No. 658,445.

Patented Sept. 25, 1900.

A. A. INGRAHAM.

ELECTRIC CAR.

(Application filed Oct. 2, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

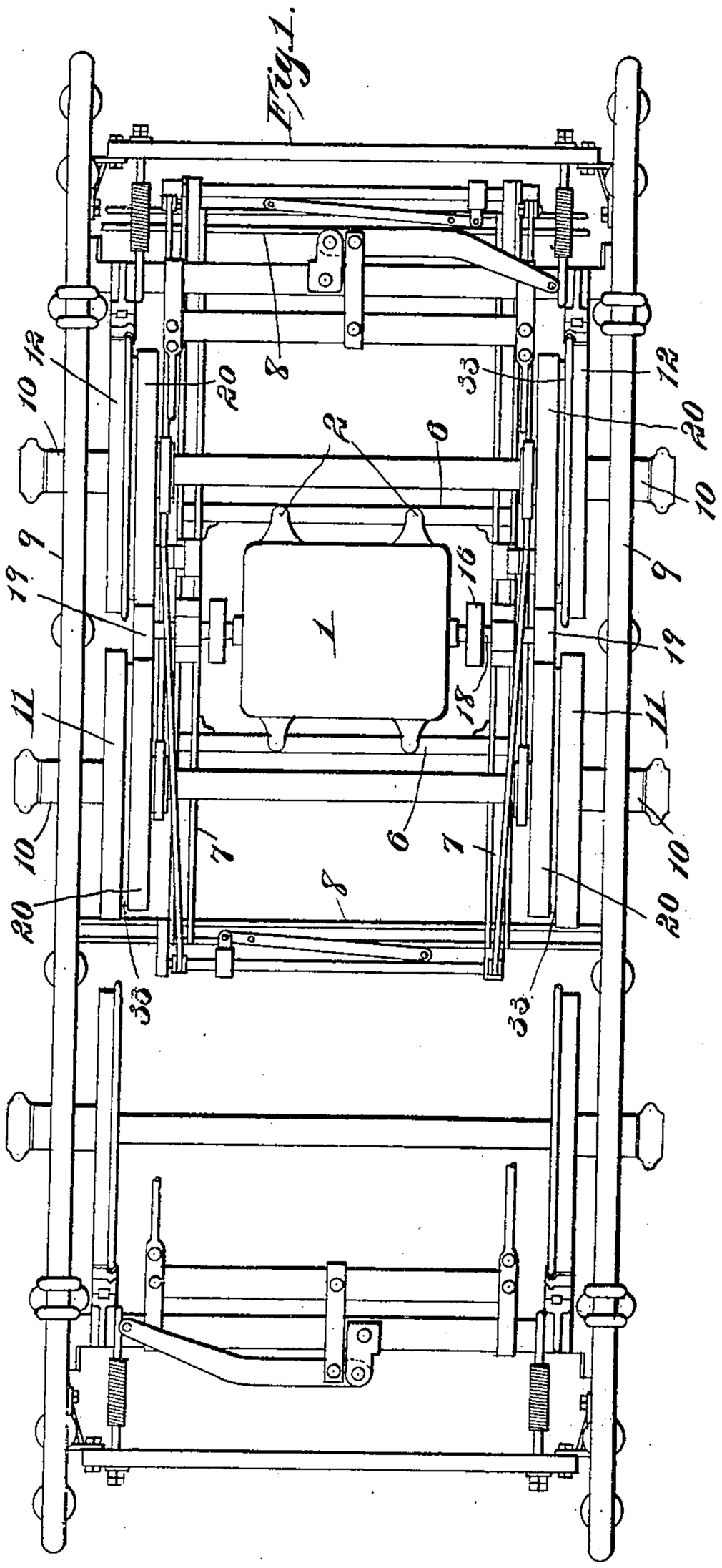

Fig. 2.

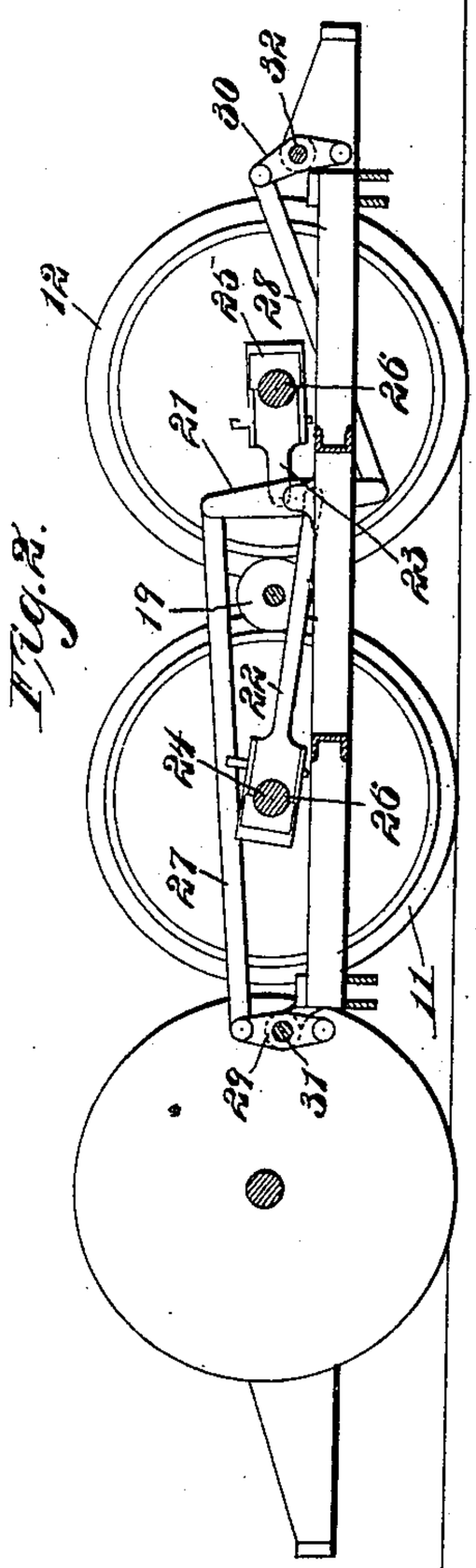

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Fig. 3.

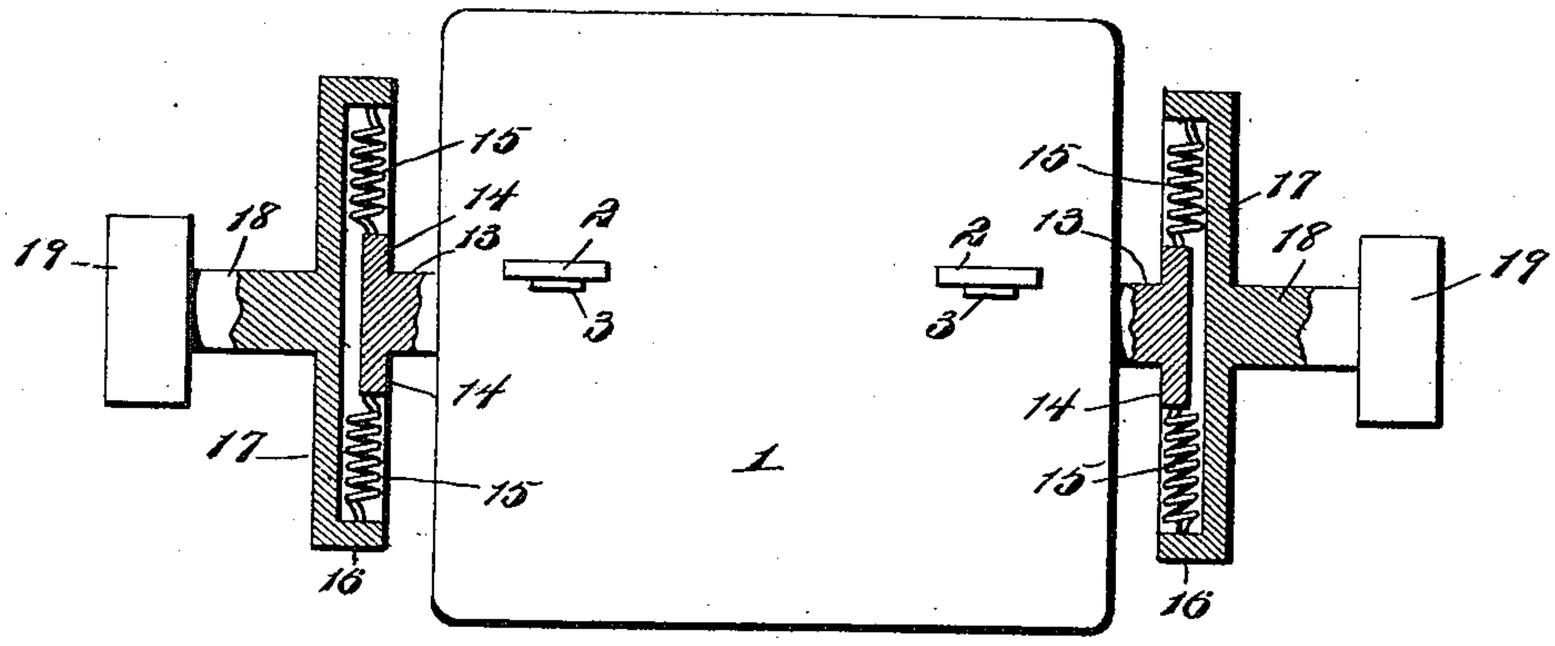


Fig. 4.

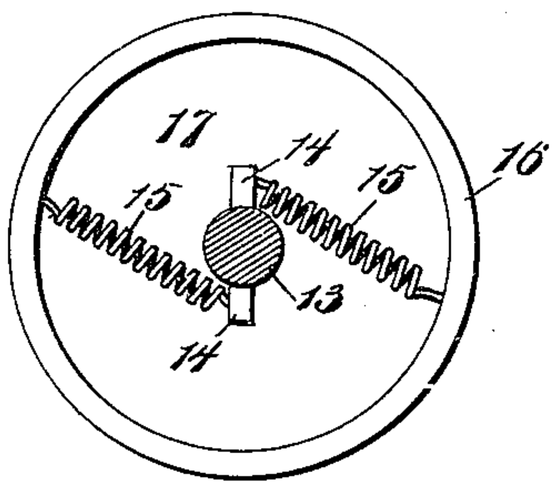


Fig. 5.

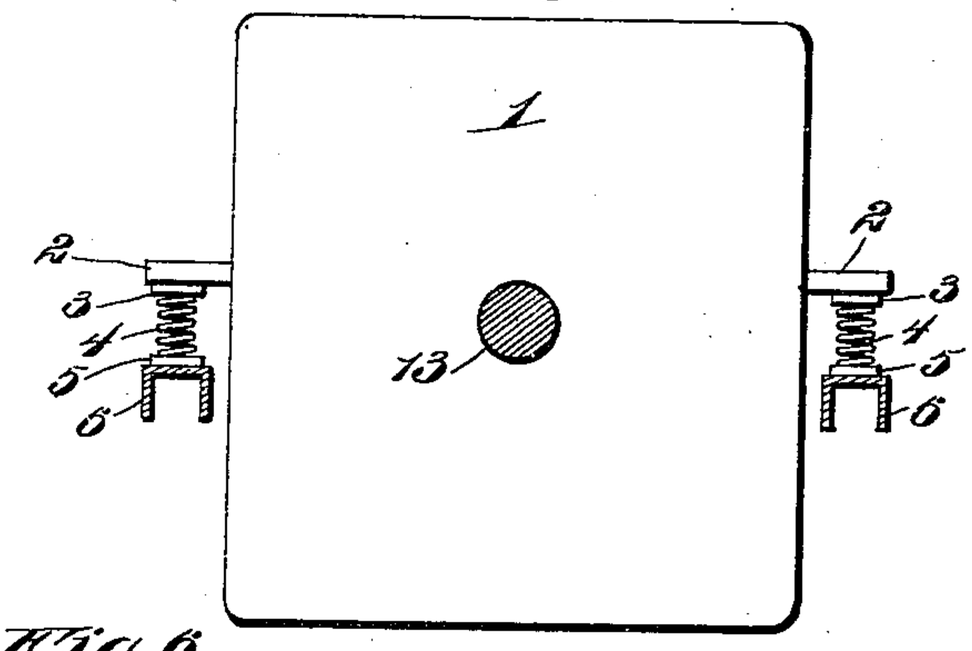
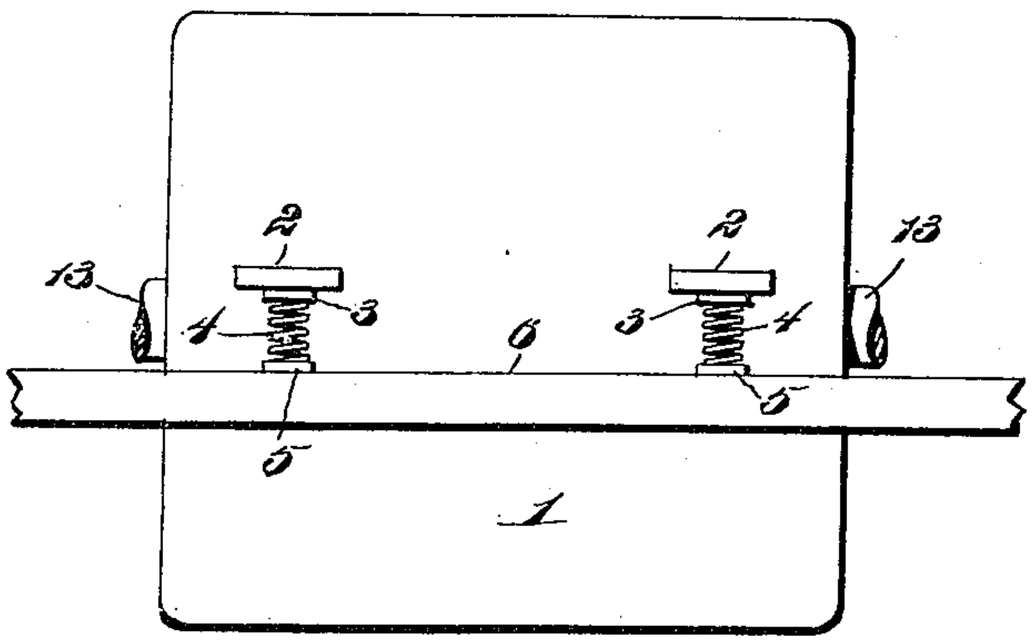


Fig. 6.



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UNITED STATES PATENT OFFICE.

ARNOLD A. INGRAHAM, OF LOWELL, MASSACHUSETTS.

ELECTRIC CAR.

SPECIFICATION forming part of Letters Patent No. 658,445, dated September 25, 1900.

Application filed October 2, 1899. Serial No. 732,343. (No model.)

To all whom it may concern:

Be it known that I, ARNOLD A. INGRAHAM, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Cars, of which the following is a specification.

My invention relates to electrically-propelled cars, and is designed as an improvement upon the invention disclosed in United States Letters Patent No. 387,610, granted to Joseph Weis under date of August 7, 1888.

The primary object of the invention is to avoid the employment of the gearing shown in the patent above referred to between the motor and the friction-wheels and to mount the friction-wheels concentric with the armature-shaft of the motor, thus materially reducing the friction.

A further object of the invention is to support the motor upon the car-truck elastically in such a manner as to avoid jar and reduce the pounding of the track-joints to the minimum.

A further object of the invention is to distribute the weight carried by the car and truck to supports on the axle-boxes outside of or beyond the wheels.

A further object of the invention is to provide flexible connections between the armature-shaft and friction-wheels to avoid strain upon the bearings of the friction-wheels.

These several objects and such others as may be disclosed hereinafter are effected by the improved construction shown in the accompanying drawings, which constitute a part of this specification, and in which—

Figure 1 is a top plan view of a car-truck and motor embodying the invention. Fig. 2 is a sectional side elevation showing means for moving the driving-wheels toward and from the friction-wheel. Fig. 3 is a side elevation of the motor, its shaft and flexible connections being shown in vertical section. Fig. 4 is a detail side view of one of the connecting-disks of the armature-shaft, and Figs. 5 and 6 are respectively an end view and a side elevation of the motor and its spring-supports.

The reference-numeral 1 designates the casing of an electric motor of any preferred construction, formed on opposite sides with projecting arms 2, provided on their under sides with depending flanges 3, which receive the upper ends of coil-springs 4, the lower ends of which are seated in cups 5, projecting from the upper sides of parallel transverse bars 6 of the truck, which are supported by longitudinal bars 7, the ends of which rest upon transverse bars or beams 8, supported by parallel longitudinal beams 9, resting upon the axle-boxes 10 beyond the wheels 11 and 12.

13 designates the armature-shaft of the motor, formed with arms 14, to which are secured the inner ends of coil-springs 15, the outer end of each of which is secured to the inner surface of an annular flange 16, projecting from a disk 17, formed integral with a shaft 18, carrying at its outer end a friction-wheel 19, adapted to revolve between the driving-wheels 11 and 12, provided with annular lateral extensions 20, constituting friction-surfaces, against which the friction-wheels 19 bear when said driving-wheels are forced against the friction-wheels by the mechanism best shown in Fig. 2. This mechanism consists of a rocking lever 21, fulcrumed on the truck, pitmen 22 and 23, connecting the lever 21 with sliding bearings 24 and 25 for the axles 26 of the wheels 11 and 12, and connecting bars or links 27 and 28, connecting the ends of the lever 21 with cranks 29 and 30, mounted upon transverse shafts 31 and 32 and adapted to be operated to draw the sliding bearings 24 and 25 together to bring their flanges 20 in contact with the friction-wheels 19 or force them apart to disengage the friction-wheel to stop the car.

An annular groove 33 is formed between each of the wheels 11 and 12 and their extensions 20. It will be understood that unless the extensions 20 and the friction-wheel 19 are the same width a ridge or shoulder would be formed upon one or the other as the result of wear. Without the groove 33 above referred to it would be impossible to form the friction-wheel and the extensions of the same width without causing the end of said friction to bear upon the faces of the wheels 11 and 12, thereby causing an undue amount of wear and tear upon the parts.

From the construction thus described it

will be apparent that the motor is yieldingly supported and that the yielding connections between the friction-wheels and armature-shaft avoid undue strain upon the bearings of the friction-wheels, at the same time affording a direct connection between the friction-wheels and driving-wheels.

While I have described my improvements in connection with a vehicle propelled by an electric motor, it is obvious that the same may be employed with motors driven by motive power other than electricity.

I claim—

1. The combination with a car-truck, of an electric motor supported by springs resting upon transverse bars; longitudinal bars supporting said transverse bars; transverse bars supporting said longitudinal bars; and longitudinal beams supporting said last-named transverse bars outside the wheels of the truck.

2. The combination with a car-truck, of driving-wheels provided with lateral extensions forming friction-surfaces, and having annular grooves separating said surfaces from the driving-wheels; a motor; friction-wheels arranged concentric to the shaft of the motor; and means for moving the driving-wheels toward and from the friction-wheels.

3. The combination with a car-truck, and the driving-wheels provided with lateral extensions forming friction-surfaces, of a motor; friction-wheels arranged concentric to the shaft of the motor; a lever mounted upon the truck; sliding boxes to the axles of said driving-wheels, pitmen connecting said boxes and lever; and means for operating said levers and pitmen, whereby the driving-wheels are moved to or from the friction-wheels.

4. The combination with a friction-wheel and its shaft, of a disk upon the free end of said shaft, an annular flange thereto, a motor having a shaft, an end of which projects within the flange of the disk, and a spring connection between said motor-shaft and flange.

5. The combination with a car-truck and driving-wheels provided with lateral extensions forming friction-surfaces; of a friction-wheel adapted to contact with an extension; a shaft to said wheel having a disk upon the inner end thereof; an annular flange upon the face of the disk, a motor; a shaft thereto, an end of which projects within the flange; and a spring connection between the flange and motor-shaft.

In testimony whereof I affix my signature in presence of two witnesses.

ARNOLD A. INGRAHAM.

Witnesses:

WM. L. CHURCHILL,

ADELBERT E. HUNTON.