, to one terminal of a switch-board, U. This switch-board is located in the last engine-house, and I have represented it in the drawings as a plug switch-board, though I may use a switch-board of any variety. I run out a loop or loops, Z, from the switch-board to different parts of the city or village, and when the switch-board is properly plugged the loop or loops will be electrically connected with one pole of the battery. I make a half-connection from each loop to the nearest signal-box, T, and I run from the other pole of the battery a wire, X, in the vicinity of all the boxes back to the pole from which it started, and make other half-connections from different points in this wire to the different signal-boxes. The circuit of any

given box is normally open, and remains so until its circuit-closer is operated, whereupon the signaling mechanism operates to sound a definite signal on gongs located in the different engine-houses.

If it should be found more desirable for any reason, I might run two or more wires X in different circuits out from and back to the same pole of the battery.

It is obvious that a single break in either of the loops Z, or in the wire X, or in each, would not interfere with the operation of the signaling apparatus; nor would two or more breaks occurring between any two successive boxes, but two or more breaks on opposite sides of a box or boxes would cut out the box or boxes between the extreme breaks and only that box or those boxes. Other defects in the circuit equivalent to breaks would of course operate with the same results.

I have shown engine-houses between the battery and the switch-board. Besides or instead of engine-houses I may have bell-towers, and in any case the wire Z' leads to the gong or bell magnet, and passes through without break in the circuit.

The comparative size of the switch-board U is exaggerated in the drawings to show the parts more clearly.

The cross-wires *t t'* are represented in the drawings as entering one at the top and the other at the bottom of the boxes T. This is done merely for convenience of illustration, as in practice they both enter at the top.

The term "signal-box" is employed in this specification to signify a circuit-closing apparatus capable, when operated, of sending a definite signal over the line. The advantages of my system are not confined, however, to circuits in which signal-boxes and gong or bell magnets are respectively the transmitters and receivers; but they would be equally great if any other variety of circuit-closers and receiving apparatus were employed.

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

1. In a signaling system, an open metallic

circuit, two or more circuit-closers in the same, each connected in two directions with each pole of the generator, and receiving apparatus at one or more stations for receiving the signal when any one of the circuit-closers is operated, substantially as set forth.

2. In combination with electric-circuit conductors, one running from each pole of a generator back to the same pole, two or more circuit-closers arranged in multiple-arc relation between the said conductors, and apparatus at one or more stations for receiving the signal when any one of the circuit-closers is operated, substantially as set forth.

3. In combination with a loop or loops connected at each end with one pole of a generator, a loop connected at each end to the opposite pole of the generator, circuit-closers arranged in multiple arc between loops which are connected to opposite poles, and apparatus at one or more stations for receiving the signal when any one of the circuit-closers is operated, substantially as set forth.

4. In a signaling system, an open metallic circuit, two or more signal-boxes in the same, each connected in two directions with each pole of the battery, and one or more gongs for receiving the box-signals.

5. In combination with electric circuit-wires, one running from each pole of the battery back to the same pole, two or more signal-boxes arranged in multiple-arc relation between the said wires, and one or more gongs or bells for receiving the box-signals.

6. In combination with a loop or loops connected at each end with one pole of a battery, a loop connected at each end to the opposite pole of the battery, signal-boxes arranged in multiple arc between loops which are connected to opposite poles, and one or more gongs or bells for receiving the box-signals.

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

L. H. McCULLOUGH.

Witnesses:

GEO. H. STOCKBRIDGE,
M. P. CALLAN.