

906,582.

C. D. TISDALE, DEC'D.
F. L. TISDALE, ADMINISTRATOR.
AUTOMATIC TRAIN STOPPER.
APPLICATION FILED MAY 16, 1907.

Patented Dec. 15, 1908.
2 SHEETS—SHEET 1.

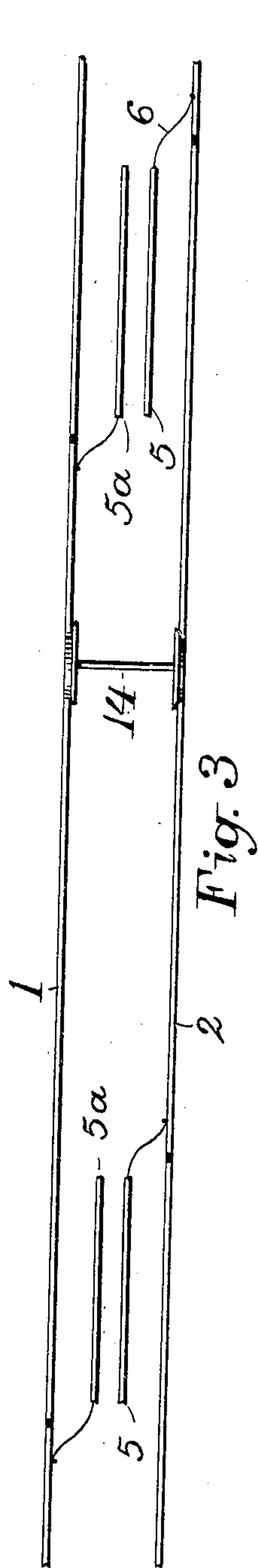


Fig. 3

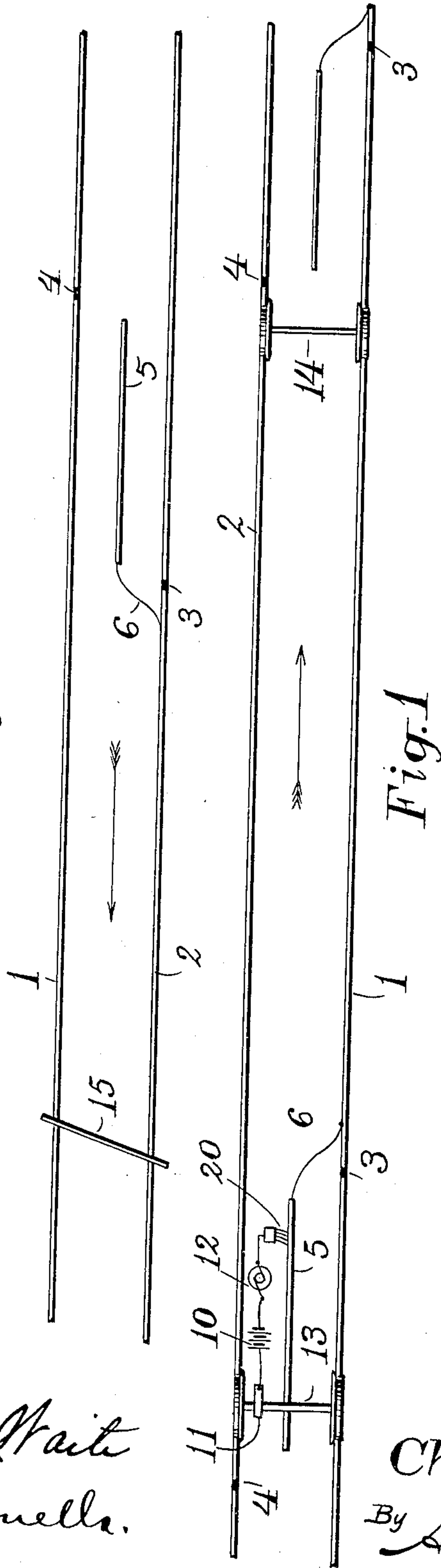


Fig. 1

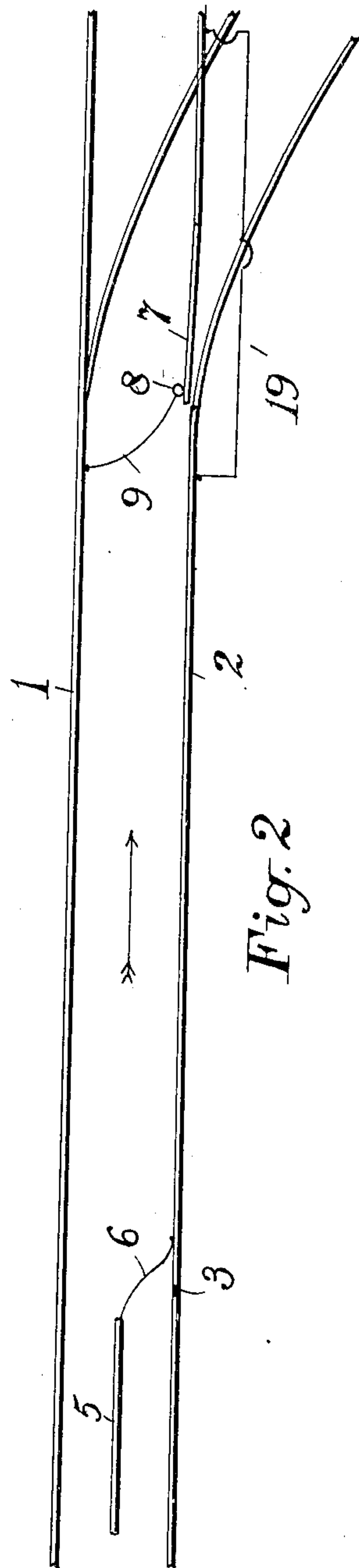


Fig. 2

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Inventor,
Charles D. Tisdale;
By A. B. Gham,
His Attorney.

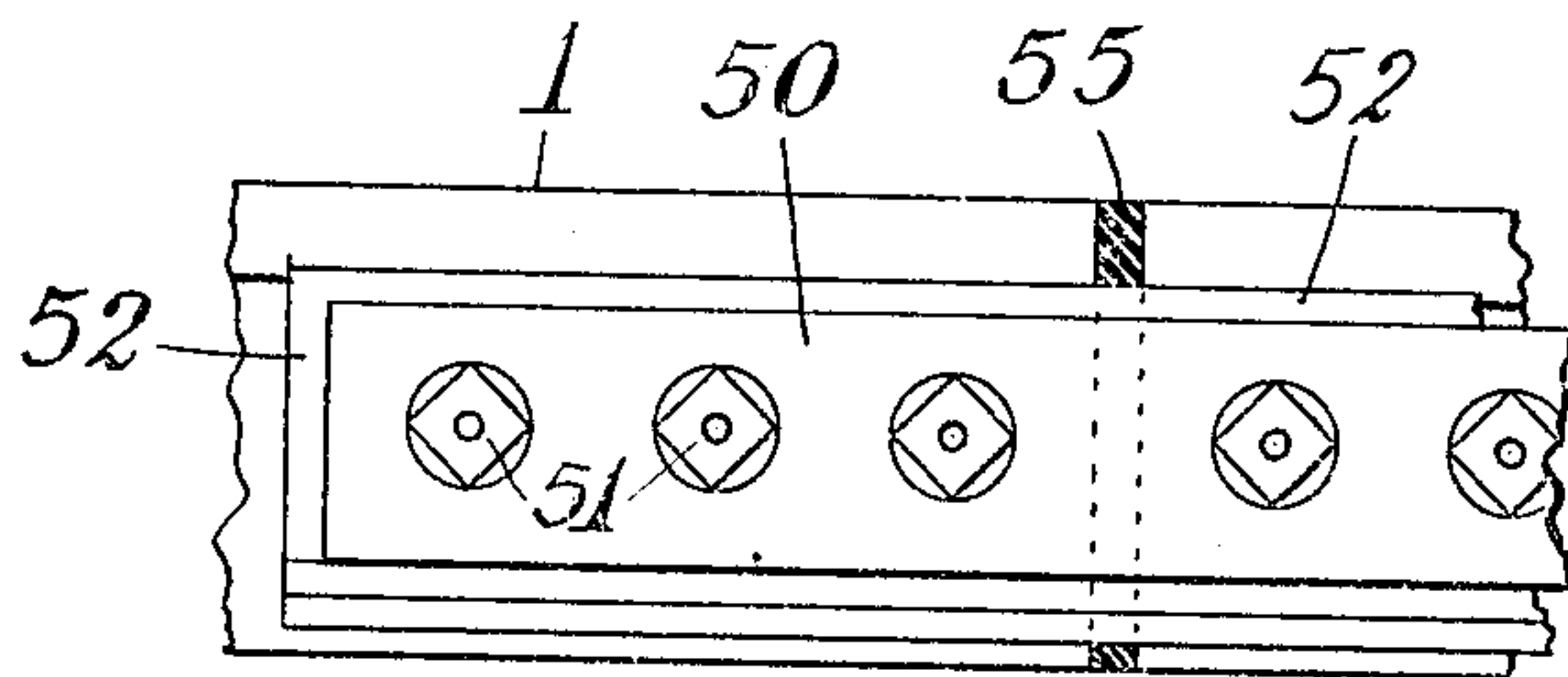
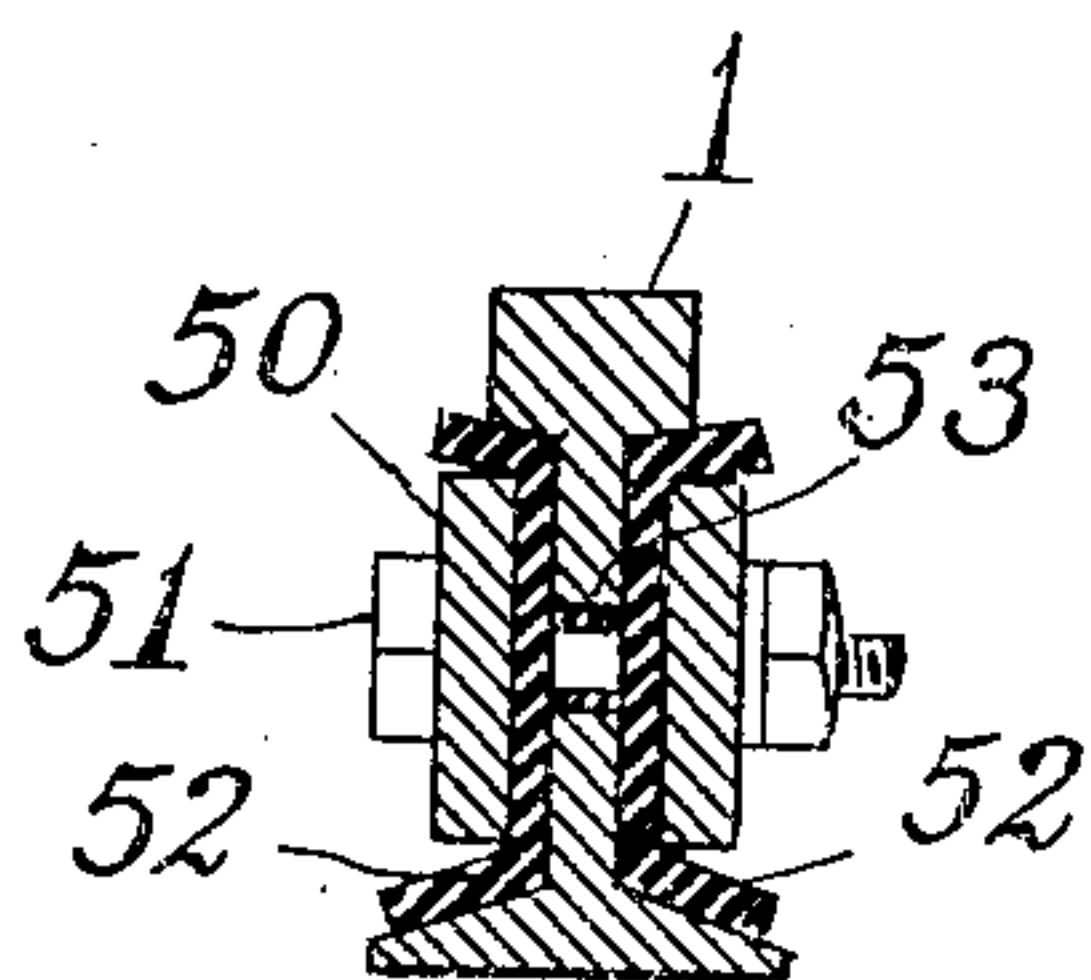
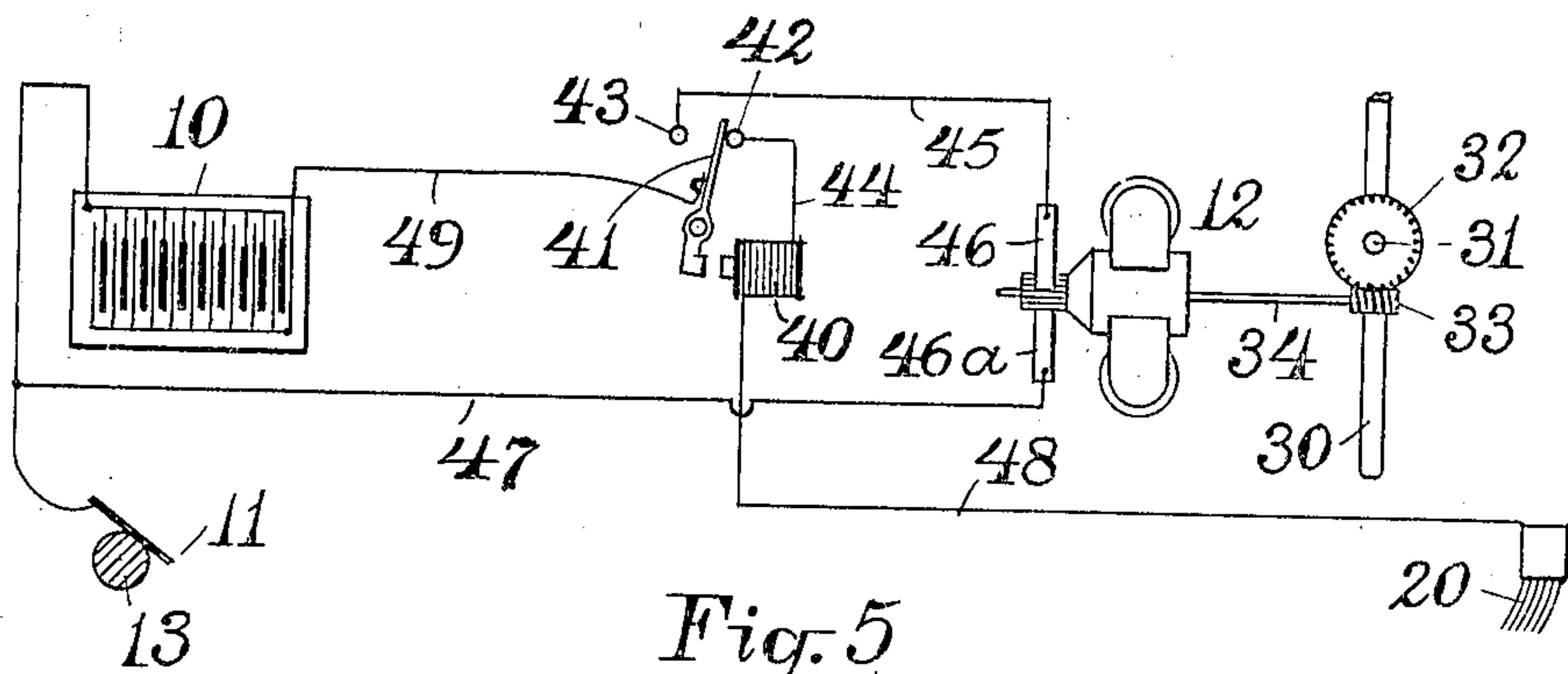
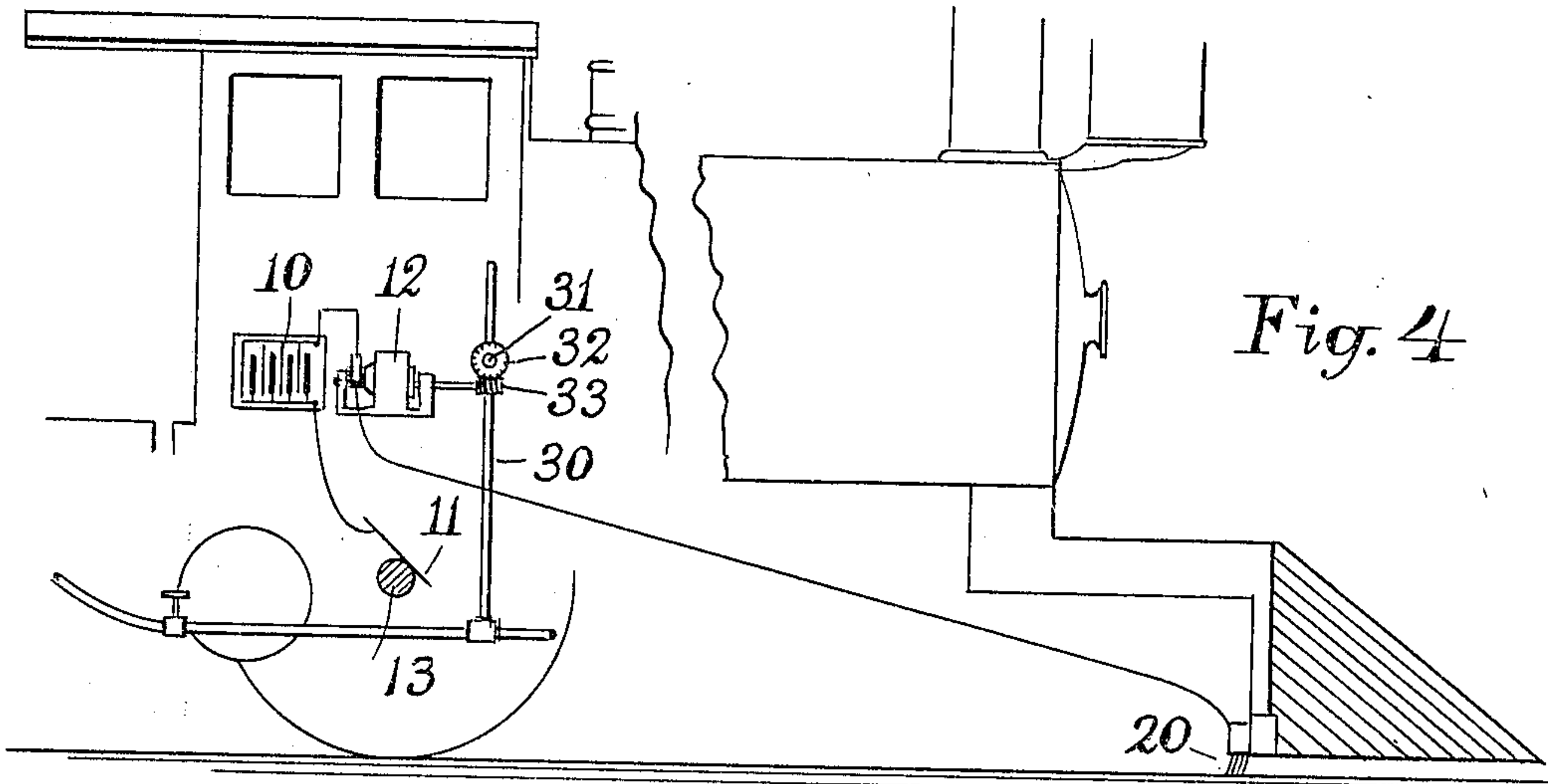
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2 SHEETS—SHEET 2.



Attest;
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Fig. 7
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His Attorney.

UNITED STATES PATENT OFFICE.

CHARLES D. TISDALE, OF RANDOLPH, MASSACHUSETTS; FRANK L. TISDALE ADMINISTRATOR OF SAID CHARLES D. TISDALE, DECEASED.

AUTOMATIC TRAIN-STOPPER.

No. 906,582.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed May 16, 1907. Serial No. 374,007.

To all whom it may concern:

Be it known that I, CHARLES D. TISDALE, a citizen of the United States, and a resident of Randolph, in the county of Norfolk and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Automatic Train-Stopppers, of which the following is a full, clear, and exact description.

The object of this invention is the construction of improved means whereby a single car or a train of cars will be automatically stopped whenever it comes upon a section or block of track occupied by another car, or upon a section wherein a switch is set for a wrong track.

Referring to the drawings forming part of this specification, Figure 1 is a diagram of a section of railway track arranged in accordance with my invention, and showing the automatic stopping device; the section being of a double-track line. Fig. 2 is a diagram of a section of track and switch arranged in accordance with my invention. Fig. 3 shows a single track line arranged in accordance with my invention. Fig. 4 is a side sectional view of a locomotive showing my invention applied thereto. Fig. 5 is a detail view of a stopping device embodying my improvements. Figs. 6 and 7 are detail views of the insulating means.

In said drawings, 1 and 2 designate the right and left hand rails of a railroad, each of which is arranged in sections of preferably one mile in length suitably bonded, but each such section insulated one from another as indicated at 3 and 4. At an end of each section is located a length of rail 5, preferably between the rails as shown, the forward extremity of which is wired to the rail 1 at a point in advance of the insulation 3; said insulation being ahead of the forward end of said length of rail 5, while the insulation 4 in the rail 2 is behind the rear end of the rail 5.

Carried by the locomotive or other propelling member of a train of cars are the devices by means of which I design to stop the train, and the batteries or other current-source for actuating said devices.

The means for stopping the train are preferably a small electric motor disposed, when energized, to open a valve in the air-brake system and by putting on the brakes to either bring the train to a stand-still, or by a partial effect in such direction to warn the

engineer of the necessity of stopping the train.

As indicated in Fig. 1, the battery cells 10 have one terminal wired to a brush 11 contacting with an axle of certain of the locomotive wheels, or in any other manner put into circuit with the track-rail 2. The other terminal of said cells is wired to the electric motor 12, and the latter with a brush 20 preferably held by a beam of the pilot or cow-catcher of the locomotive, and in a position to contact with the rail 5. When the locomotive reaches a point to bring said brush 20 in touch with the rail 5, the current from the battery 10 flows through the motor windings 12, brush 20, rail 5, wire 6, rail 1, the wheels and axle 14 of any car which may be standing or moving in any part of the mile-section, the rail 2, wheels 13 and brush 11 back to the other terminal of the battery. The motor 12 being thus energized, the stopping device operated by the same will be caused to set the brakes, and the train soon brought to rest. In this way the unknown movement of two trains in a single block is made impossible, and all collisions prevented.

In the showing of a double-track system in Fig. 1, it will be seen that the wire 6 from the rail 5 is at the front end of the latter in each case, although it makes no difference as to which of the track-rails 1 or 2 said wire is connected with, provided the insulation 3 is in said track-rail in advance of the rail 5, and the insulation 4 is located in the other track-rail behind the rail 5.

On the track whereon an arrow points toward the left, in Fig. 1, and which arrow indicates the direction of travel of the trains moving thereon, a rail or bar 15 is represented as laid across from rail to rail, as is so often done by train-wreckers. Such rail or bar being a good conductor of electricity, the instant an approaching locomotive reaches the block-section containing such obstruction, warning is given thereby precisely as in the case of a train as described above.

Warning of an open switch is given in the same way, as shown in Fig. 2. Here a switch 7 is illustrated as open upon the main line, and the approaching trains in danger of entering a siding or spur track containing freight or passenger cars. Each switch is shown as brought into contact with a fixed contact-block 8 wired to the rail 1; and hence the moment an approaching locomotive

reaches the contact-rail 5, the circuit is completed as above described, and the warning given. To prevent such switch from interfering with the warning-action from a train beyond it, a wire 19 may be run about it, as shown.

For a single track line where the trains traverse the same in both directions, I provide two contact-rails 5 and 5^a at each end of a block-section, as shown in Fig. 3, both at equal distances from the middle of the track, and the brush 20 being correspondingly carried by the locomotive, in order that when a train travels in one direction such brush will touch the contact-rail 5 alone, and when moving in the opposite direction, the brush will touch the contact-rail 5^a alone. It will be observed that the wires 6 join the front ends of the contact-rails in each case, to the nearer track-rail.

In the construction illustrated in Fig. 5, the electric motor 12 is shown as having its armature brushes 46, 46^a as in the direct circuit between the battery 10 and the brush 20. While this is entirely practical, in the case of very fast trains the brush 20 is liable to have traversed the entire length of a contact-rail 5 and the circuit again broken before the motor 12 has had time to overcome its inertia and rotate enough to operate the brake-valve. This can be obviated, of course, by lengthening the contact-rails; but for railroads extending several thousand miles, this is somewhat expensive. The most economical method of overcoming such objection is that illustrated in Fig. 5, wherein the armature brushes are wired in direct circuit with the batteries 10, but which circuit is normally open but adapted to be closed whenever the brush 20 and wheels 13 are put in circuit as by another train in the block-section. As shown, the armature brush 46 is wired to the contact 43 through the lead 45, and the brush 46^a is joined by the wire 47 to one pole of the battery-cells 10. The other pole of said cells is connected by the wire 49 to the light switch 41 normally in touch with the contact 42 and adapted to be thrown by the electromagnet 40 into touch with the contact 43 where said switch remains until returned to its normal position by hand, there being no spring or other means for causing it to leave said contact 43. Said electromagnet is joined by a wire 44 to the contact 42, and by a wire 48 to the brush 20. Hence, whenever the main circuit is closed by the passage of the brush 20 along the contact-rail 5, and some distant train, the electromagnet 40 is energized and instantly throws the switch 41 over into touch with the contact 43. This position of the switch completes the circuit between the battery cells and the armature brushes, and sets the motor 12 in action. The latter, through its shaft 34, worm 33 thereon, worm gear 32, and cock 31 actuated

thereby, lets the air into the air-brake pipe 30 and so sets the brakes.

The insulations 3 and 4 may be formed as illustrated in Figs. 6 and 7; where 50 indicate the fish-plates, and 51 the bolts for securing the same to the rail ends. Between each fish-plate and the sides of the rails is located a sheet of insulating material 52, and about each bolt 51 is a collar 53 of insulating material, the length of each such collar not requiring to be more than enough to keep the bolt from contact with the rail-web. Between the rail-ends is driven a thin block of insulating material 55, as shown in Fig. 7.

A locomotive and train, whether run by steam or electricity, or a single high speed trolley car, equipped with above described devices, and the track correspondingly disposed, when its brush 20 reaches the contact-rail 5 of a block-section is not affected in case there is no other train upon such section, or no obstruction as 15 lying across the rails, or any switch 7 left open; but in case either of such contingencies arises, the electromagnet 40 is energized and the current from the battery-cells 10 switched to the motor 12 and the air brakes set. The train being thus brought to a full or partial stop, the engineer then returns the switch 41 into touch with the contact 42, after having allowed the motor to revolve enough to again bring the cock 31 to its normal closed position; for I prefer to employ a cock for this purpose which has no stop but can revolve indefinitely. The brakes being now released, the engineer proceeds cautiously until he reaches the obstruction, open switch, stalled train, or the next block-section; for if the stop were caused by a waiting or slowly moving train, the same will probably have gone on again and left the preceding block entirely free for the cautiously approaching warned train.

Inasmuch as by means of the sensitive switch 41 the contact-rails 5 can be quite short, almost mere blocks, the latter may be located at more frequent intervals than a mile apart without materially increasing the expense of my train stopping system.

What I claim as my invention and for which I desire Letters Patent is as follows, to wit;—

1. The combination with a railway and a piece of rolling stock thereon, of a brush, operating devices and a source of current all carried by said rolling stock, said current-source being in electrical connection with said brush, operating device and the track-rails, each track-rail being provided with insulation at points located at substantially equal distances apart, but with the insulation in one track-rail a limited distance ahead of the insulation in its neighboring rail, and a contact member located between each pair of neighboring insulations both

laterally and longitudinally and positioned to be swept by said brush and wired at its front end to the section of track-rail ahead of the insulation which is itself ahead of said member.

2. The combination with a railway and a piece of rolling stock thereon, of a brush, operating devices and a source of current all carried by said rolling stock, said current-source being in electrical connection with said brush, operating device and the track-rails, each track-rail being provided with insulation at points located at substantially equal distances apart but with the insulation in one track-rail a limited distance ahead of the neighboring insulation in the other track-rail, and two contact members located between each pair of neighboring insulations both laterally and longitudinally, and positioned so that one will be swept by said brush when the said rolling stock is moving in one direction and the other when the rolling stock is oppositely moving, and each contact member being wired at its front end to the nearer section of track-rail ahead of the insulation which is itself ahead of said member.

3. The combination with a railway and a piece of rolling stock thereon, of a fixed contact wired to one of the track-rails, a brush carried by the rolling stock in a position to sweep said contact, a source of electricity having one pole in connection with the wheels of the rolling stock, an electric motor, an air brake pipe, a valve admitting air thereto, means enabling the rotation of said motor to open said valve, a switch finger in electric connection connected with said source, a pair of contacts one of which is

wired to one of the armature brushes of said motor, an electromagnet adapted when energized to throw said finger into touch with the last-named contact, an electric connection between the other of said contacts and said electromagnet, an electric connection between said electromagnet and the first-named brush, and electric connection between the other of the armature brushes and the first-named pole of said source.

4. In a train stopper, the combination of a locomotive having a brush fixed to its pilot, a source of electricity having one pole in electric connection with the wheels of the locomotive, an electric motor having a worm gear on its shaft, an air brake, a valve controlling the air thereto, a worm gear fixed to said valve and meshing with said worm, a switch finger in electric connection with the pole of said source of current not in connection with said wheels, a pair of contacts one of which is wired to one of the armature brushes of said motor, an electromagnet adapted when energized to throw said switch finger into touch with the last-named contact, an electric connection between the other of said contacts and said electromagnet, an electric connection between said electromagnet and the first-named brush, and electric connection between the other of the armature brushes and the first-named pole of said source of current.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 11th day of April, 1907.

CHARLES D. TISDALE.

Witnesses:

A. B. UPHAM,
EDWARD F. COLLINS.