No. 834,336. PATENTED OCT. 30, 1906.

L. H. THULLEN.

AUTOMATIC ELECTRIC BRAKING.

APPLICATION FILED DEC. 22, 1903.

2 SHEETS—SHEET 1.

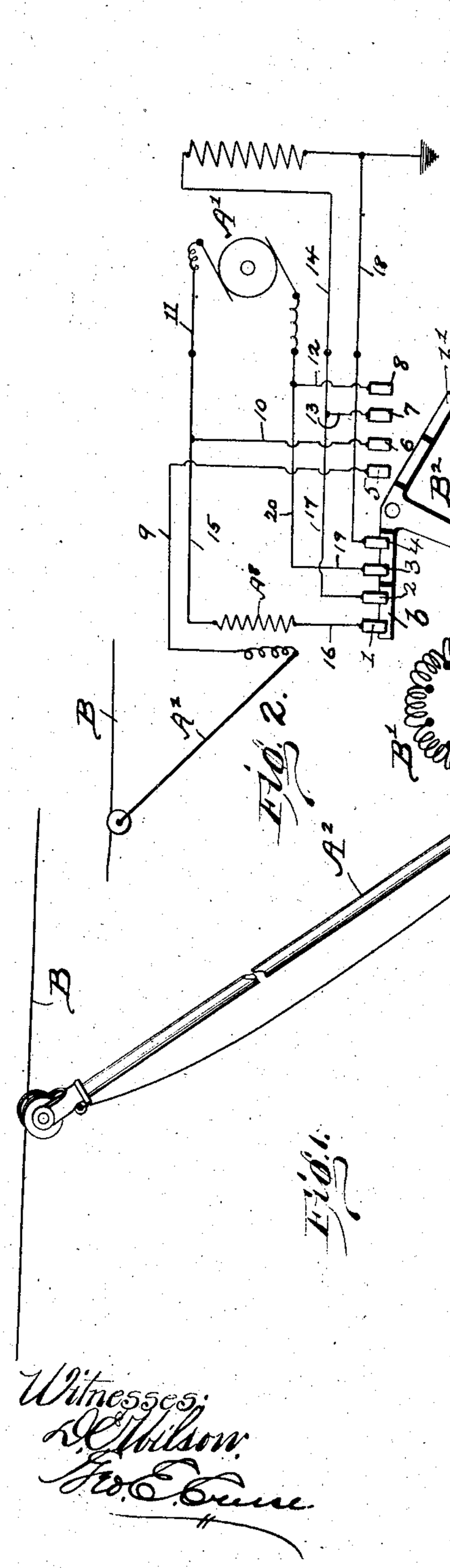


Fig. 2.

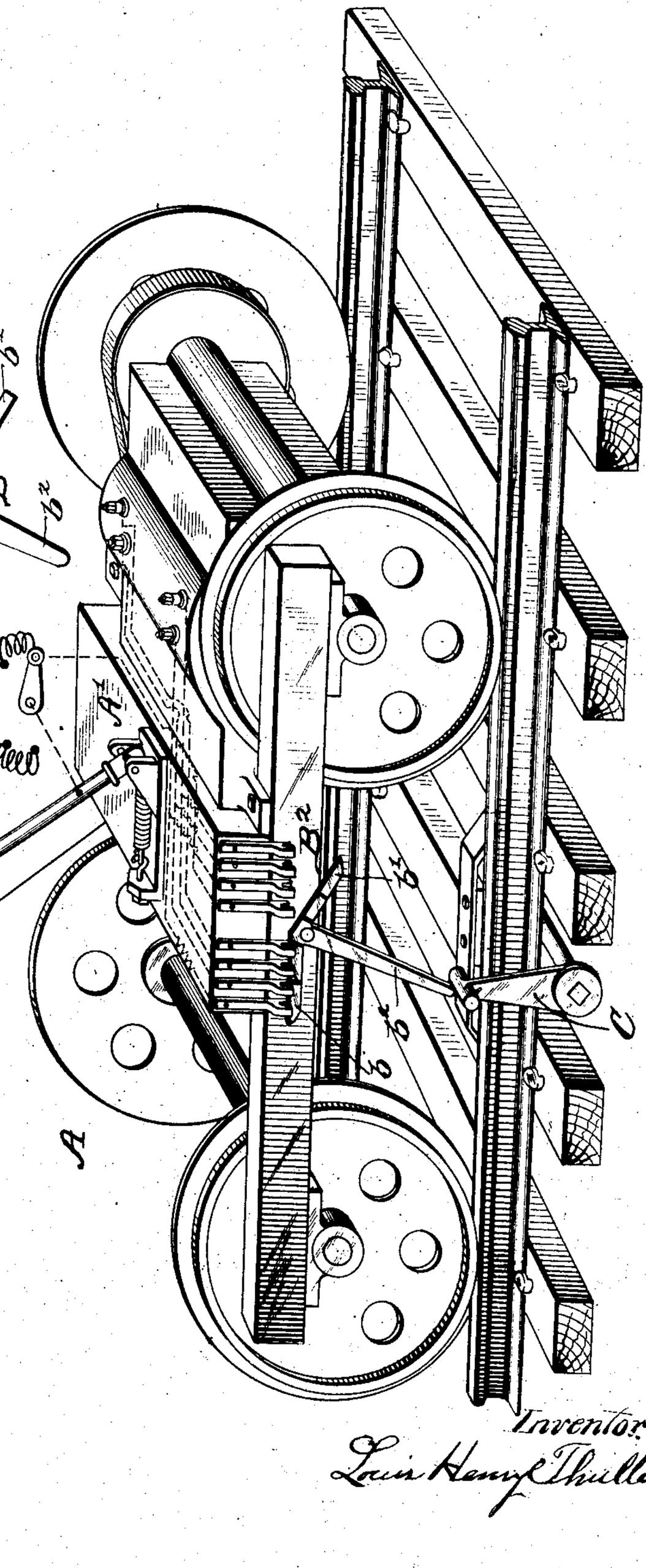


Fig. 1.

Witnesses:
L. E. Wilson.
Fred. E. Crane.

Inventor:
Louis Henry Thullen

No. 834,336. PATENTED OCT. 30, 1906.

L. H. THULLEN.

AUTOMATIC ELECTRIC BRAKING.

APPLICATION FILED DEC. 22, 1903.

2 SHEETS—SHEET 2.

Fig. 3.

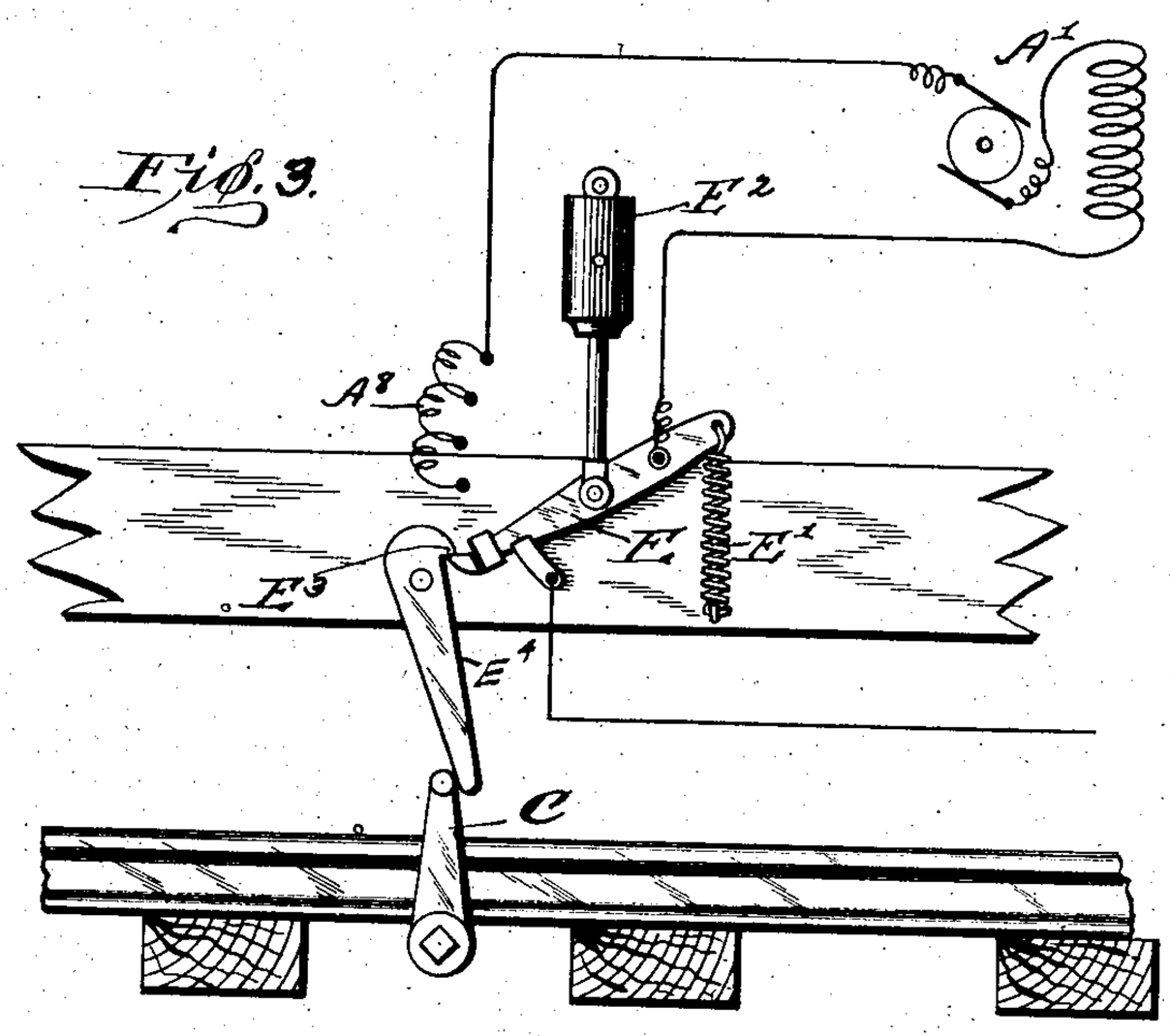
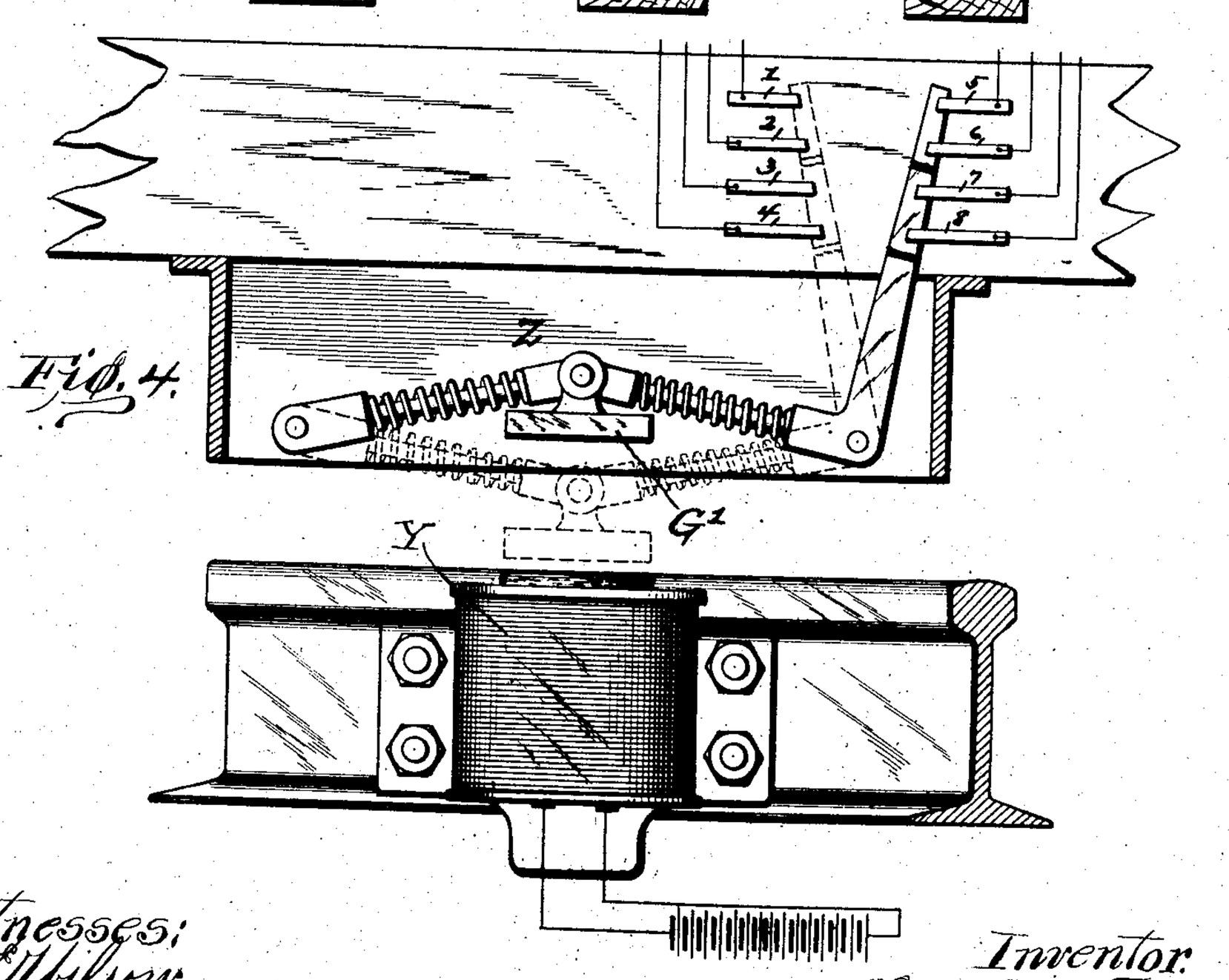


Fig. 4.



Witnesses:
L. C. Wilson.
Jno. E. Crume.

Inventor.
Louis Henry Thullen

UNITED STATES PATENT OFFICE.

LOUIS H. THULLEN, OF EDGEWOOD, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL CO., OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

AUTOMATIC ELECTRIC BRAKING.

No. 834,336. Specification of Letters Patent. Patented Oct. 30, 1906.

Application filed December 22, 1903. Serial No. 186,184.

To all whom it may concern:

Be it known that I, LOUIS H. THULLEN, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Electric Braking, of which the following is a specification.

My invention relates to the braking of a car or cars on which an electric motor or motors are mounted, and particularly to an automatic braking action of such a car or cars.

I will describe a car equipped with an apparatus embodying my invention and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a view of a car equipped with an apparatus embodying my invention. Fig. 2 is a diagrammatic view showing some circuits required for the apparatus of Fig. 1. Fig. 3 is a view illustrating a modification. Fig. 4 is a view showing a modification of a setting device.

Similar characters of reference designate corresponding parts in all of the figures.

A designates an arbitrary representation of a car, and A′ an arbitrary representation of a motor, the armature of which is suitably geared with an axle or axles of the car in order that the car may be propelled along a railroad-track.

A^2 designates a suitable conductor by means of which electric current from a line conductor B is led to a suitable form of controller B′, carried by the car. The return for the current from the motor may be through the track-rails, a separate conductor, or through the ground. The electric current for the motor after passing through the motor enters a circuit controller or switch B^2 and from the switch to the motor. This switch is normally in the position to permit current to enter the motor upon the operation of the controller B′, but when operated, as hereinafter explained, it will cut off the current from the motor and close a circuit on the motor to have it act as a dynamo, and the power required to operate the motor when run as a dynamo will put a braking action on the car or train. The current generated by the motor when operated as a dynamo can be used to apply a friction-brake to the wheels or to the track.

The circuit controller or switch B^2 may be of any desired construction or arrangement. As shown, it consists of a substantially T-shaped lever suitably pivoted to a support. The arms *b*, *b′*, and b^2 are suitably insulated from each other. The arm *b* is adapted to bridge the contacts 1, 2, 3, and 4, and the arm *b′* is adapted to bridge the contacts 5, 6, 7, and 8. The two arms *b b′* are so arranged that when one arm *b* is in engagement with its series of contacts the arm *b′* is out of engagement with its series of contacts. The two arms may be alternately engaged by rocking the lever on its pivot through the arm b^2. The ordinary position of the T-shaped lever is such that the arm *b′* is in engagement with its series of contacts, so that when the controller B′ is operated current will flow through wire 9, contact 5, arm *b′*, contact 6, wires 10 and 11, through armature of motor, wire 12, contact 8, arm *b′*, contact 7, through wires 13 and 14, through the field of the motor to ground. The arm *b′* is provided with insulation, so that there will be no short circuit of the current from contact 6 to contact 7 through the arm. The arm *b* is similarly provided with insulation to prevent a short circuit through the arm from contact 2 to 3. When the T-shaped lever is rocked to move the arm *b′* out of its engagement with its series of contacts, current will be cut off from the motor, and the arm *b* is moved into engagement with its series of contacts to close a circuit on the motor. This circuit starting from one brush of the armature is as follows: wires 11 and 15, resistance A^8, wire 16, contact 1, arm *b*, contact 2, wires 17 and 14, through the field of the motor, wire 18, contact 4, arm *b*, contact 3, and wires 19 and 20, back to the armature. Should there be any momentum of the car at the time of operating the T-shaped lever, the motor would be made to act as a generator, and the current generated will put a braking action on the armature, and hence the car. Preferably the resistance A^8 will be cut out of the closed circuit after a time, and this may be accomplished in any desired

manner and by any desired means. In Fig. 3 I have shown a means whereby the resistance A^8 may be cut out of the closed circuit.

E designates a pivoted lever acting as a switch which is included in the circuit which is closed on the motor A′ and which when free to move gradually cuts out the resistance. A spring E′ is adapted to move the lever E on its pivot, and a too free movement of the lever is prevented by a dash-pot E^2, suitably secured to the lever. The free end of the lever is engaged by a hook E^3, carried by a lever E^4, and which is engaged by a trip located in the track.

The T-shaped lever may be rocked on its pivot in any desired manner and by any desired means. I preferably employ a projection or trip C, located near the railroad-track. This projection or trip may be moved into and out of any operative position by any desired means, and the means may be controlled in any desired manner. For example, the projection or trip C may be operatively connected with a signal mechanism.

In Fig. 4 I have shown a modification in the means for operating the switch B^2. In this form an electromagnet Y is substituted for the trip C. The current for the electromagnet may be controlled in any desired way. An armature G′ is carried by a toggle arrangement of levers Z, one of which levers may be a part of the switch B^2. Instead of two arms *b b′* but one arm need be used for this arrangement, as the series of contacts are opposite each other instead of being arranged as shown in Figs. 1 and 2.

Many changes may be made in the relative arrangement and the construction of the parts without departing from the spirit of my invention.

What I claim as my invention is—

1. In combination with a motor carried by a car, and having its armature geared with an axle of the car, a circuit including the armature and field of the motor which is normally open, a switch for closing said circuit and means located along a railway-track for operating the switch to close said circuit.

2. In combination with a motor carried by a car, and having its armature geared with an axle of the car, a circuit including the armature and field of the motor, which is normally open, a switch for closing said circuit, and an automatically-operated means located along a railway-track, engaging said switch whereby it is moved to close said circuit.

3. In combination with a motor carried by a car, and having its armature geared with an axle of the car, a feed-circuit for the motor, a second circuit including the armature and field of the motor which is normally open, a double-acting switch for said circuits, and means located along a railway-track for operating the switch.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LOUIS H. THULLEN.

Witnesses:
W. L. McDaniel,
Geo. McCormick.