(No Model.)

J. GRAY.

ELECTRIC LOCOMOTIVE.

No. 478,591. Patented July 12, 1892.

Fig. 2.

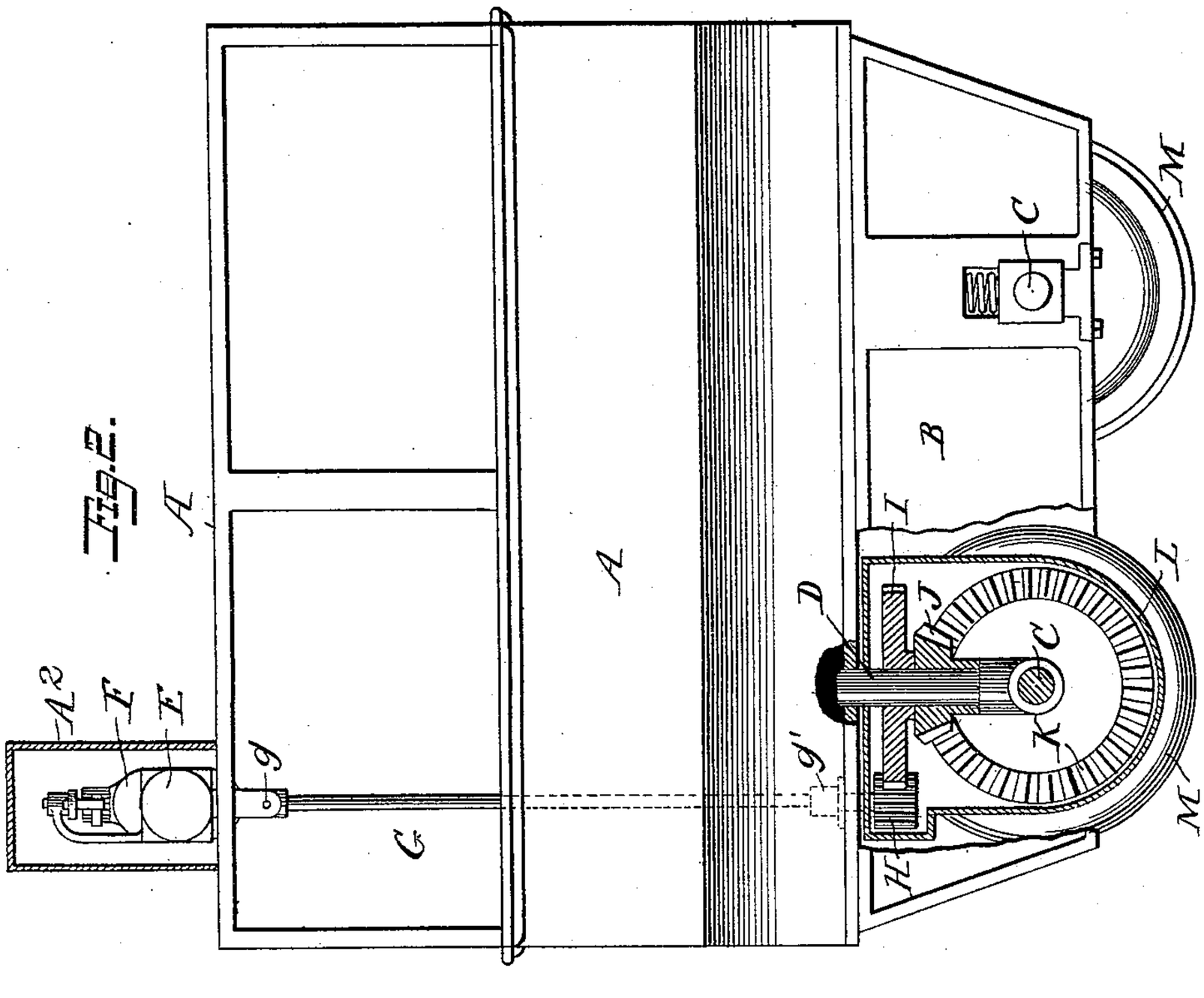
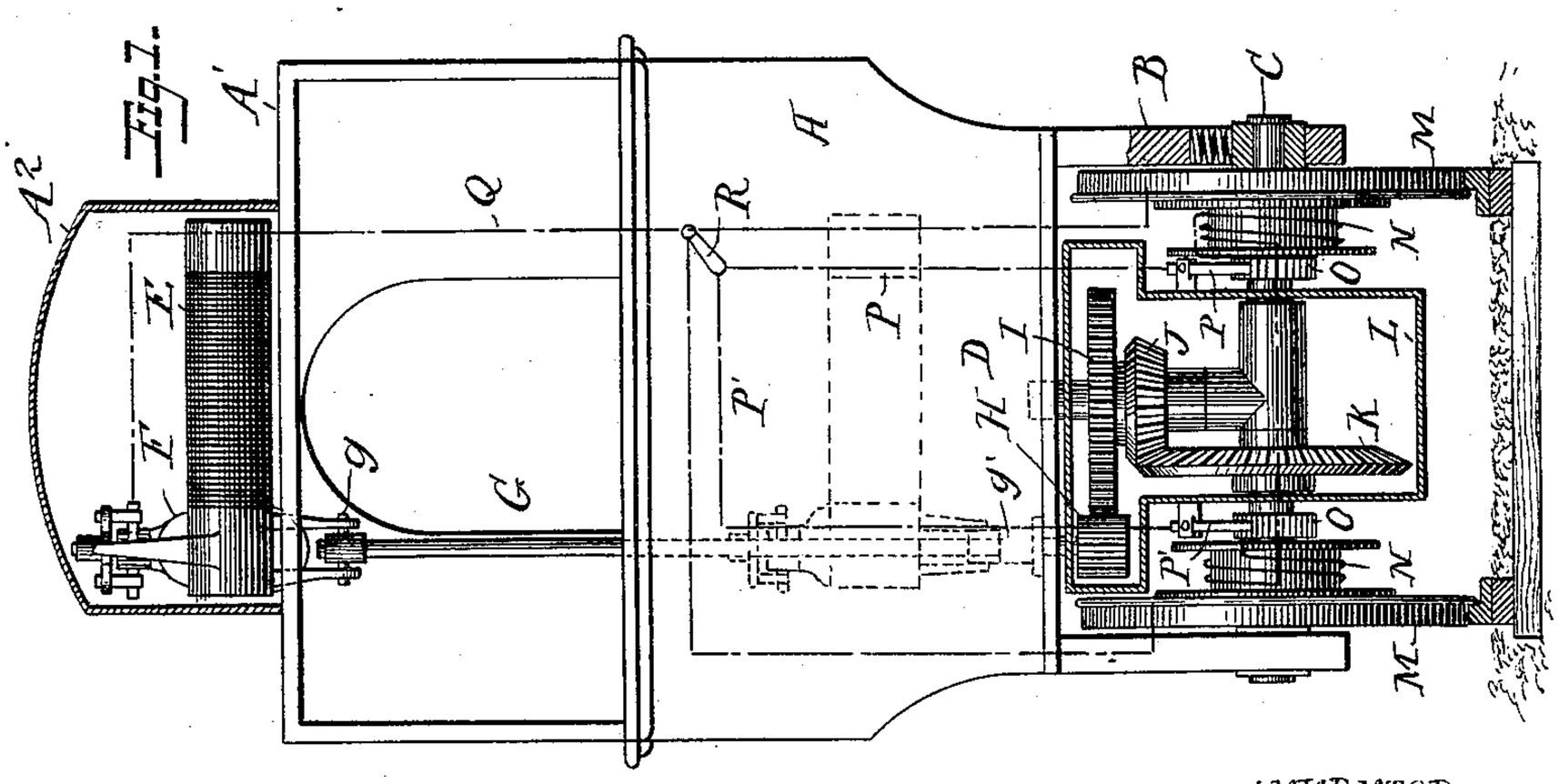


Fig. 1.



WITNESSES

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ELECTRIC LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 478,591, dated July 12, 1892.

Application filed June 12, 1891. Serial No. 396,022. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA GRAY, a citizen of the United States, residing in Medford, Middlesex county, Massachusetts, have invented certain new and useful Improvements in Electric Locomotives, of which the following is a specification.

My invention relates to electric locomotives, and has for its object to improve the construction and arrangement of the operating devices of said locomotives and to provide means for increasing the traction between the locomotive and the truck when desired.

To these ends my invention consists in a construction and arrangement of devices, substantially as hereinafter specified.

In the accompanying drawings, Figure 1 is an end view, partly in section, of an electric locomotive embodying my invention. Fig. 2 is a side view, also partly in section.

I have shown my invention as applied to a motor-car, adapted more especially to sustain the motor and to be connected with any suitable passenger or other car, although it is evident that my invention can with equal propriety be applied to one or both ends of an ordinary passenger-car.

In the drawings, A represents the body of the car, which may be of any desired form and construction, and I have shown it in this instance mounted upon a single truck B, although, of course, if the body of the car is made longer it may be mounted upon two trucks or the wheels and connections may be otherwise arranged.

Extending from the forward axle C is a vertical bolt or bearing D, the upper end of which passes through a bearing in the floor of the car. The axle C may be supported in the usual hangers from the car-body. In this way the greater portion of the weight of the motor-car and the motor is caused to be supported upon the forward axle, which tends to increase its traction, and the rear wheels of the truck act as guide-wheels, as well as assist in supporting the body of the motor-car.

Heretofore in electric railroading it has been general to apply the motor to the truck, it being common to support the motor on the truck-frame and connect it directly with the axle or wheels of the trucks. The motor being thus mounted, its comparatively delicate mechanism is exposed more or less to the elements, such as dust and water, and it is difficult to protect the motor when in this position from damage or destruction from these or other causes. Moreover, it is difficult to get access to the motor for purposes of repair or adjusting the parts. In order to overcome these objections, I mount the motor on the upper portion of the car-body, and in the present instance I have shown it supported upon the frame A′, it being inclosed by a suitable case or protector A^2. Thus E represents the field-magnet of the motor, and F the armature thereof, the latter being arranged vertically and being connected, preferably by a universal or flexible joint or coupling *g*, with the vertical shaft G, passing through the car and running in bearings *g′* in the car-floor. In this way it will be seen that the motor is in a position to be readily accessible and can easily be protected from the deteriorating effects of the elements, and its weight is supported by the forward wheels of the trucks. The motor may be mounted so that the shaft extends down through the car at one side, as shown in Fig. 1, or it may be in the middle or in any other convenient place.

Mounted on the lower end of the shaft G is a broad gear-wheel H, it being preferably made broad, so as to allow for a vertical movement of the truck-frame and car-body and still retain its connection with the gear-wheel I, which is mounted on the king-bolt over the axle. Connected to this gear-wheel I is the bevel-wheel J, meshing with the bevel-wheel K, fixed on the axle, and it will thus be seen that the rotation of the armature of the motor is transmitted directly through this system of gearing to the forward axle of the motor-car.

I have not shown herein the means for regulating the circuit of the motor, as these form no part of my invention, the motor being intended to be used in connection with any ordinary system, either of the single or double overhead or underground or even with secondary batteries, and of course the circuit connections will be arranged in a well-known manner to suit the requirements of any particular case.

In order to protect the gearing from dust or other dangerous elements, I surround the

whole with a casing L of any suitable material. It often happens that in mounting grades or with a heavy load the traction of the motor-car is not sufficient, and in order to increase this traction I provide the hubs N of the wheels M of iron and surround them with numerous coils of wire, one terminal of each coil being connected to the wheels and the other terminals of each coil being connected to disks or plates O, insulated from the axle and from the hubs, and I provide a branch circuit having connection with the brushes P, bearing on said plates. In the instance shown in the drawings the current from the armature F of the motor passes by a conductor Q directly to the wheels of the truck and thence to the rails forming the return-circuit. Connected to this conductor Q is a switch-arm R, by means of which the branch-circuit wires P′ may be connected with the circuit Q, so that part of the return-circuit will pass through the brushes P and thence to the coils N on the hubs of the wheels and magnetize the wheels, so that they have an attraction for the rails, and I preferably so wind the coils on the hub that the wheels of each side shall be of opposite magnetism. Of course if the circuit is taken from a double trolley-wire overhead instead of being completed through the wheels and rails the branch circuit will include only the coils on the hubs.

What I claim is—

1. In an electric locomotive, the combination, with one of the axles of the car located near the end thereof, of a bevel-gear mounted on the car-axle, a vertical bearing extending from the axle, a bevel-gear mounted thereon and engaging the bevel-gear on the car-axle, a spur-gear also mounted on the vertical bearing, a pinion engaging the spur-wheel, and a vertical shaft extending to the top of the car, and a motor mounted on the front end of the car and connected to said vertical shaft, substantially as described.

2. The combination, with an axle of a car, of a bolt or bearing extending vertically from the axle, a bevel-gear mounted on the axle, a bevel-pinion mounted on the bolt, a gear-wheel also mounted on the bolt, an electric motor mounted on the top portion of the car, and a vertical shaft connecting the armature of the motor with the gear-wheel on the bolt, substantially as described.

3. The combination, with the forward axle of a car, of a vertical bolt mounted on the axle and having a bearing on the floor of the car, a bevel-gear connected to the axle, a bevel-pinion on the bolt, a gear also mounted on the bolt, an electric motor mounted on the car above the forward axle, and a vertical shaft connected to the armature by a flexible joint and having a broad pinion on its lower end engaging said gear-wheel, substantially as described.

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

JOSHUA GRAY.

Witnesses:
WILLIAM E. ROGERS,
JOHN B. MORAN.