

(No Model.)

F. MANSFIELD.

GEARING AND MOTOR SUPPORTING MECHANISM FOR ELECTRIC LOCOMOTIVES.

No. 441,771.

Patented Dec. 2, 1890.

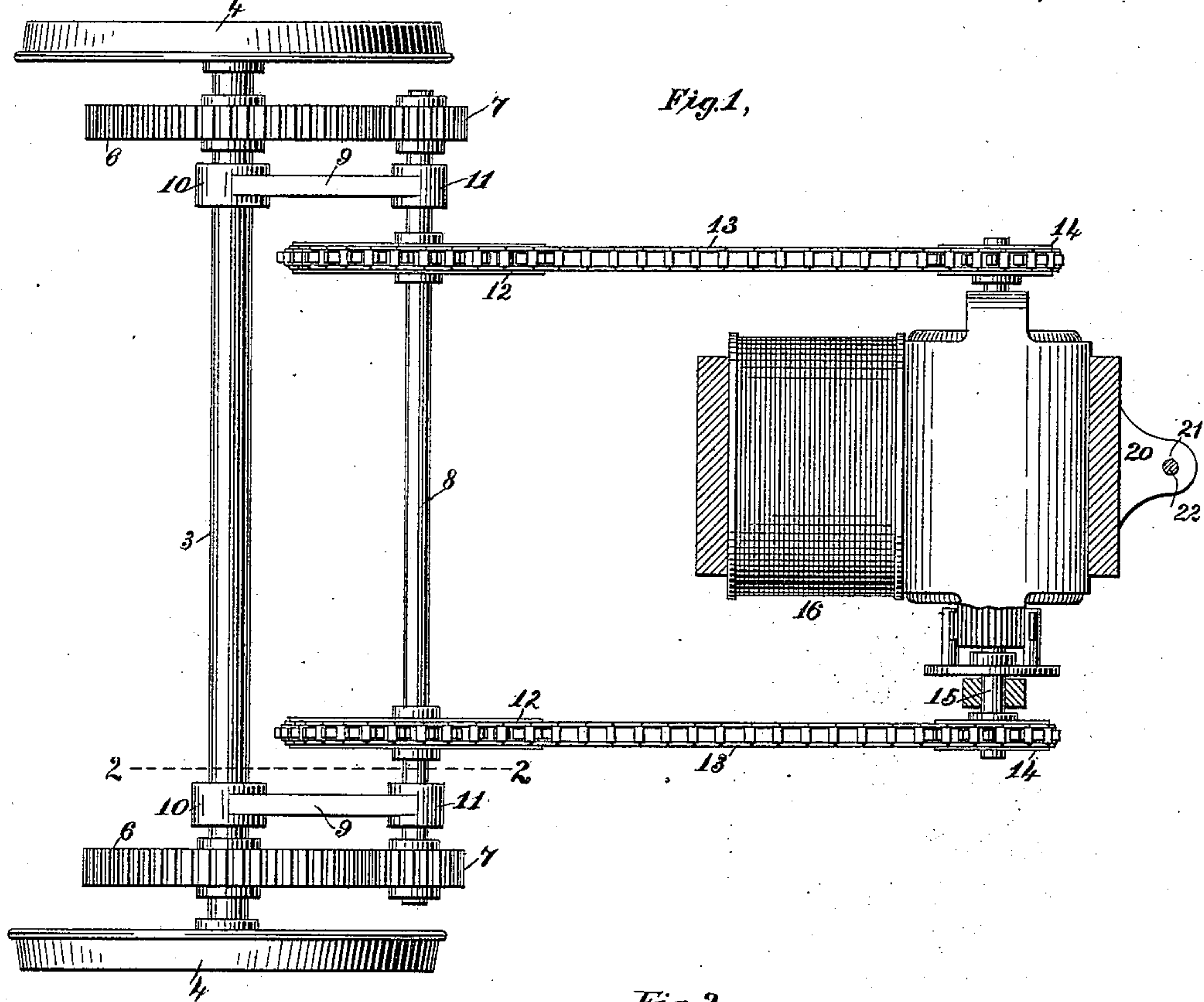
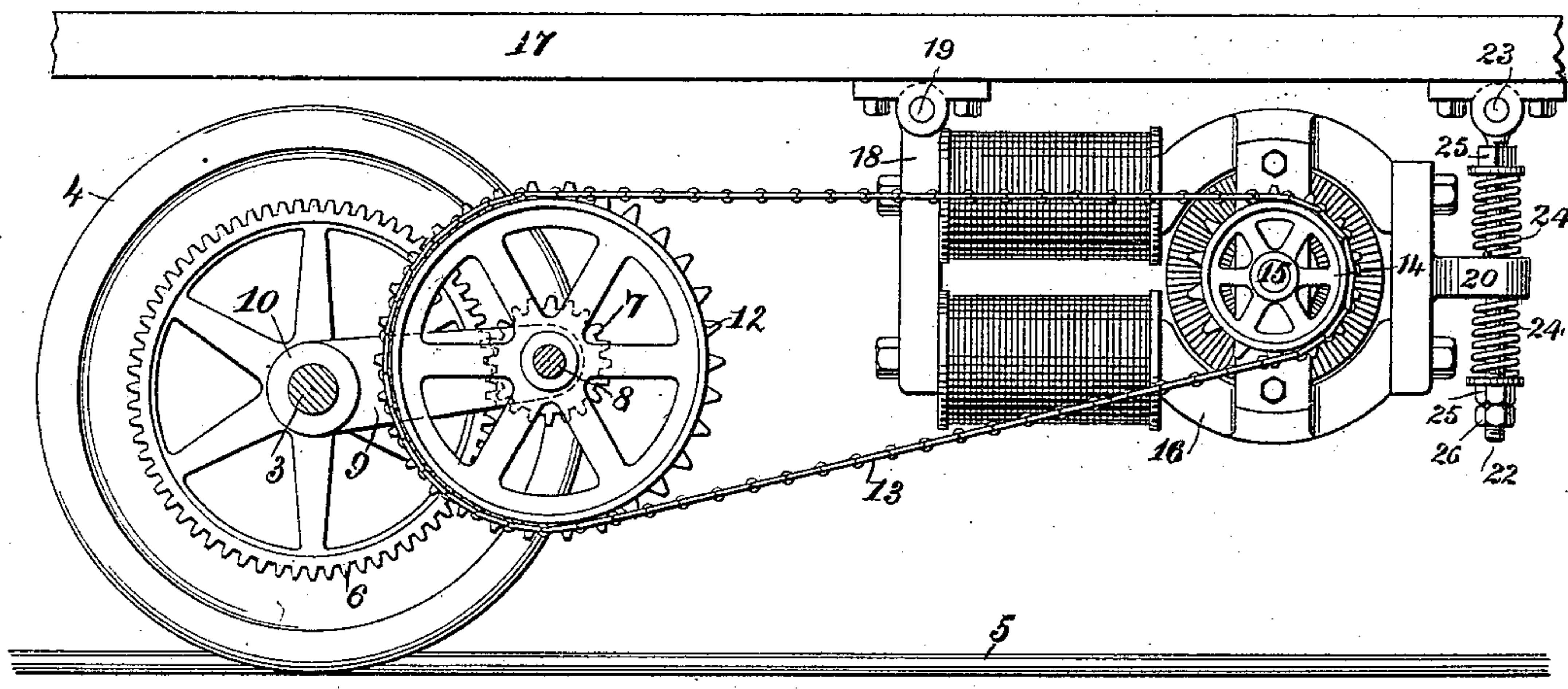


Fig. 2,



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GEARING AND MOTOR-SUPPORTING MECHANISM FOR ELECTRIC LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 441,771, dated December 2, 1890.

Application filed April 8, 1890. Serial No. 347,103. (No model.)

To all whom it may concern:

Be it known that I, FRANK MANSFIELD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gearing and Motor-Supporting Mechanism for Electric Locomotives, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates in part to gearing mechanism for electric locomotives—that is, to the means intermediate the electric motor on the car and the driven car-wheel axle whereby the motion of the motor may be imparted to the axle at a reduced speed in order to propel the car.

The invention further relates to the peculiar manner of mounting the motor on the car.

As the armature-shaft of an electric motor rotates at a high speed, the speed-reducing gearing intermediate the armature-shaft and the axle is constantly subjected to severe jarring and straining.

One object of my invention is to relieve the speed-reducing gearing of the great stress that the sudden starting of the motor renders it liable to, and thereby to prevent the possibility of straining and stripping the gears.

Another object of my invention is to utilize the springs of the car itself to prevent sudden jarring of the motor and to so mount the motor that the load may be put upon the gearing gradually.

Another object of my invention is to render the driven axle and the driving-motor each independent of the play and shifting movements of the other, such objectionable movements being consequent upon the car-wheels taking switches and curves, encountering obstacles, and traveling over uneven places in the tracks.

To the aforesaid purposes my invention, briefly stated, consists in an intermediate drive-shaft mounted and rotating in swinging bearings, which are swiveled upon the car-wheel axle, so as to oscillate or swing about the axle, and in the motor mounted entirely upon the car, so as to yield and swing thereon,

the mounting being provided with one or more hinge-joints and one or more interposed springs, and in a flexible driving connection intermediate the swinging drive-shaft and the electric motor, whereby upon starting the motor the rise or fall of the oscillating drive-shaft will give the gearing a very appreciable lead in taking up the motion of the rapidly-rotating armature-shaft. Another and important office of the flexible driving means between the armature-shaft and the drive-shaft is to render the play and shifting of the axle and of the motor wholly independent each of the other, so that the play of these parts will not strain the gears or allow them to pinch.

The invention further consists in the details of construction of the apparatus.

In order that my invention may be fully understood, I have illustrated in the accompanying drawings and will proceed to describe the best forms thereof so far devised by me, with the knowledge, however, that such forms may be variously modified without departing from the spirit of my invention.

In the accompanying drawings, Figure 1 is a plan view of my improved apparatus, the motor being shown partly in section. Fig. 2 is a sectional view taken in a plane indicated by the line 2 2 with the motor and its sustaining mechanism in full, together with portions of the car and the track.

In the said drawings like numbers of reference designate corresponding parts throughout.

Referring to the drawings, 3 designates the car-wheel axle provided with the car-wheels 4 4, which are shown as resting on the car-track 5. Between the car-wheels and on the axle near each end thereof is mounted an intermediate gear-wheel 6, both of which wheels rotate with the axle. Each gear 6 meshes with and is driven by a pinion 7, one of which is mounted fast at each end of the drive-shaft 8. This drive-shaft is mounted so as to oscillate about the axle 3 by means of the hanger-bearings 9 9, the respective ends of each of which are formed with the journal-bearings 10 and 11, the former of which bearings receives the axle and the latter the drive-shaft, which turns freely in such bearings. However, the drive-shaft may be mounted in any well-known suitable manner, so as to

possess the function of swinging or oscillating about the axle driven thereby.

Upon the drive-shaft 8 are fixedly secured the large sprocket-wheels 12 12, about each of which passes a flexible driving connection or chain belt 13, and these belts are also passed about the smaller sprocket-wheels 14 14, respectively, which are secured fast upon the respective ends of the armature-shaft 15 of the electric motor 16.

The motor 16 is mounted upon the car 17, which is shown only in portion, by means of the following mechanism: To one end of the motor is attached the swinging bracket 18, which is hinged at 19 to the car. At the other end of the motor is a projection 20, which is formed with a perforation 21, through which loosely extends a swinging pendant or rod 22. The pendant is hinged at 23 to the car, and is surrounded by two spiral springs 24 24, the adjacent ends of which, near the center of length of the pendant, abut against the opposite faces, respectively, of the projection 20, while the other ends of the springs bear, respectively, against the washers 25 25, which are mounted on the pendant. Upon the lower end of the pendant is a nut 26, which serves to sustain the lower spring in operative position.

It is obvious that the rotation of the armature-shaft 15 will impart the desired motion to the car-wheel axle 3 through means of the intermediate connections consisting in the belts 13, sprocket-wheels 12 12, drive-shaft 8, gears 7 7, and pinions 6 6.

The tendency of the swinging drive-shaft 8 is to dip down and the motion of the motor will cause the shaft to descend or rise, according as the armature rotates in one direction or the other, so that the drive-shaft in its oscillations will give the gears a lead in taking up the motion of the motor, thereby preventing the sudden strain and jar from injuring the gearing upon starting the motor.

By virtue of the flexible driving connection between the armature-shaft and the drive-shaft the shifting movements or play of the axle, drive-shaft, and motor, respectively, are rendered independent of each other, so that the play of such parts will not affect the gearing in transmitting the motion of the motor to the axle.

It will be at once evident that by supporting the motor entirely upon the car itself the car-springs are brought into play and successfully utilized to prevent sudden jolting of the motor. Further, by flexibly attaching the motor to the car I am enabled to put the load on the gearing gradually; which will obviate the necessity of gradually letting the current onto the motor, as is the case when the motor is rigidly secured in position. In my construction of flexibly mounting the motor the full current may be put quickly onto the motor without imparting any jerking motion to the car. The exertions of the motor itself will swing it in its mountings and will

bring the interposed springs into play, so that such mechanism will assist in taking up the stress from the gearing when the motor is suddenly started.

The swinging drive-shaft will serve to always keep the driving chain belts taut, and in case of using leather belting they will likewise be maintained taut, and will be prevented from slipping as they become stretched.

What is claimed as the invention is—

1. An electric locomotive having the motor thereof supported entirely upon the car and attached thereto by swinging members, substantially as and for the purpose set forth.

2. An electric locomotive having its motor attached thereto by swinging members, for the purpose set forth.

3. The combination, with an electric motor and the body upon which it is mounted, of the swinging bracket intermediate the motor and body, a swinging pendant also intermediate the motor and the body, and interposed springs on the pendant, substantially as and for the purpose described.

4. The combination, with the body upon which the motor is mounted, of the swinging motor 16, provided with the swinging bracket 18, hinged at 19, and the swinging pendant 22, hinged at 23 and provided with the interposed springs 24, held suitably in position, substantially as and for the purpose set forth.

5. An electric-locomotive gearing consisting in the combination, with a car-wheel axle, of a drive-shaft pivotally swung to the axle so as to revolve thereabout and driving the axle, an electric motor on the car, and connections intermediate the armature-shaft of said motor and the said drive-shaft, substantially as described.

6. The combination, with a car-wheel axle, of a drive-shaft having bearings swiveled upon the axle and driving the said axle, an electric motor on the car, and a flexible connection intermediate the armature-shaft of said motor and the said drive-shaft for driving the latter, whereby the said flexible connection may be kept taut by the play of the swinging drive-shaft, substantially as described.

7. The combination, with a car-wheel axle provided with a gear, and a drive-shaft provided with a gear meshing with the said gear of the axle and having bearings swiveled upon said axle, of an electric motor on the car, and a flexible driving-belt intermediate the said drive-shaft and the armature-shaft of the motor, substantially as described.

8. The combination, with a car-wheel axle having intermediate gear-wheels mounted thereon, a drive-shaft provided with pinions meshing with said gear-wheels and having bearings swung upon the axle so as to allow the drive-shaft to oscillate about the axle, and a sprocket-wheel secured on the drive-shaft, of an electric motor on the car, having the armature-shaft thereof provided with a sprocket-wheel, and a drive chain belt inter-

mediate the sprocket-wheel on the drive-shaft and sprocket-wheel on the armature-shaft for imparting motion to the drive-shaft, substantially as described.

5 9. The combination, with a car-wheel axle having an intermediate gear-wheel fixed near each end thereof, a drive-shaft having swing-
10 ing hanger-bearings swung upon the axle, and the drive-shaft provided with a pinion near each end, meshing with said gear-wheels, respectively, and a sprocket-wheel secured
15 near each end of the drive-shaft, of an electric motor on the car, having the armature-shaft provided at each end with a sprocket-wheel,
and drive chain belts belted between the
20 sprocket-wheels on the drive-shaft and the sprocket-wheels on the armature-shaft, respectively, whereby the swinging drive-shaft may take up the slack in the drive chain belts, substantially as described.

10. The combination, with the axle 3, provided with the intermediate gear-wheels 6, the swinging drive-shaft 8, provided with the
25 hangers 9, which are swung upon the axle 3, and provided with the pinions 7, meshing

with and driving the gears 6, of an electric motor mounted on the car, and flexible driving-connections intermediate the armature-shaft of said motor and the said drive-shaft 8, for driving the latter, substantially as de- 30 scribed.

11. The combination, with the axle 3, provided with the intermediate gear-wheels 6, the drive-shaft 8, provided with the hangers 9, which are swiveled to the axle 3, and the pin- 35 ions 7, fast upon the drive-shaft and meshing with the gears 6, of the sprocket-wheels 12, secured upon the drive-shaft, the electric motor 16 on the car and having the armature-shaft 15, provided with the sprocket-wheels 40 14, and the chain belts 13 intermediate the sprocket-wheels, substantially as described.

In testimony whereof I have hereunto set my hand and seal this 7th day of April, 1890, in the presence of the two subscribing wit- 45 nesses.

FRANK MANSFIELD. [L. S.]

Witnesses:

PAUL F. C. TUCKER,
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