

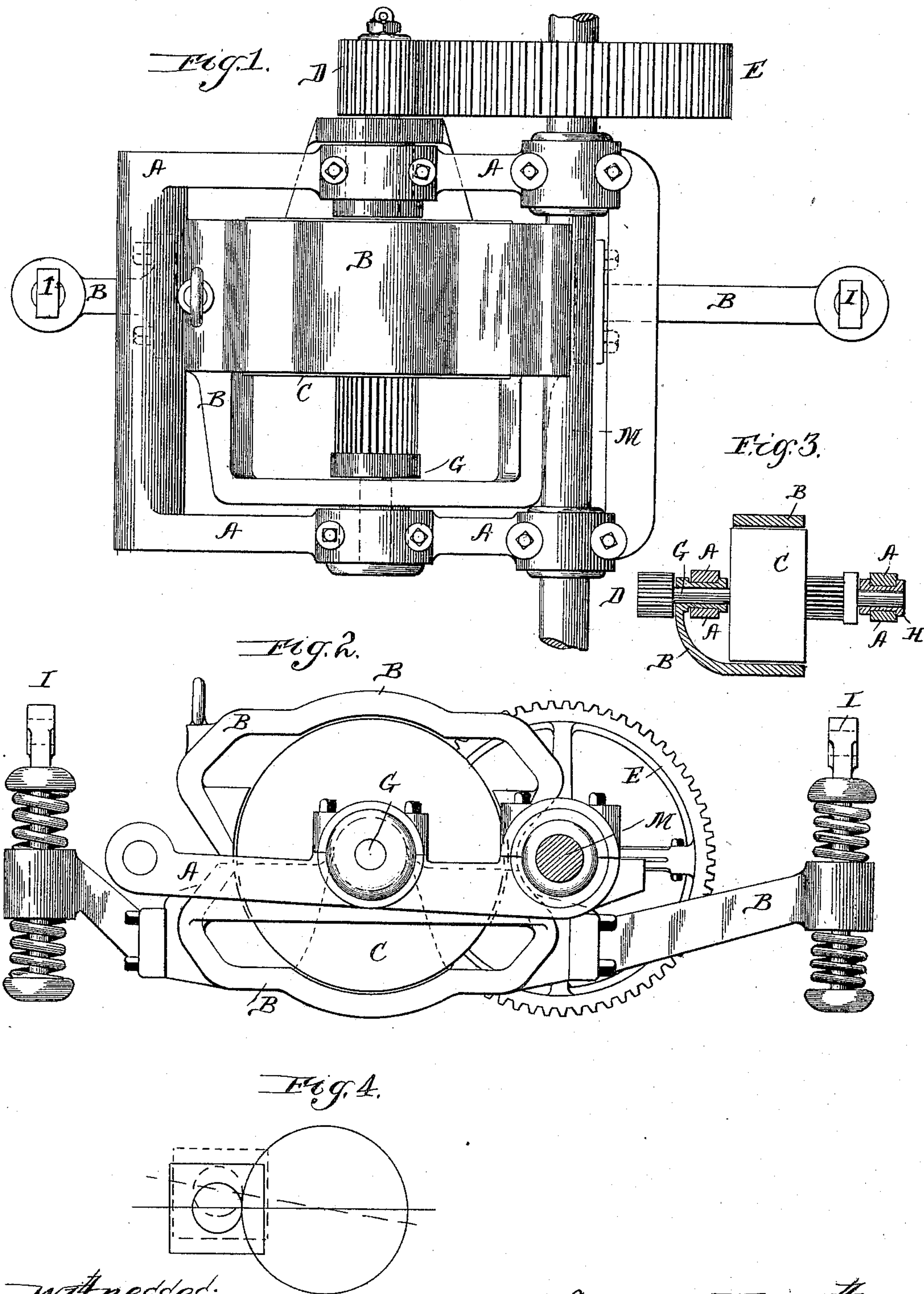
No. 634,903.

Patented Oct. 17, 1899.

E. C. MORGAN.
ELECTRIC MOTOR FRAME.

(Application filed Mar. 24, 1892. Renewed Aug. 31, 1899.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

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ELECTRIC-MOTOR FRAME.

SPECIFICATION forming part of Letters Patent No. 634,903, dated October 17, 1899.

Application filed March 24, 1892. Renewed August 31, 1899. Serial No. 729,125. (No model.)

To all whom it may concern:

Be it known that I, EDMUND C. MORGAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric-Motor Frames, of which the following is a specification.

This invention relates to motor-suspensions for electric cars.

10 The object of the invention is to provide a motor-suspension of simple and efficient construction, wherein the motor is relieved of the shock and jar to which the truck is subjected.

15 A further object of the invention is to provide a flexible or yielding suspension of the motor with reference to the truck-axle.

Other objects of the invention will appear more fully hereinafter.

20 The invention consists, substantially, in the construction, combination, and arrangement of parts, all as will be more particularly hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the claims.

25 Like letters refer to the same parts in the several figures of the drawings, in which—

30 Figure 1 is a plan view of a construction embodying the principles of my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section, on a reduced scale, through the bearings for the motor. Fig. 4 is a diagram indicating the relative movements of the gears.

35 In the equipment of motor-trucks for electric cars or other purposes it is a matter of material importance to suspend the motor in such manner as to relieve it of the shock and jar imparted to the truck.

40 In the common form of motor-suspension heretofore employed the motor is supported on one side directly upon the truck-axle and on the other side upon springs connected to the truck-frame or to the car-body or else directly to the car-body. In this construction 45 the weight of the motor is largely imposed directly upon the axle. The result of this concentration of the weight of the motor directly upon the axle is that every inequality in the track produces a thump and jar, thus causing

a hammer-blow, with the great weight of the motor and the inertia due to the resistance of the mass of the motor to motion, as the hammer, to be delivered upon the track-rails and particularly at the rail-joints. The effect is a constant pounding of the ends of each track-rail, thus rapidly wearing the rail, destroying the rail-joint, and loosening the rail-bond connection. This pounding increasing, of course, with the deterioration of the track is injurious not only to the rails, joint, and bonding, but also to the motor-shaft and axle-bearings and to the motor. Moreover, in starting a motor and car from positions of rest the starting effort or torque of the motor, the friction of repose, and the inertia of the car are too great to be overcome instantly. Therefore when the current is suddenly supplied to the motor the disposition of the motor-armature to turn is powerfully resisted. In the case of the construction above referred to, wherein the motor is supported directly upon the axle, this resistance results in breakage of the parts—such, for instance, as the teeth of the gear and pinion.

75 It is the special purpose of the present invention to avoid the objections above noted, and I will now describe a construction and arrangement wherein this purpose is accomplished.

80 The motor proper is of the usual form and need not be particularly described, but is shown in a general manner in the accompanying drawings, and is designated by the letter C. The motor-shaft G is journaled in bearings formed in hollow extensions H of a main frame B. This frame may be provided with brackets for securing the same to the car or other vehicle, or it may have bearings for vertical rods I, which latter may have springs interposed between collars on such rods and the bearings in the frame, so as to form a yielding rest or suspension for such frame. Ordinarily, however, the springs of the vehicle will be found sufficient.

95 As stated above, the motor-shaft is journaled in hollow extensions of the main frame B. These hollow extensions may be turned or smoothed, so as to form journals around

which a supplemental frame A may swing, as clearly indicated in Figs. 1, 2, and 3 of the drawings. The supplemental frame A has journal-bearing at one end thereof upon an axis M, which, if desired, may be the truck-axle and upon which is mounted a gear E, which meshes with a pinion D on the motor-shaft.

It will be seen that the hollow extensions H of main frame B rest in journal-boxes formed in the supplemental frame A, and therefore such hollow extensions serve the double purpose of bearings for the motor-shaft and pivots on which the guiding or supplemental frame A may turn or swing. As shown in Fig. 2, these hollow bearings H rest in sockets or seats formed in the supplemental or guiding frame and are loosely clamped therein by superposed caps.

The axle M may be the main axle, upon which the truck-wheels are mounted, or it may be an intermediate shaft.

It will be seen that the supplemental frame A serves to link the pinion D to the gear E, so that they will always be kept in gear, and yet such frame permits the axle to be lifted without causing a corresponding movement of the motor-shaft, because in the movements of such supplemental frame as the axle rises or falls it swings or turns freely about the bearings of the motor-shaft, and hence without imparting corresponding movements to the motor.

In Figs. 1 and 2 the supplemental frame is shown as extended beyond its pivotal point; but this is not necessary.

The diagram of Fig. 4 indicates different positions assumed by the gears and bearings and the constant intermeshing of such gears under different conditions.

By the construction and arrangement above described the constant jarring of the motor by the truck-wheels pounding on rail-joints or passing over obstructions is avoided, thus avoiding the objection of the motor becoming crystallized and brittle. Moreover, by this construction I avoid concentrating or imposing the weight of the motor upon the axle, and hence avoid the hammer-blows above referred to, with the consequent wear and flattening of bearings and parts and rapid deterioration and injury to the motor, track-rails, rail-joints, and bonds. It will also be seen from the foregoing description that I provide a construction and arrangement wherein when the motor starts up from a position of rest a desirable range of yielding movement of the motor is secured relative to but independent of the axle, so as to avoid injury to the motor or reduction gears in overcoming the friction of repose and inertia of the car.

It is obvious that many modifications may be made in the details of my invention without departing from the principle thereof, and I therefore do not wish to be understood as

confining myself to the particular details shown and above set forth.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a truck-axle, of a motor yieldingly suspended with reference to such axle, a swinging frame mounted on the axle and adapted to guide the motor, and attachments on the motor for the reception of the swinging ends of the swinging frame, as and for the purpose set forth.

2. In an electric locomotive, the combination of a truck-frame and an axle, of a guiding-frame, a motor having bearings in the guiding-frame, gearing between said motor and axle, and devices for yieldingly supporting said motor at both sides independently of the guiding-frame, as and for the purpose set forth.

3. The combination of a main-frame spring-supported from the car or vehicle body and provided with suitable bearings, a motor-shaft journaled in said bearings, a supplemental frame pivotally supported from said bearings, a main axle journaled in said supplemental frame, and gearing connecting said main axle and motor-shaft, whereby the movement of the main axle will not be communicated to the motor-shaft, as and for the purpose set forth.

4. The combination with a main axle and a motor, of a yieldingly-suspended frame, forming a support for the motor, said frame having hollow extensions forming bearings for the motor-shaft, a supplemental frame journaled upon said hollow extensions and provided with independent bearings for the main axle, and gearing between the main axle and motor-shaft, said supplemental frame forming guiding means for the motor relative to the axle, as and for the purpose set forth.

5. The combination with a main axle and a motor, of a frame supported independently of the main axle and having hollow extensions forming bearings for the shaft of the motor, a supplemental frame loosely journaled upon such hollow extensions of the main frame so as to be capable of a pivotal movement thereon, said supplemental frame provided with independent bearings for the main axle, and intermeshing gears arranged on the main axle and motor-shaft respectively, as and for the purpose set forth.

6. The combination of a main axle and a motor, of a frame in which the motor is mounted, said frame supported independently of the main axle, a guiding-frame pivotally connected to the axle and motor-frame, respectively, and gearing connecting the main axle and motor-shaft, whereby movements of the main axle will not be communicated to the motor, as and for the purpose set forth.

7. The combination with a main frame yieldingly supported at each side independently of the guiding-frame and having bearings, of a motor-shaft journaled therein, a

supplemental frame pivotally supported concentric with the motor-shaft, a main axle, said supplemental frame being journaled upon said axle, and gearing connecting said
5 shaft and axle, as and for the purpose set forth.

8. In an electric locomotive, the combination with a truck-frame and an axle, of a guiding-frame, a motor carried by the guid-

ing-frame, gearing between said motor and axle, and devices for yieldingly supporting said motor at both sides.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

EDMUND C. MORGAN.

Witnesses:

FRANK T. BROWN,

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