

(No Model.)

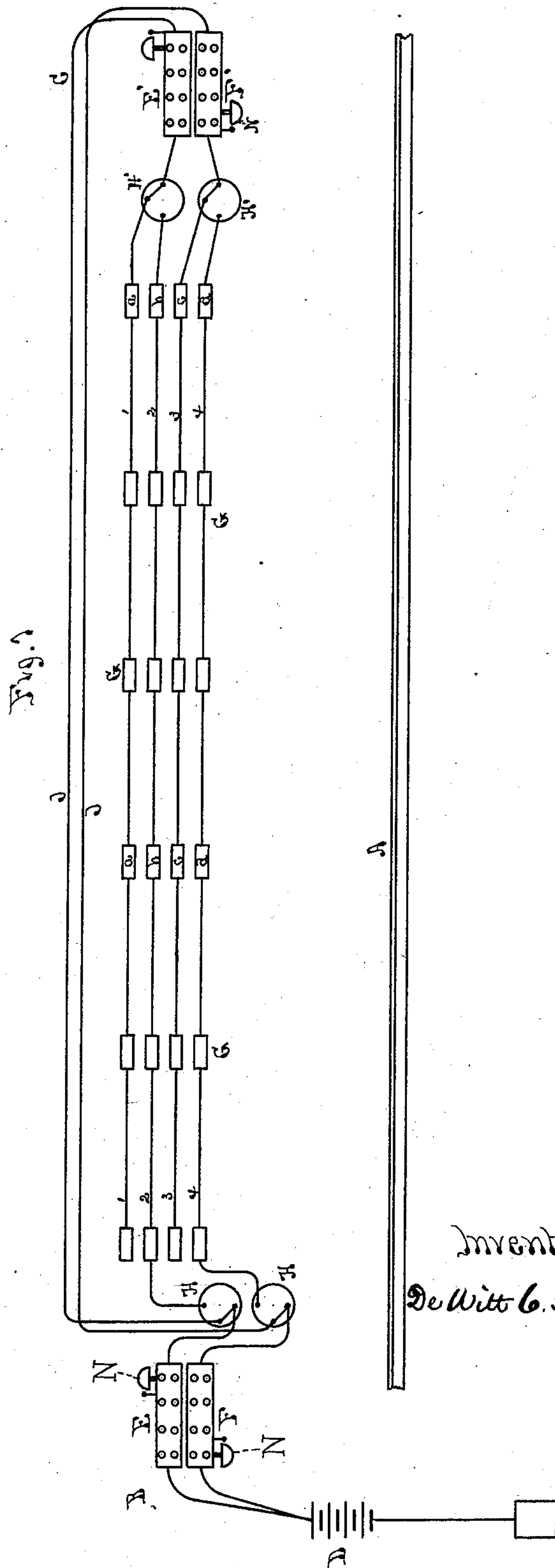
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DE WITT C. FARRINGTON.

ELECTRIC RAILWAY SIGNAL.

No. 279,929.

Patented June 26, 1883.



Witnesses

*Wm. D. Brown*  
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Inventor

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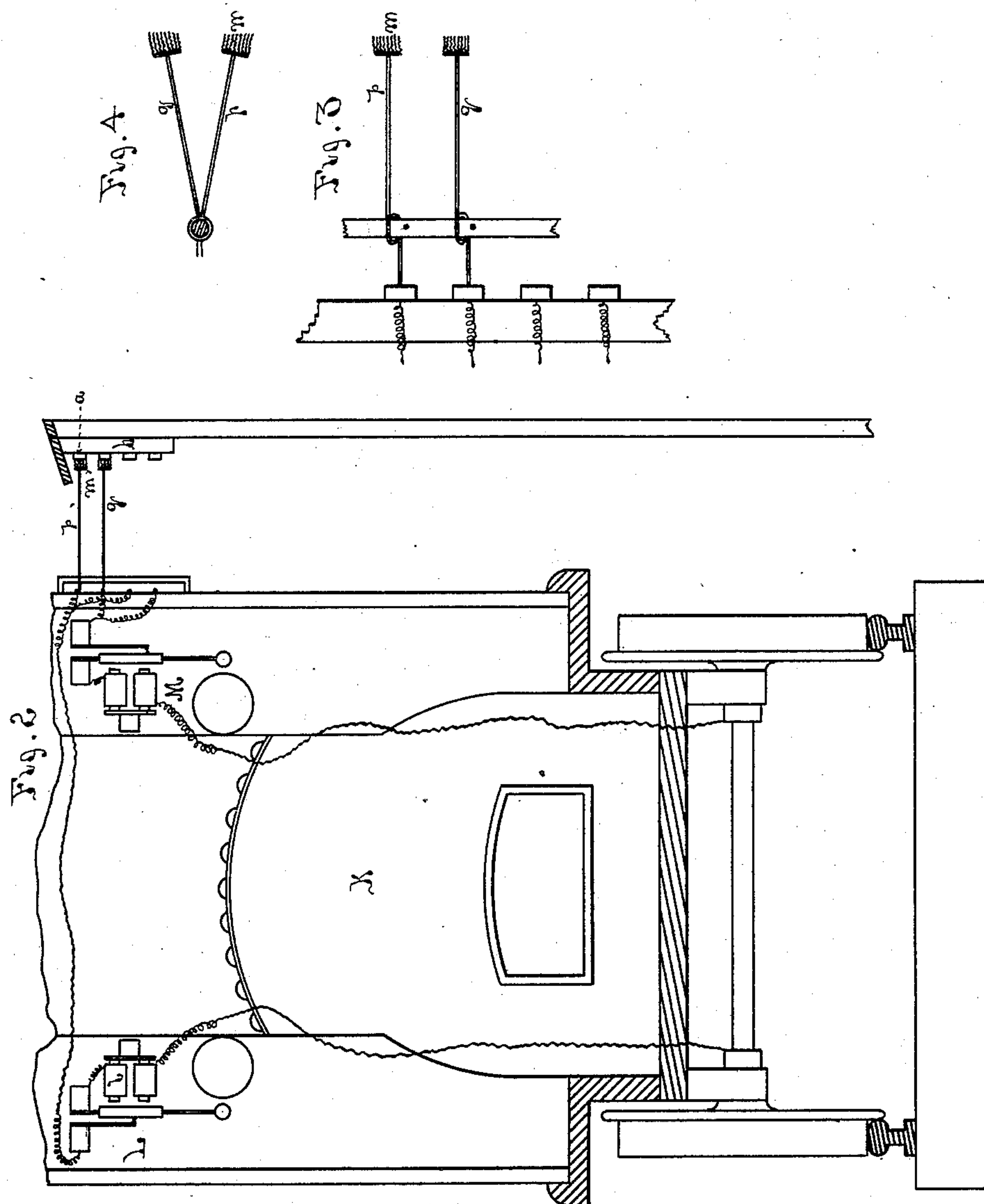
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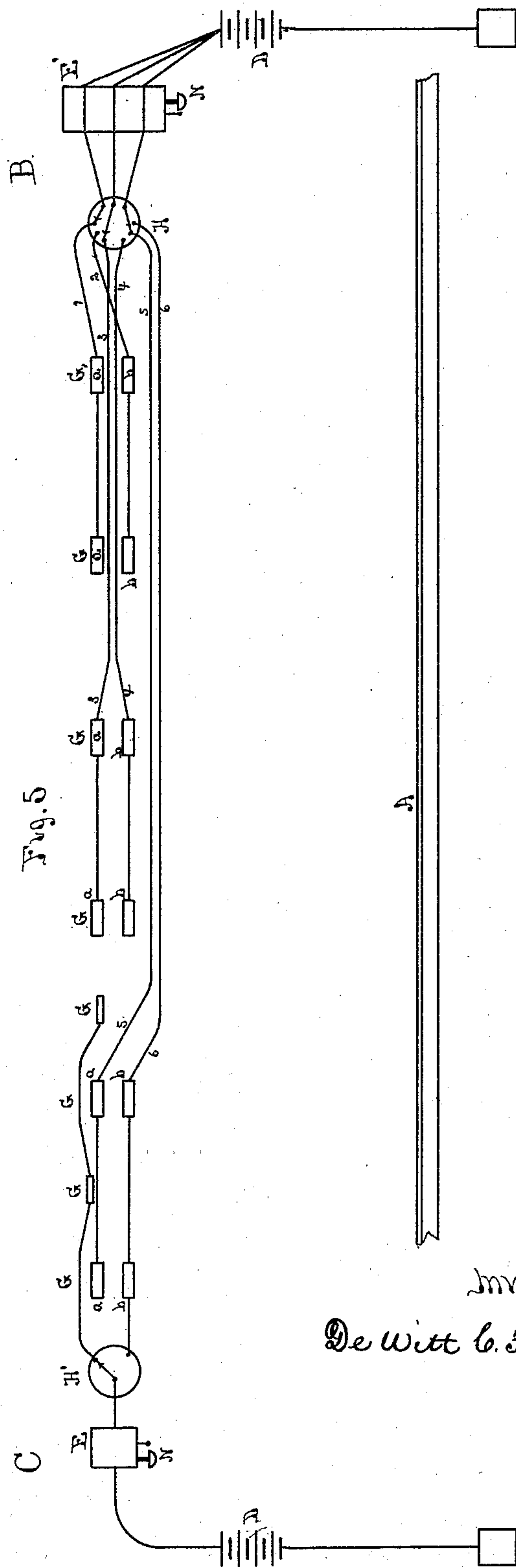


Fig. 5

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# UNITED STATES PATENT OFFICE.

DE WITT C. FARRINGTON, OF LOWELL, MASSACHUSETTS.

## ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 279,929, dated June 26, 1883.

Application filed June 5, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, DE WITT C. FARRINGTON, of the city of Lowell, county of Middlesex, and State of Massachusetts, have invented a new and useful Improvement in Electric Railroad-Signals, of which the following is a specification.

My invention relates to electric signals on railways; and its objects are to provide a system of signals by which the engineer in charge of each engine going over the road will at regular recurring intervals know that he is in communication with the stations along the line, and to know whether, in the judgment of the persons attending such stations, the line is unobstructed or danger is to be apprehended; to enable the station-masters to know the whereabouts of each engine at all times, and to signal to the engineer at regular intervals whether the line is unobstructed or occupied by other trains and great caution required; to indicate to the engineer when on a moving train whether switches or draw-bridges are open or closed, and to enable the engineer of any engine to signal or communicate with the station-masters of the stations near him from any point along the line or with any other train on the section. I accomplish these objects by the mechanism shown in the accompanying drawings, in which—

Figure 1 is a view of a section of track with station and intermediate mechanism. Fig. 2 is a rear view of a locomotive-cab, with the alarm mechanism carried by the engine. Figs. 3 and 4 are details. Fig. 5 is a modification of Fig. 1.

A is a section of track between the stations B and C.

D is a battery placed at station B.

E is an annunciator of any of the well-known kinds, which drop consecutively the different indicators by separate successive electric impulses. E' is another similar annunciator placed at station C. F and F' are annunciators similar to E and E'.

G G are targets placed at certain known distances apart along the side of the track—say one mile apart. Each of these targets is provided with four parallel strips of metal, which are placed parallel with the line of the rails. These strips are insulated from one another, and each is connected with its corre-

sponding one throughout the line A, between the stations B and C, the upper strips, *a a*, being connected by the wires 1 1; the next, *b b*, by the wires 2 2; *c c*, by wires 3 3, and *d d* by wires 4 4, each terminal one being also connected by similar-numbered wire with the switch-board at the end stations.

H H are switch-boards at station B, by which either of the lines 1, 2, 3, or 4 can be connected with the battery.

H' H' are switch-boards at station C, by which the circuit through main lines J J can be made to connect with either of the lines, either through annunciator E' to lines 1 and 2, or through annunciator F' to lines 3 or 4. Between the stations these wires are all carried on poles *k k* in the usual manner.

N is the bell of the annunciator.

In Fig. 2, K is the cab; L, an alarm-bell, placed near the engineer, as shown in the drawings. It is of the kind which continues to operate while the electric current is passing over the line which passes through its electro-magnet *l*, one part of such line being connected through the frame-work of the engine with the track, and the other connected to a brush, *m*, carried by the spring-arm *p*, which brush comes into contact with the strip *a* of the targets. M is another bell or gong of a different tone from L, which also sounds when the circuit is made through its electro-magnet. The circuit passing through the electro-magnet of gong M is made through a metallic brush carried by the arm *q*, which brush comes in contact with strip *b* of the targets, as seen in the drawings. The arms *p* and *q* may, however, be lowered upon their pivoted post, so that the brushes they carry will come into contact with strips *c* and *d*, respectively, instead of *a* and *b*.

The operation of my device may be thus described: A locomotive passing from station B toward station C will bring the brushes carried upon its arms *p* and *q* into contact with the strips or plates *a* and *b* of each target as it passes it, and, the section A being clear for the passage of the train, the station-master leaves the line 1 in connection with the battery, when the circuit will be complete from the battery D through annunciator E, line J, annunciator E', line 1, plates *a*, arm *p*, electro-magnet *l* to the track and ground, when the brush carried



by arm  $p$  is in contact with the plate  $a$ , thus ringing the gong  $L$  while passing the target. At the same time the indicator or drop of the annunciators  $E$  and  $E'$ , will be dropped, so as to show that the train has passed the first target. When the locomotive reaches the second target, the circuit will again be complete, and the gong again sounded, and indicator changed to show that the engine has passed the second target. This will be repeated, so long as line 1 is in electrical connection with the battery, until the engine passes off the section at  $C$ . During all the time the train is on the section the station-master at either station can readily determine the progress of the train by reference to the annunciator, and if from any accident it is stopped he can tell where it is to be found, while the engineer is informed by the striking of the gong  $L$  as he passes the targets that all is clear and that the circuit is complete through both stations. If, from any cause, it becomes necessary to warn the engineer of any danger ahead, either station-master can do so by shifting his switch so as to bring line 2 into circuit instead of line 1. Then when the engine passes the next target the circuit will be completed through arm  $q$ , electro-magnet of bell  $M$ , and the frame of engine and track to ground, and gong  $M$  will be struck. As this gong is loud and different in tone from  $L$ , its striking will instantly inform the engineer of danger and warn him that he must proceed with caution. If at any time on passing a target neither of the gongs are sounded, the engineer is informed that the circuit is not complete, and consequently that he must proceed with caution, as he has no communication with either station. If after one engine and train has left station  $B$  another be dispatched going in the same direction, the arms  $p$  and  $q$  on the engine of the following train are lowered so that the brushes they carry will be on the level of the two lower strips on the targets  $c$  and  $d$ , and the key of the switch at the station so placed as to bring line 3 into circuit. As this engine passes the targets the annunciator  $F$  will indicate the position of this train, and the station-master can see what approach it is making to the train ahead of it, and the safety-gong will be sounded on the engine as it passes each target. If at any time this train gets so near to the one in advance of it that there may be danger of its overtaking it, which can always be determined by a glance at the annunciators, the station-master sets the key of his switch so that line 4 will be in circuit with the battery when the danger-gong on the second engine will be sounded as that engine passes the next target, and the engineer will be warned to proceed with caution. If for any reason it becomes desirable to prevent the rapid approach of a train to the station, the station-master at station  $B$  can do so by connecting line 2 or 4 with the circuit, so that the danger-gong on any approaching engine will be sounded and the engineer warned of danger. If, instead of the two trains going in

the same direction, it be supposed that it be a single track on which trains are approaching, it becomes no more difficult to inform the engineers of their proximity to one another, the arrangement and operation of the devices being substantially the same, only such changes being required as would readily suggest themselves to any person familiar with the system as explained.

Similar targets on a separate circuit can be placed at proper distances from switches or draw-bridges, and the shifting of the switch or bridge can be made to connect the line extending to either the strip or plate which will sound the safety-gong, or the one that will sound the danger-signal, according as they be closed or opened. A similar independent target can be used to ring a gong or operate a semaphore to give warning of the approach of a train at a crossing.

To enable an engineer to communicate with the station-masters from any point along the line, I provide a metal chain or wire having a hook at one end, which can be thrown over the line  $J$ , when by touching the end held in the hand to either arm  $p$  or  $q$  the gong  $L$  or  $M$  may be struck, and by a prearranged code of signals communication can be had with the stations.

Instead of using a gong to sound the danger-alarm on the engine, a semaphore or whistle may be used.

By this system it will be observed the use of machinery not under the immediate supervision and eye of either the engineer or station-master is avoided, and a failure of a gong to strike as the engine passes a target will always warn the engineer that he is to use extra caution, as the circuit between him and the stations has been broken. For this reason the use of a battery at the station is preferable to the use of one on the engine, as no grounding of the wire along the line can deceive the engineer, as would be the case if the battery were carried upon the engine.

In the modification shown in Fig. 5 the targets along the section are connected in sets, those over the first part of the section forming one set, whose danger and safety plates are each connected by separate lines with the station at the end of the line, and the next targets farther out on the section forms the next set, which are connected with the station by separate wires not passing through the first set of target-plates. There may be any number of such sets; but ordinarily three will be sufficient on any one section. By this construction separate trains on different parts of the line can separately indicate their position at the station which they have passed, using targets having only two strips each, and as many trains as there are sets of connected targets can be operated on the section at one time. The engineer can, by means of his wire or chain, signal the station by making and breaking contact with the rails, and can signal an approaching train by making electrical con-



nection between the danger and safety wires between the targets at any place. The brush carried by the engine which sounds the gong warning the engineer of danger is carried slightly in advance of the one sounding the gong indicating safety, so that if the two wires be connected at any place along the line, the first sound made by either gong will be by the danger-gong.

10 What I claim as new and of my invention is—

1. The combination of a target having strips placed parallel to the track and one another, with two alarm-bells of different tones placed on an engine, one of which is brought into an electric circuit by its metallic connection coming into contact with one strip of the target or the other by having its metallic connection brought into contact with another strip of the target, substantially as described.

20 2. The combination of two separate electric bells of different tones, each provided with an electric connection, with separate brushes carried by an arm on the locomotive, and with the ground through the track, with targets provided with separate insulated plates, connected with separate lines and adapted to be put into electric circuit by the station-master at the end of the section, substantially as described.

25 3. The combination of a target provided with separate parallel contact-strips connected with separate lines, with a return-line, J, and suitable connecting mechanism therewith, substantially as shown, whereby each target-line can be put into an electric circuit which passes through the stations at both ends of the target-line, substantially as described.

4. The combination of the line J and the lines 1 2, each of which is provided with target-plates placed parallel to the track and insulated from the others, with the battery D and switch H', adapted to connect the line J with either of the target-lines, substantially as described.

5. The combination of the lines J J, extending through the annunciators at stations B and C, and the lines 1 2 3 4, provided with targets placed at intervals along the track A, each adapted to be placed in electrical connection with line J, with a locomotive provided with the arms *p* and *q* and gongs L and M, each placed in metallic connection with a brush carried by one of the arms and the ground, and each adapted to receive the electric current from the target-plates of one of the lines, substantially as described.

6. The combination of targets provided with separate plates placed along the section and connected by separate wires, with two electric gongs placed on a locomotive, provided with arms extending out sufficiently to come into contact with the plates upon the targets, one of which arms is slightly in advance of the other, and adapted, when both plates are in the same electric circuit at the same time, to begin to sound, one before the other, substantially as described.

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Witnesses:

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