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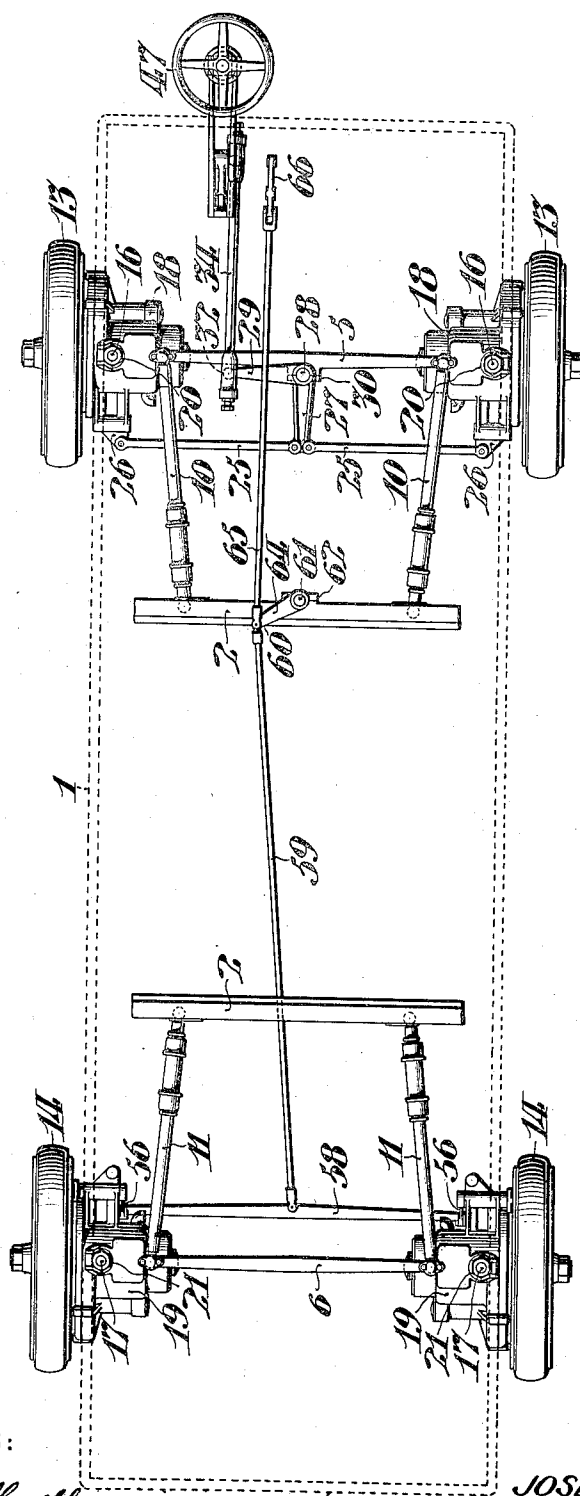
PATENTED APR. 2, 1907.

J. LEDWINKA.
AUTOMOBILE.

APPLICATION FILED JULY 10, 1906.

5 SHEETS—SHEET 1.

FIG. 1.



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JOSEPH LEDWINKA,
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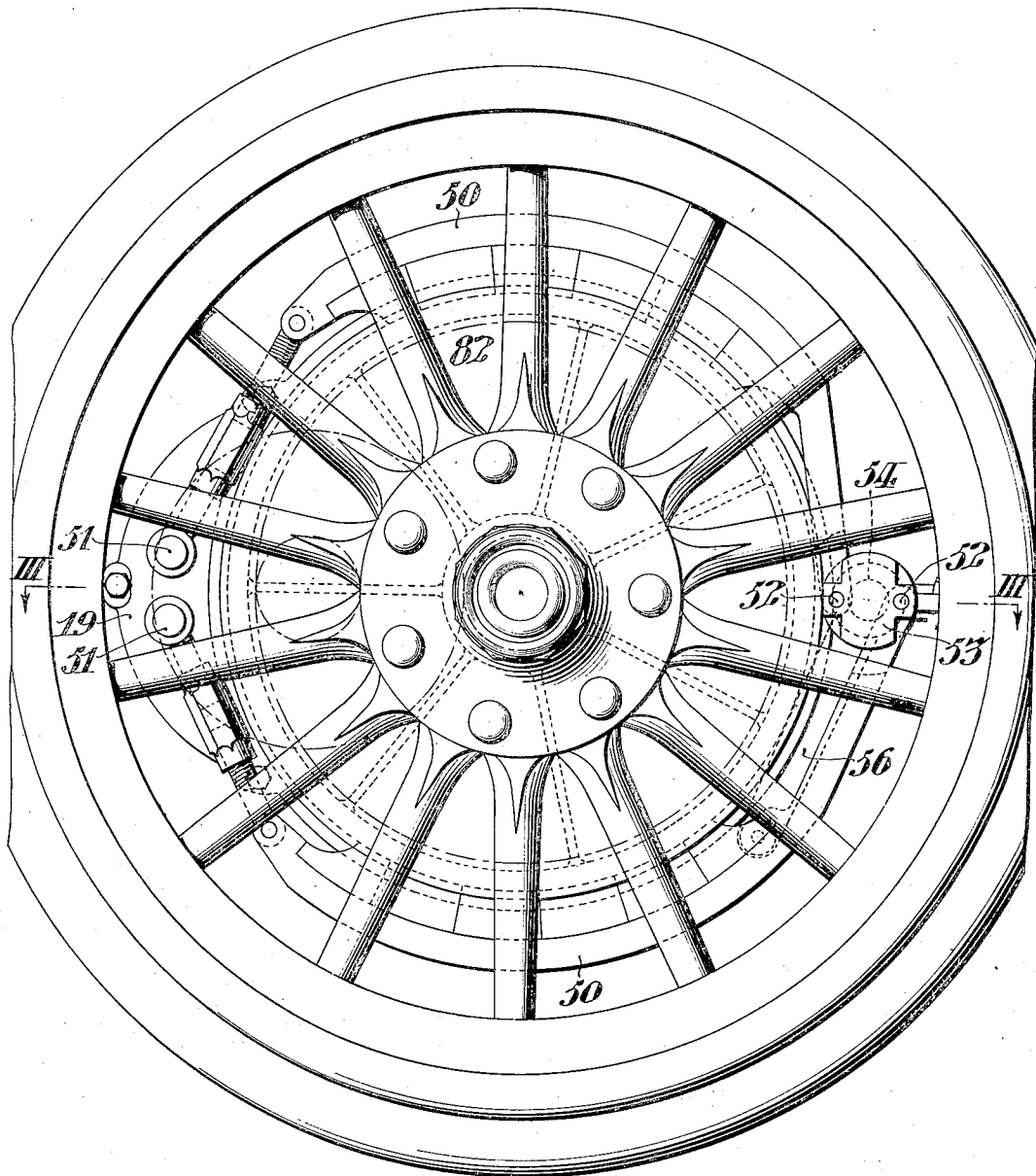
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5 SHEETS—SHEET 2.

FIG. II.



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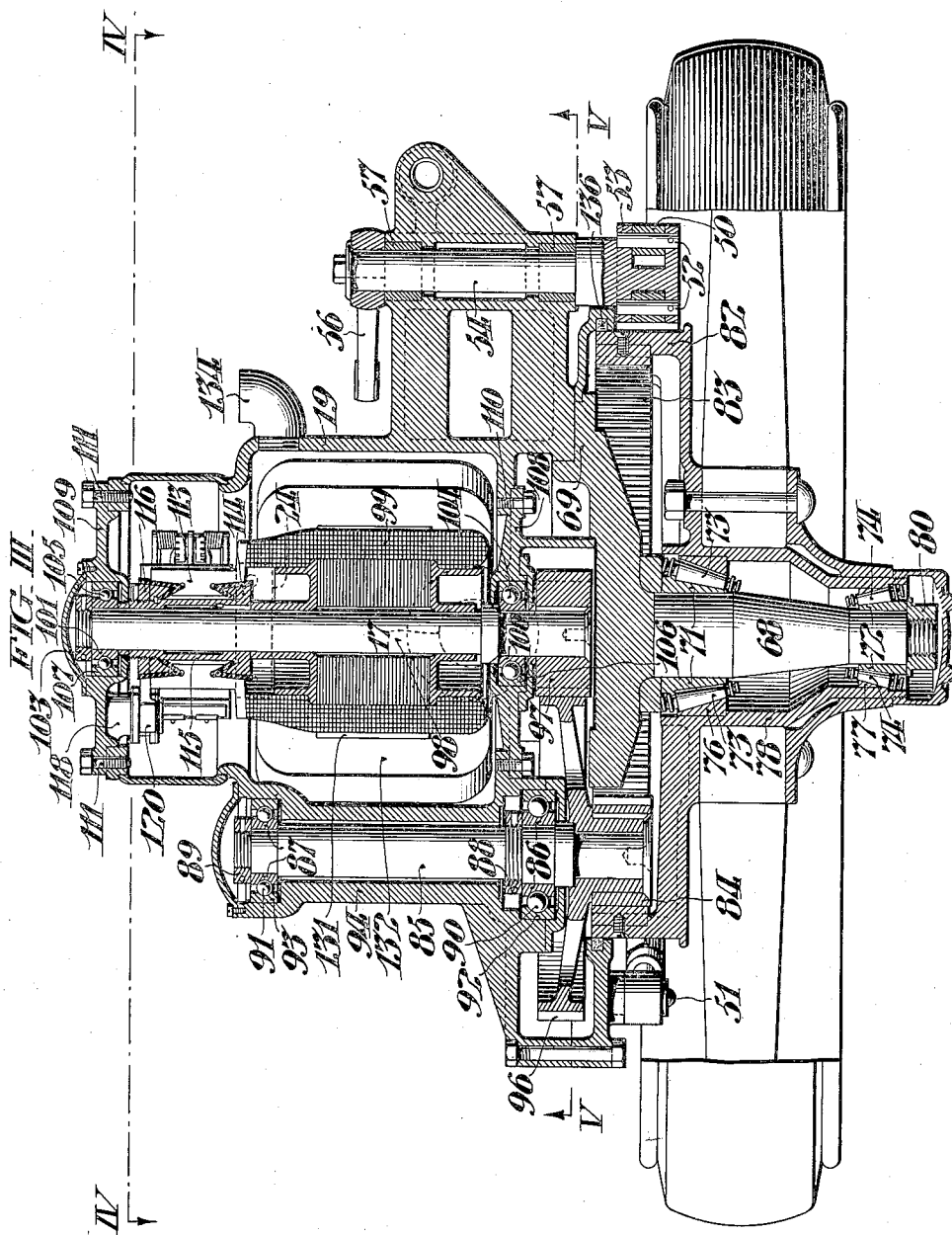
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5 SHEETS—SHEET 3.



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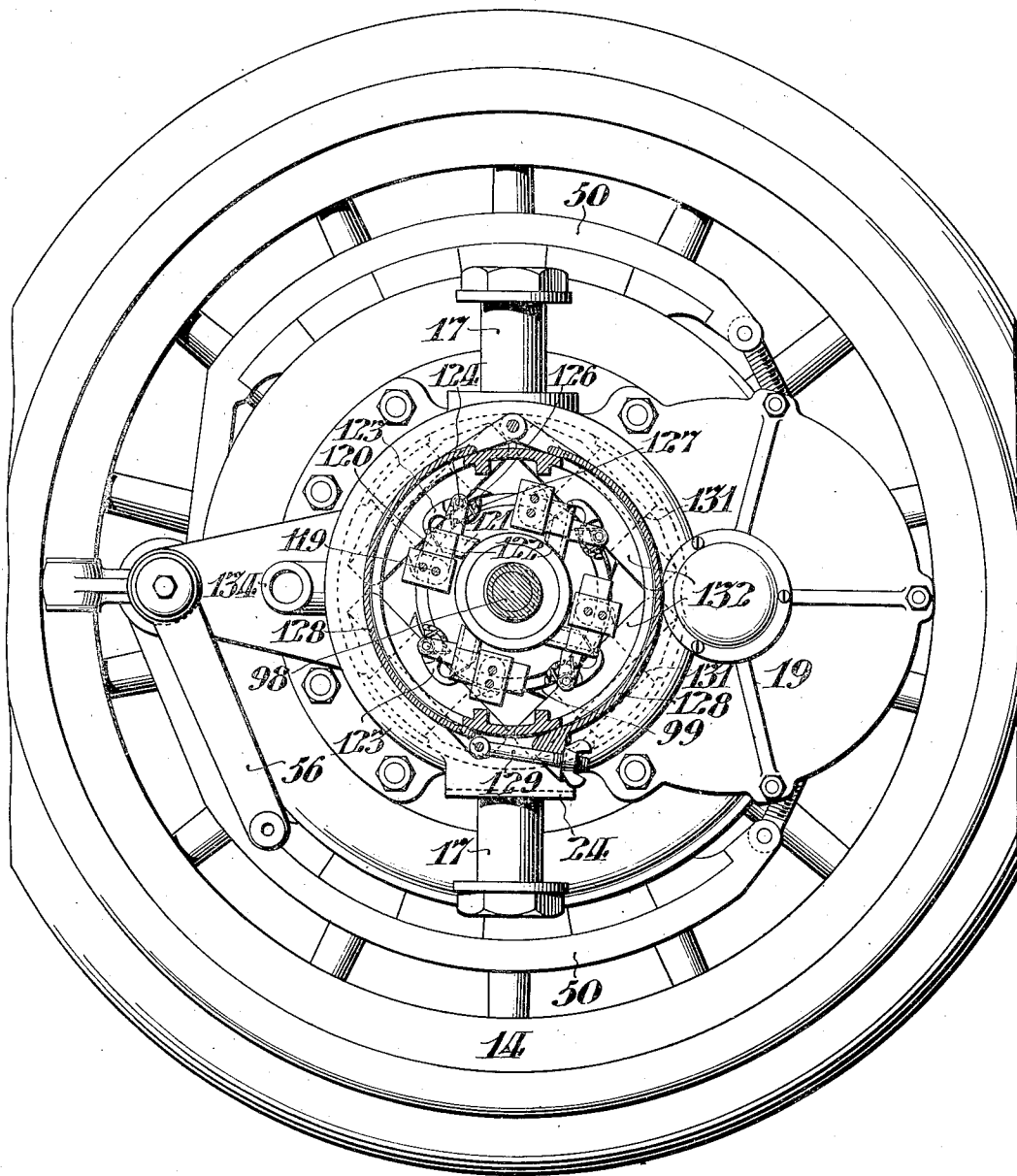
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6 SHEETS—SHEET 4.

FIG. IV.



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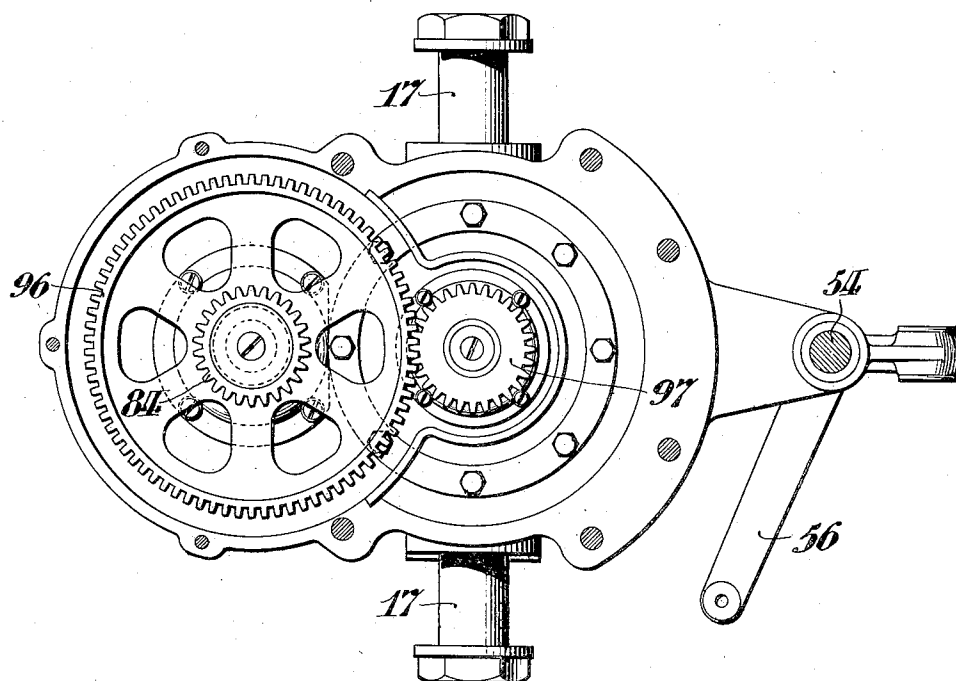
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5 SHEETS—SHEET 5.

FIG. V.



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UNITED STATES PATENT OFFICE.

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AUTOMOBILE.

No. 849,145.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed July 10, 1906. Serial No. 325,457.

To all whom it may concern:

Be it known that I, JOSEPH LEDWINKA, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Automobiles, whereof the following is a specification, reference being had to the accompanying drawings.

My improvement relates to electrically-propelled automobiles of the type wherein the motors are respectively local to the vehicle-supporting wheels and arranged to turn with the latter on vertical axes in the vehicle-frame, and particularly to the construction and arrangement of the driving mechanism connecting such motors and wheels.

As hereinafter described, the improved driving mechanism includes a counter-shaft carried by the motor-casing independently of the vehicle-supporting wheel, but provided with a pinion engaging an internal gear-wheel carried by said vehicle-wheel.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified, including brake mechanism carried by said motor-casing and adapted to check the rotation of the vehicle-supporting wheel.

In said drawings, Figure I is a plan view of the running-gear of a vehicle conveniently embodying my improvements. Fig. II is a side elevation of the right-hand rear wheel and motor shown in Fig. I. Fig. III is a plan sectional view taken on the line III III in the direction of the arrows shown in Fig. II. Fig. IV is a vertical sectional view taken on the line IV IV in the direction of the arrows shown in Fig. III. Fig. V is a vertical sectional view taken on the line V V in the direction of the arrows shown in Fig. III.

Referring to Fig. I, the body-frame of the vehicle comprises the rectangular platform 1 and the vertical hanger-frames 2, which are in rigid relation therewith. The under-frame comprises the front and rear axle-frames 5 and 6, connected with said body-frame by suitable springs bearing upon the respective axle-frames 5 and 6 and by spring buffer-rods 10 and 11, said rods being arranged in pairs respectively local to the front wheels 13 and rear wheels 14. Said wheels 13 and 14 are respectively connected

with said front and rear axle-frames 5 and 6 by vertical trunnions 16 and 17, which are in rigid relation with the respective motor-casings 18 and 19, supported in bearings 20 and 21 in their respective axle-frames. The rear wheels 14 are prevented from turning on their trunnions 17 and are maintained in parallel relation by the lugs 24 on the casings 19, which are rigidly secured to the axle-frame 6 by bolts. However, the front wheels 13 are free to turn upon their trunnions 16, such turning movement being effected by the links 25, which are pivoted to the brackets 26 on the motor-casings 18. Said links 25 are each connected with the arm 27 of the bell-crank lever, comprising the vertical shaft 28 and the arm 29, said shaft being mounted in the bearing 30 in said axle-frame 5. As indicated in Fig. I, said lever-arm 29 is provided with the ball end 32, engaging a socket in the link 34, and said link is operatively connected with the steering-wheel 47, so that said wheels 13 may be turned upon their vertical trunnions 16 in either direction, in accordance with the direction of rotation of said wheel 47. Each of said wheels 14 is provided with a hand-brake comprising two semi-annular members 50, which, as shown in Figs. II and III, are pivoted at 51 upon the motor-casings 19 and pivoted at their opposite ends upon the eccentric-pins 52 in the drum 53, carried by the shaft 54, which is provided with the operating-lever 56 and mounted to turn in bearings 57 in said casing 19.

As shown in Fig. I, the two brake-levers 56, respectively, local to the wheels 14, are transversely connected by the yoke 58, and the latter is connected by the link 59 with the lever-arm 60, carried by the shaft 61, mounted in the bearing 62 on the front hanger-frame 2. Said shaft 61 is provided at its upper end with the lever-arm 64, which is connected by the link 65 with the bell-crank lever 66. It is to be understood that said bell-crank lever 66 may be connected with any suitable mechanism whereby said links 65 and 59 may be longitudinally reciprocated to apply and release the brakes 50.

Each vehicle-supporting wheel 13 and 14 is operatively connected with its motor, like the wheel 14, (shown in Figs. II to V, inclusive,) wherein the axle 68 of said wheel is

secured in rigid relation with the motor-casing 19 by the flange 69. Said axle 68 is provided with the conical roller-bearing rings 71 and 72 for the respective rollers 73 and 74, which engage corresponding bearing-rings 76 and 77 in the hub 78 of said wheel, said bearings being adjustable by the nut 80, which also retains said wheel on its axle in its normal position. (Shown in Fig. III.) Said hub 78 carries the brake-drum 82, which coöperates with the brakes 50 above described, and said drum is provided with the internal gear-wheel 83, which engages the pinion 84, which is rigidly secured to the counter-shaft 85. As shown in Fig. III, said counter-shaft 85 is provided with ball-bearing rings 86 and 87, respectively retained by the nuts 88 and 89 in screw-threaded engagement with said shaft. Said bearing-rings 86 and 87 respectively engage the bearing-balls 90 and 91, which are engaged by corresponding bearing-rings 92 and 93 in the bearing-boss 94 on the motor-casing 19. Said pinion 84 is in unitary relation with the gear-wheel 96, which is engaged by the pinion 97, the latter being rigidly secured to the shaft 98 of the motor-armature 99. Said shaft 98 is provided with bearing-rings 100 and 101, the latter being retained by the nut 103. Said bearing-rings 100 and 101 respectively engage the bearing-balls 104 and 105, which are mounted to rotate in corresponding bearing-rings 106 and 107 in the respective bearing-plates 108 and 109. Said bearing-plates 108 and 109 are rigidly secured in removable relation in the motor-casing 19 by the respective bolts 110 and 111. Said shaft 98 carries the commutator-sections 113 in rigid relation therewith, between the flange 114 in unitary relation with the sleeve 115, and the ring 116 in screw-threaded relation with said sleeve. Said plate 109 is provided with the four bosses 118, which respectively support by the screws 119 the four brush-holders 120. (Shown in Fig. IV.) Said brush-holders comprise rectangular tubes 121, through which carbon-block brushes 122 are presented in contact with the armature-segments 113, under pressure of the rocker-arms 123, which are pivoted at 124 in said brush-holders 120. Said arms 123 are pressed upon said blocks 122 by the springs 126, the outer ends of which may be selectively engaged with either one of the notches 127 to adjustably vary the pressure of contact of the brushes 122 on the commutator.

As shown in Fig. IV, the casing 19 is provided with lateral openings local to the commutator, and said openings are provided with semicircular doors 128, which are normally closed together by the swing-bolt 129 in the position shown in Fig. IV, but which may be released and upturned to afford access to the commutator and brushes. As indicated in dotted lines in Fig. IV, the polar projections

131 of the motor-field extend radially in rigid relation with said casing 19 and are provided within the latter with respective field-coils 132, which are electrically connected with the exterior circuit of the vehicle by leads which extend through the elbow 134, (shown in Figs. III and IV,) but which are omitted from the drawings.

It may be observed with reference to Fig. III that all of the members of the motor and the gearing connecting the same with the vehicle-wheel are inclosed and that the joint between the casing 19 and the drum 82, which turns therein, is sealed by the dust-guard ring 136.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. The combination with a vehicle-wheel; of a stationary axle for said wheel; a motor-casing supporting said axle in rigid relation therewith; a motor carried by said casing comprising an armature-shaft in alinement with said axle; means supporting said armature-shaft independently of said axle; a pinion on said armature-shaft; a counter-shaft provided with a bearing on said motor-casing exterior thereto; a gear-wheel carried by said counter-shaft in engagement with said armature-shaft pinion; a pinion on the end of said counter-shaft adjoining said gear-wheel; and, a gear-wheel carried by said vehicle-wheel in engagement with said counter-shaft pinion, substantially as set forth.

2. The combination with a vehicle-wheel; of a motor-casing carrying a stationary axle for said wheel; a motor carried by said casing, comprising an armature-shaft; means supporting said armature-shaft in said casing independently of said axle; a bearing on said motor-casing exterior thereto; a counter-shaft mounted in said exterior bearing; a pinion on said armature-shaft; a gear-wheel on said counter-shaft engaging said armature-shaft pinion; a pinion on said counter-shaft; and, a gear-wheel on said vehicle-wheel, engaging said counter-shaft pinion, substantially as set forth.

3. The combination with a vehicle-wheel provided with a brake-drum; of a motor-casing carrying a stationary axle for said wheel; a band-brake encircling said drum; a brake-shaft mounted to oscillate on said motor-casing; a head at one end and a lever at the other end of said brake-shaft; eccentric-pins in said head respectively connected with the opposite ends of said brake-band; and, a power-transmitting connection between said motor and said vehicle-wheel, substantially as set forth.

4. The combination with a vehicle-wheel

provided with a brake-drum; of a motor-casing carrying a stationary axle for said wheel; a band-brake encircling said drum; a brake-shaft mounted to oscillate on said motor-casing; a head at one end and a lever at the other end of said brake-shaft; eccentric-pins in said head respectively connected with the opposite ends of said brake-band; and, power-transmitting connection between said motor and said vehicle-wheel, comprising an internal gear-wheel in rigid relation with said brake-drum, substantially as set forth.

5. The combination with a vehicle-wheel provided with a brake-drum; of a motor-casing carrying a stationary axle for said wheel; a band-brake encircling said drum; a brake-shaft mounted to oscillate on said motor-casing; a head at one end and a lever at the other end of said brake-shaft; eccentric-pins in said head respectively connected with the opposite ends of said brake-band; a power-transmitting connection between said motor and said vehicle-wheel, comprising an internal gear-wheel in rigid relation with said brake-drum; a counter-shaft provided with a pinion engaging said internal gear-wheel; a gear-wheel in rigid relation with said counter-shaft pinion; and, a pinion on the armature-shaft of said motor, engaging said counter-shaft gear-wheel, substantially as set forth.

6. The combination with a vehicle-wheel; of a motor-casing carrying a stationary axle for said wheel; a motor-armature provided with a commutator mounted to rotate within said casing; openings in opposite sides of said casing local to said commutator; doors for said openings pivoted on said casing, and, a swing-bolt arranged to connect said doors in closed position, substantially as set forth.

7. The combination with a vehicle-wheel; of a motor-casing carrying a stationary axle

for said wheel; a motor carried by said casing, comprising an armature-shaft; bearings in unitary relation with said casing, respectively upon opposite sides thereof; a brake-shaft mounted in one of said bearings; a counter-shaft mounted in the other of said bearings; and, a power-transmitting connection between said armature-shaft and vehicle-wheel, substantially as set forth.

8. The combination with a vehicle-wheel; of a motor-casing carrying a stationary axle for said wheel; a motor carried by said casing comprising an armature-shaft in alinement with said axle; means supporting said armature-shaft independently of said axle, comprising bearing-plates respectively at opposite ends thereof; means securing said plates in removable relation with said motor-casing; brush-holder bosses carried by the outer one of said bearing-plates; brush-holders secured to said bosses; and, a power-transmitting connection between said armature-shaft and vehicle-wheel, substantially as set forth.

9. The combination with a vehicle-wheel; of a motor-casing carrying a stationary axle for said wheel; a motor carried by said casing, comprising a bearing-plate at the end of said casing; means securing said plate in removable relation with said casing; brush-holder bosses carried by said bearing-plate; brush-holders secured to said bosses; and, a power-transmitting connection between said armature-shaft and vehicle-wheel, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 5th day of July, 1906.

JOSEPH LEDWINKA.

Witnesses:

D. BRITTON CHAMBERS,
CHARLES BERG.