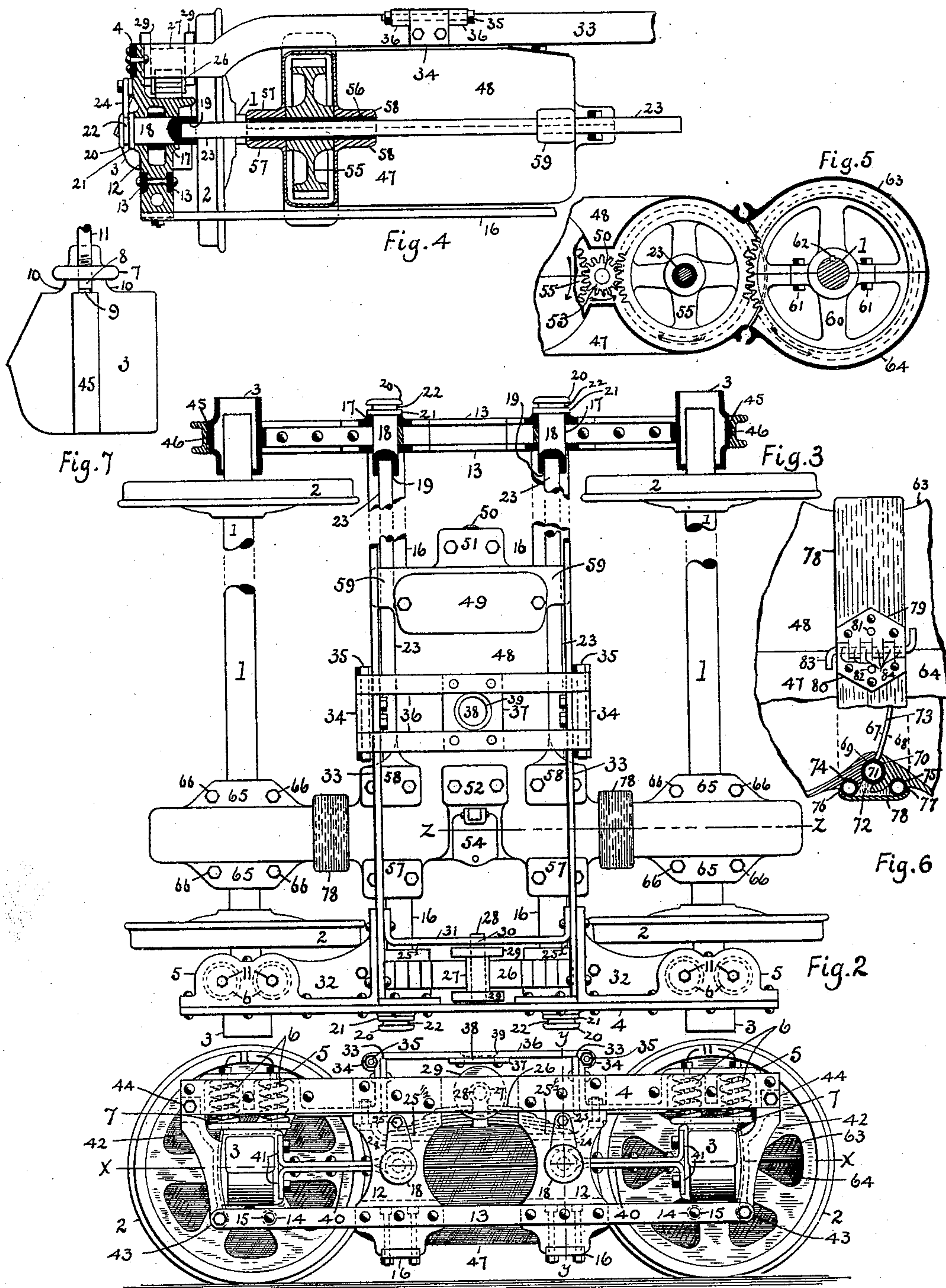


(No Model.)

L. T. PYOTT.  
ELECTRIC LOCOMOTIVE.

No. 585,120.

Patented June 22, 1897.



Witnesses.  
S. J. Murdock  
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Fig. 1

Inventor.  
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# UNITED STATES PATENT OFFICE.

LOUIS T. PYOTT, OF PHILADELPHIA, PENNSYLVANIA.

## ELECTRIC LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 585,120, dated June 22, 1897.

Application filed November 17, 1896. Serial No. 612,454. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS T. PYOTT, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Locomotives; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electric locomotives wherein a single motor is geared to both axles and between the same. I also provide means for readily and quickly removing the wheels, and also the ready and quick inspection of the motor or its removal. The attachment of my locomotives under the car or their removal therefrom in very short time is also provided for, a locomotive of my design being placed under each end of a car, each locomotive having four wheels or mounting and carrying long heavy cars upon eight wheels, all of which are used for traction and all being driven by two motors.

I attain the objects of my invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a plan of part of my structure. Fig. 3 is a section on line  $x x$ , Fig. 1. Fig. 4 is a section on line  $y y$ , Fig. 1. Fig. 5 is a section on line  $z z$ , Fig. 2. Fig. 6 is an enlarged view, partly in elevation and partly in section, of the gearing-casings and their flexible attachments. Fig. 7 is a side view of the axle-boxes and attachments.

Similar figures of reference indicate similar parts throughout the views.

Upon axles 1 are mounted driving-wheels 2, the axles entering axle-boxes 3, which are provided with bearings of any suitable description, as usual, and which need not be further described, as their use is well known. Above the axle-boxes 3 are side frames 4, extending somewhat beyond the axle-boxes and having attached to their inner sides spring-pockets 5. Springs 6 are seated therein at their upper ends and at their lower ends they

rest upon seats 7, these seats having a longitudinal tongue 8 centrally upon their lower part and fitting into a groove 9, formed by upward projections 10 from the axle-boxes 3, which extend across the axle-boxes and upon the tops of which the seats 7 rest. Bolts 11 pass downward through the spring-pockets 5, inside of the springs 6, and are screwed into the spring-seats 7, thus permitting the springs to be adjusted to proper tension and retaining the springs in place when the wheels 2 and their boxes 3 are removed, as will be further described hereinafter.

Between the axle-boxes 3, removed somewhat from the center of the side framing 4, but attached thereto, are supports 12, which reach downward to a distance below the axle-boxes 3 and have attached thereto inside and outside longitudinal bars 13, which extend somewhat beyond axle-boxes 3. Thimbles 14, inserted between them and held by rivets or bolts 15, stiffen them and tie them together parallel with their attachment to the supports 12. At the lower end of supports 12 are attached transverse bars 16, which reach across from the supports 12 of one side of the locomotive to the other side, tying the sides to each other. Centrally in the supports 12 in a horizontal line with the axles 1 are circular passages 17, into which are inserted motor-bar supports 18 of round section, having pockets 19 within their inner ends and beyond supports 12 and flanges 20 21 and groove 22 in their outer ends. Within the pockets 19 motor-supporting bars 23 are inserted and carried, and within the grooves 22 latches 24 enter, the latches being swingingly attached at 25 to the supports 12, and when in place in grooves 22 the flanges 20 21 prevent the withdrawal of the motor-bar supports 18.

At 25½ seats are formed on supports 12, on which rest the ends of body-springs 26, the springs having a central band 27, which reaches above the spring and is bored to receive an axle 28, carrying side bearing-wheels 29, on which the car-body is supported. These wheels permit the easy turning of the locomotive under its load, while transferring the weight to be carried upon the springs for easy vertical movement. The inner ends of the axles 28 extend beyond the inner wheels 29 and are inserted in a perpendicular slot 30,



formed in tie-bar 31, thus preventing the springs 26 from creeping or shifting their position longitudinally.

To brackets 32, formed on spring-seats 5, are attached upper transverse bars 33, which reach from one side of the locomotive to the other side, and near the ends of these bars 31, already mentioned, are attached. Midway of the bars 33 are attached, outside of each, hinge-pieces 34, formed at their upper ends to hold hinge-bolts 35, which extend through at each side far enough to hold bars 36, which pass each side of hinge-pieces 34, rest upon upper transverse bars 33, and carry the king-bolt guide-plate 37, secured to the center of the bars 36, and having a central guiding-hole 38 and an oil or tallow recess 39.

The axle-boxes 3, wheels 2, and axles 1 are radially carried in the upward and downward movement by the following construction: Radius-bars 40 are vertically attached to axle-boxes 3 upon their inner face by bolts in feet 41, which are turned one up and one down. From the horizontal center of the axle-boxes 3, thereafter doubling upon itself, the bars 40 reach inward and encircle the motor-bearing supports 18 within the supports 12. The two parts of the bars 40 are secured to each other where lying together. At the outer side of the axle-boxes 3 are pedestals 42, hinged at 43 to the longitudinal bars 13 and between the same and secured at their upper ends to the side frames 4 and spring-pockets 5 by removable bolts 44, which when removed permit the pedestals 42 to swing downwardly and outwardly away from the axle-boxes 3 when it is required to remove them and their wheels 2 and axles 1, the outer faces of the axle-boxes being curved radially from the centers of the motor-bar supports 18. Upon the curved surface of the axle-boxes 3 is a tongue 45, fitting into a recess 46, formed in the pedestals 42, the object of the tongue and groove being to hold the boxes transversely from any tendency to move on account of any shock or blow received by the wheel-flanges from the rails and thereafter transmitted by the wheels and axles to the axle-boxes.

A motor of suitable power and construction is inclosed within a casing composed of a lower part 47 and an upper part 48, an inspection-cover 49 being secured over an opening at the inner upper end.

The armature-shaft 50 is central between and parallel to axles 1 and horizontally in the same plane and runs in bearings 51 52. At one end of the armature-shaft 50 is secured the armature-pinion 53, and over it in the casing 48 is an opening having a cover 54 for inspection and oiling. The pinion 53 gears into intermediate gears 55, one being at each side, they being run on sleeves 56, confined in bearings 57 58 of casing 47 48 and secured on motor-supporting bars 23, which extend transversely across the machine and are carried by the motor-bar supports 18, heretofore described, and also pass through lugs 59,

formed on the lower part 47 of the motor-casing. Thus it will be seen that the bars 23 support the motor, its casing, the armature-pinion 53, and sleeves 56, on which the intermediate gears 55 turn. The direction in which pinion 53 runs reverses the movement of intermediate gears 55, as will be seen by the arrows in Fig. 4, and while pinion 53 lifts one it depresses the other, thus tending to reduce rattling and backlash to a minimum. Both trains of gears being run in one direction, the wear is upon one side of the teeth, which enables their being turned to wear the other side of the teeth, thus adding largely to their usefulness and durability by doubling the life of the gears. It will also be noticed that the armature-pinion 53 runs in the same direction as the driving-wheels 2.

The driving-gears 60 are placed upon the axles 1, they being in halves and secured together by bolts 61 and driving the axle by key 62. The reduction of speed from the motor to the wheels 2 is 4.78, as shown in this instance, the number of teeth in each train of gears being fourteen, fifty-one, and sixty-seven, and by the radius-bar mechanism the intermediate and axle gear-teeth are at all times equidistant and their teeth have at all times the same amount of contact. The motor-casing 47 48 embraces pinion 53 and intermediates 55, and separate casings composed of upper parts 63 and lower parts 64, they being held by lugs 65, which are formed on each part of the casing, go half-way around the shaft and are secured to each other by bolts 66. Casings 63 64 must be joined to casings 47 48 to exclude dust and dirt, and as casings 63 64 must also follow axles 1 and wheels 2 in their upward and downward radial movement, due to inequalities of track, together with the lateral movements due to the thrusts of the wheel-flanges against the rails, and as the car-body and its load, resting upon side bearing-wheels 29 and body-springs 26, is liable to compress springs 6 and move the whole mechanism, which rests upon axle-boxes 3, there must be a yielding movement between the casings where they are joined. To accomplish this desirable and necessary movement, I form the open ends 67 of casings 47 48 in a curved line radial from the center of motor-supporting shafts 23, which is also the center of intermediate gears 55, this being necessary, as the radius-bars 40 control the movement of axles 1, wheels 2, and gears 60 radially from their center around motor-shaft supports 18. The inner open end 68 conforms to 67, but no contact of metal to metal is made, each casing end falling short of touching the other.

Formed in ends 67 68 are recesses 69 70, into which are inserted a yielding substance. As shown in Fig. 6 it is a hose 71, the ends of casings exterior thereof being formed to make a space 72 wider than the space 73 within the yielding substance, so that as 71 is compressed it will yield into space 72, as it is important to prevent any foreign sub-



stance from entering the gear-casings and coming in contact with the gears.

I still further provide means for excluding dust and dirt by forming seats 74 on casings 47 47 and 75 on casings 63 64, in which are seated compressible material 76 77, respectively. As shown in Fig. 6 it is hose, but other suitable material may be used. The recesses 69 70 and seats 73 74 extend entirely around the open ends of the casings, and exterior to the compressible material 76 77 is placed a flexible strap or binder 78, having interlocking ends 79 80 and projections 81 82. The strap or binder 78, after being put in place, will be drawn tightly together by means of the projections 81 82 and secured by a removable piece 83, inserted through openings 84 made in interlocking ends 79 80.

The wheels 2 on axles 1 are removed by removing bolts in feet 41, removing bolts 44 and swinging pedestals 42 down, and removing piece 83 from strap or binder 78, or if wedges are inserted above transverse bars 16 and under motor casing 47 to support the motor, latches 24 may be moved to one side, when motor-shaft supports 18 may be withdrawn. Then by removing bolts 44 the pedestals 42 may be swung down, piece 83 be removed from strap 78, and the wheels 2 rolled out, in either case it being unnecessary to jack up the car-body or to remove the locomotive from under it.

To remove the motor, a pair of wheels already being removed, it is only necessary to insert blocking under transverse bars 16 to support the car-body, when, by swinging latches 24 to one side, motor-bar supports 18 may be withdrawn, leaving the motor free to be removed; or the motor and a pair of wheels may be removed by loosening the opposite straps 78, swing down the pedestals on the side of the wheels to be removed, and withdrawing the motor-bar supports. In either instance the removal can be made without removing the locomotive from under the supported car-body. The king-bolt guide-plate 37 and its attached bars 35 are hinged, as described, at each end to enable the bars and the plate to be swung away from above the motor-casing, when the locomotive is detached from the car. If it is necessary or desirable to have a clear working-space above the motor-casing, all that is necessary to be done is to remove a hinge-bolt 35. When wheels 2 are removed, the axle-boxes 3, by means of the tongue 8, fitting in the groove 9, permit the boxes to slide out without removing the spring-seat 7 or springs 6, which are held in place by bolts 11.

It will be noticed that my entire locomotive above the axle-boxes is carried by springs 6, which are properly the locomotive-springs, no additional springs being necessary for the motor and its casing, while the supported car and its load are supported upon the springs 26, and this construction greatly decreases

the number of springs usually employed for similar work.

Having described my invention and the best means I am now aware of to carry it into practice, I claim—

1. An electric locomotive having driving-wheels and axles therefor, a framework supported thereby, removable means upon the framework for supporting a motor-case and a motor centrally disposed between said axles and having its armature-shaft parallel thereto, a spur-pinion upon the armature-shaft, a double train of spur-gears engaging therewith and moving radially-held axle-gears and driving-wheels in the same direction as the armature-pinion, removable casings over the axle-gears and means to secure the axle-gear casings radially yielding to the motor-casing, substantially as described.

2. An electric locomotive having a framework therefor carried on driving-wheels mounted upon driving-axles carried in axle-boxes radially held and guided from the framework, by radius-bars and pedestals bearing only upon the outer sides of the axle-boxes and curved upon their faces next thereto, and a centrally-located motor having its armature-shaft gear interposed between the driving-axles and geared thereto substantially as set forth.

3. An electric locomotive having a framework of upper and lower members therefor substantially as described, supporting members attached to the upper and lower members at each side of the center, and carrying radius-bars attached to the axle-boxes ties from the upper members and the lower members of one side to those of the opposite side, single-legged pedestals curved upon their inner face and guiding axle-boxes and hinged upon the outer ends of the lower members and fastened removably to the upper members, removable means on the frame for supporting a single motor-case and an inclosed motor independent of any axle-support and means to lock the removable supports, substantially as described.

4. In an electric locomotive, a framework therefor, composed of side frames above the axle-boxes, longitudinal bars below the axle-boxes, supports between the axle-boxes and connecting the side frames and the longitudinal bars, removable means within the supports to carry the supporting-shafts of a motor-case and its motor, means to lock the removable means, a sleeve upon each shaft, bearings on the motor-case inclosing and holding the sleeves and lugs upon the motor-case for its suspension from the shafts, substantially as described.

5. In an electric locomotive a framework therefor, composed of side frames, longitudinal bars, central supports, upper and lower ties across from the frame of one side to the frame of the other side, radius-bars pivoted to the central supports and secured to axle-



boxes, axle-boxes curved upon their outer side, pedestals hinged to the longitudinal bars, curved upon their inside and removably secured to the side frames, spring-pockets attached to the side frames, springs within the  
 5 pockets, seats under the springs adjustably supported, axle-boxes under the spring-seats and means whereby the axle-boxes may be withdrawn and the springs remain upon their  
 10 seats and within the spring-pockets, substantially as described.

6. In an electric locomotive, a framework therefor, constructed of side frames and longitudinal lower bars, upper transverse ties  
 15 for the side frames, lower transverse ties for the longitudinal bars, pockets for springs at the ends of the side frames, springs in the pockets and means for their support adjustably, outer pockets hinged upon the longitudinal bars, central supports from the side  
 20 frames to the longitudinal bars, spring-pockets within the central supports and springs seated therein, substantially as described.

7. In an electric locomotive a framework  
 25 substantially as described and having central supports with spring-pockets therein, springs in the pockets, a central band upon the springs an axle within the band and side bearing-wheels upon the axle and outside of the  
 30 band, substantially as described.

8. In an electric locomotive a framework therefor comprising members as described, springs within pockets of the central support members thereof, a central band thereon holding  
 35 and supporting an axle and bearing-wheels and means to permit the vertical movement of the spring while at the same time preventing its longitudinal movement, substantially as described.

9. In an electric locomotive, a framework therefor of central supports attached to side frames and longitudinal bars and transversely held as described, pedestals bearing only upon  
 45 the outsides of the axle-boxes and hinged at the lower outer ends of the frame to be swung downward upon the release of the fastening to the framework at their upper ends, a curved surface upon the inner face of the pedestals, axle-boxes adjoining the inner face of the  
 50 pedestals and having their outer face curved to conform to the curve of the pedestals, and interlocking means upon the curved surfaces of the pedestals and axle-boxes to restrict the lateral movement of the axle-boxes, substantially as described.  
 55

10. In an electric locomotive, a framework therefor of substantially the construction described, means to suspend and carry a motor removably upon the framework, a gear upon  
 60 the armature-shaft of the motor, a double

train of intermediate gears carried upon the means on the frame used to suspend the motor and its case, gears upon the driving-shafts, radius-bars from each means of motor suspension to each driving-axle box to radially  
 65 control the movement of each driving-shaft and the gears thereon in an equidistant path from the center of the intermediate-gear shaft, as the driving-axles rise and fall and thereby maintain the constant depth of contact of the  
 70 teeth of the intermediate and driving-axle gears, substantially as described.

11. In an electric locomotive, a framework therefor supported by wheels and axles, means for guiding the wheels and axles for radial  
 75 movement from the center of removable supports provided on the frame for a motor-case wherein is carried a motor having its armature-shaft parallel to the axles aforesaid, and between the same, and a central guiding king-  
 80 bolt plate resting upon transverse members of the framing and secured thereto, front and back by means to permit its being swung from its working position, substantially as described.  
 85

12. In an electric locomotive, a framework therefor as and for the purpose described, driving-axles, wheels and axle-boxes supporting the frame, a motor-case removably supported upon the frame and inclosing a motor,  
 90 its armature-gear and two intermediate gears, a gear upon each driving-axle, casings over the gears, openings in the gear-casings through which the intermediate and driving-axle gears are united, recesses surrounding each opening  
 95 yielding material in the recesses, seats exterior to the openings and yielding material seated therein and means to inclose the yielding material and exclude the entrance of foreign substances into the gear-casings and also  
 100 the exit of lubricating material therefrom substantially as described.

13. An electric locomotive comprising a framework substantially as described, a motor and its casing thereto removably held and  
 105 thereby carried, axles, wheels, and axle-boxes, multiple springs supported upon yielding seats supported from the framework, and inserted in grooves on the axle-boxes and carrying all of the aforesaid parts, and separate  
 110 springs mounted upon the framework and having rolling means thereon for supporting a car-body, substantially as described.

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

LOUIS T. PYOTT.

Witnesses:

R. C. WRIGHT,

WILLIAM C. STOEVER.