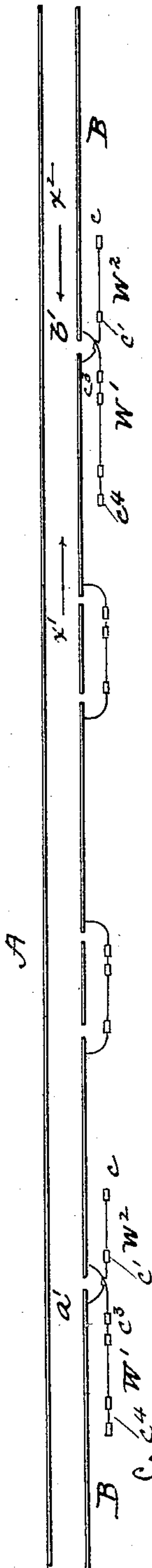
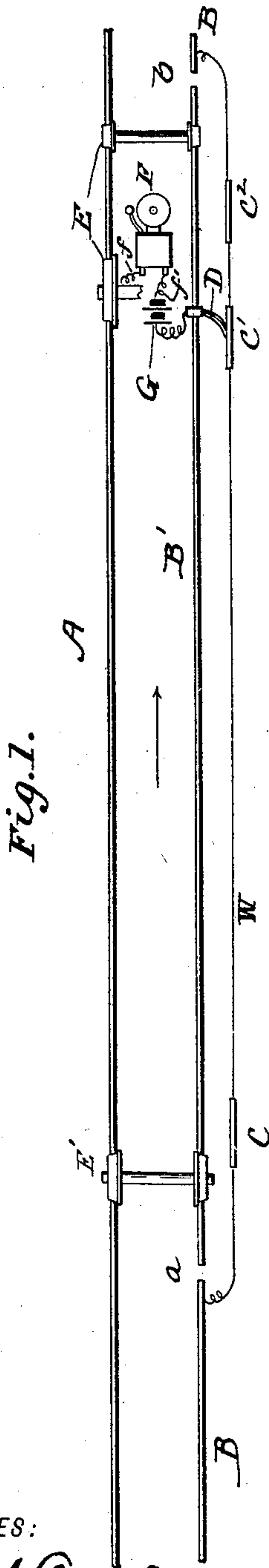


(No Model.)

S. J. DOUCET.
AUTOMATIC RAILWAY SIGNALING APPARATUS.

No. 452,072.

Patented May 12, 1891.



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AUTOMATIC RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 452,072, dated May 12, 1891.

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To all whom it may concern:

Be it known that I, STANISLAUS J. DOUCET, a subject of the Queen of Great Britain, and a resident of Shippegan, New Brunswick, Canada, have invented certain new and useful Improvements in Automatic Railway Signaling Apparatus, of which the following is a specification.

Heretofore railway signaling apparatus has been devised in which the signaling devices are included in an electric circuit formed by sections of the railway-track; and my invention refers particularly to this class of devices, my object being to provide improved apparatus whereby the engineer or other person on a moving train will be notified if another train is on the same track, ahead or behind, within an unsafe distance. To attain this object I divide the track into sections of convenient length, and at different points along each such section (say a mile apart) I disconnect or insulate a portion of one rail for a certain length greater than the length of the longest trains used. To distinguish herein between sections I term the first-mentioned the "track-section" and the latter or one-rail section the "insulated rail or portion." The opposite rail is electrically continuous the whole length of the track-section, and the abutting rails at each end of the insulating portions are connected by a wire, so that the wire and not the insulated portion will convey the electric current at such portions of the track. At suitable points this wire, which may be strung on poles, is connected with contact-plates or equivalent devices, which are fixed in a suitable location to receive contact by a wire brush or its equivalent carried by a locomotive, (one on each side.) The wire brush is insulated from the locomotive and is connected with an electric alarm in the engine-cab, the alarm apparatus being in electrical connection with the wheels and axles of the train.

My invention consists in the construction and combination of parts as hereinafter described and claimed.

In the drawings which accompany and form part of this specification, Figure 1 is a plan view showing as much as is necessary to illustrate my invention; and Fig. 2 is a similar view, on a reduced scale, of the same ar-

rangements of contact-plates and connecting-wires, and illustrating also at each end of the figure a somewhat different arrangement that may be used in connection with the system claimed.

Referring first to Fig. 1, A indicates the electrically-continuous rail of a track-section, and B the divided rail having the insulated portion B', which should be of such length that all the wheels on one side of the longest train that may be used may rest at one time on said portion. At *a* and *b* the points of insulation are indicated.

W indicates a wire connecting the ends of the divided rail beyond the ends of the insulated rail, and C C' C² indicate the contact-plates connected with wire W and fixed in a position where a brush D or its equivalent projecting from some part of the engine may make contact therewith. The wire may be strung on poles at one side of the track, or it might be an insulated wire laid between the rails, with the contact-plates projecting upward to be touched by a brush extending downward from the engine.

The wheels of the locomotive are indicated at E, while E' represents the last wheels of the train.

F indicates an ordinary electric alarm, preferably placed in the cab of an engine and connected by wire *f* with the axle of the engine and by wire *f'* with a battery G and brush D, the latter being insulated from the engine.

Supposing that a train is either standing in the position indicated by the wheels in Fig. 1 or has reached that position while passing in the direction of the arrow *x*, if there is no train elsewhere on the same track-section, no alarm will be rung, for the reason that there is no connection from one rail of the track to the other except through the wheels and axles of train indicated in the figure, and the rail portion B', on which all the wheels on one side of the train are resting, is completely insulated; but if there is another train elsewhere on the section the circuit will be complete when the brush rests on contact-plate C'. This fact is demonstrated by the following: Suppose the train in moving reaches the point where the brush passes over plate C. An alarm would then be rung

because some of the rear wheels and their axles connect the two rails A and B; but this is not a danger-signal, for the reason that it is expected at this point; but if the double
5 alarm is rung when the brush passes over plates C' and C^2 the engineer, knowing that all the wheels of his own train are between points a and b and therefore not in position to complete the circuit, is warned that an-
10 other train is on his track-section.

The object of having one contact-plate at one end of the insulated section and two at the other is twofold. It is to be understood that this arrangement is the same through-
15 out the length of the road. Now for all trains passing in the direction of arrow x the single ring, if not followed by the double alarm, shows that the system is in working order, and also that no other train is on that
20 track-section; but when trains are moved in the opposite direction the engineer knows that a doubling is one of "safety" unless followed by a single one, which is then the danger-signal. This arrangement of single and
25 double contact-plates prevents mistaking the signal given at one end of the wire for that given at the nearest end of the wire in the next sub-section reached by the train. Of course the arrangement could be varied some-
30 what or duplicated in any sub-section or insulated portion, so as to cause a repetition of the danger-signal, it being, however, desirable that there shall be a difference between the number at one end of wire W and those
35 at the other end, for the purposes above described.

At an increased expense, chiefly in the amount of wire used, an improved apparatus or construction possessing some advantages
40 over the foregoing and in addition thereto may be employed, and in Fig. 2 I illustrate the same. As indicated in said figure, I divide the rail B into sections of convenient length, as indicated at $a' b'$, and at these
45 points I extend wires $W' W^2$ forward and back, crossing each other, as shown. At the end of wire W^2 , I connect a contact-plate c , and near the crossing-point I connect another contact-plate c' . The wire W' is simi-
50 larly provided with two contact-plates c^3 at its end and c^4 near the crossing-point. Between points a' and b' I show two sub-sections, the same as that shown in Fig. 1, and in Fig. 2 the distance from a' to b' may be supposed
55 to be three miles, while the intermediate sub-sections are one mile apart from each other and from points a' and b' . By this arrangement the maximum and minimum interval of space within which danger-signals will be
60 given and received by moving trains is determined beforehand and may be of any desired extent and with but very little more wire than for the arrangement previously described. All the wires $W' W^2$ should be at least half a
65 mile long, so that two trains moving at points and in the direction of arrows $x' x^2$ would receive timely warning of danger.

By having two sub-sections between points $a' b'$ in every section indicated by said points collisions are impossible, for if one train is
70 on the section $a' b'$ and another enters it one or the other will receive a danger-signal in time, and the half-mile wires W' and W^2 prevent the danger of collision at either point a' or b' , while by having these insulated
75 points $a' b'$ and the crossing wires W' and W^2 no danger-signal will be given when another train is at a safe distance away on another main section.

The distance between plates c and c' and
80 between plates c^3 and c^4 being about half a mile, it will therefore be understood that trains cannot be within half a mile of each other without a signal being given. For instance, if a train be anywhere on the track
85 with which wire W^2 is in connection, then if another train causes contact at c^4 a danger-signal will be given, and, owing to the difference in the number of contact-plates of
90 wires W' and W^2 , the engineer of the train whose brush makes contact will know if a signal is received, whether the train causing it is in front or behind him.

Having now described my invention, what I claim is—

1. In a railway-signal apparatus, the combination, with one electrically-continuous rail and the other having a section insulated, of a series of contact-plates connected together and its opposite ends connected to the rail at
100 each end of the insulated section, whereby an electric alarm carried by a train and having a contact-brush adapted to make contact with the said plates may have its circuit completed, substantially as described.

2. In a railway-signal apparatus, the combination, with one electrically-continuous rail and the other having an insulated section, of a wire connecting the ends of the rail beyond the insulated section and a series of
110 contact-plates differing in number connected to the wire near each end thereof, substantially as described.

3. In a railway-signal apparatus, the combination, with one electrically-continuous
115 rail and the other rail having sections insulated, of a series of contact-plates located in proximity to the track and electrically connected together and to different insulated rail-sections, said contact-plates differing in number in different locations and all located in
120 the same line parallel with the rails, whereby a contact-brush carried by a train having suitable alarm apparatus and connections will cause a signal to indicate the direction of
125 danger.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

STANISLAUS J. DOUCET.

Witnesses:

THOMAS AHIER,
U. C. TRJDEL.