D. BALACHOWSKY & P. CAIRE.

DRIVING WHEEL FOR ELECTRICALLY PROPELLED VEHICLES.

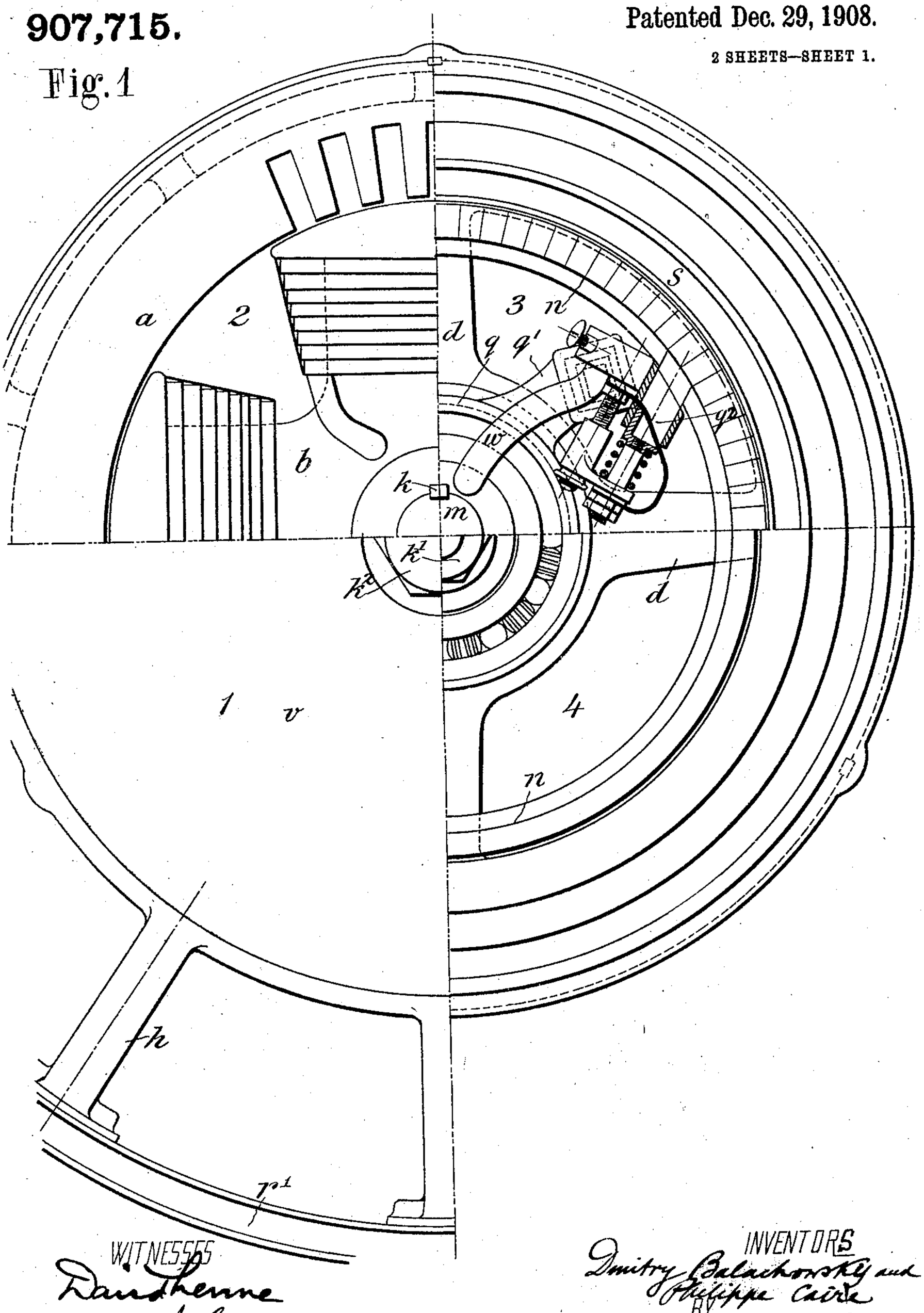
APPLICATION FILED MAY 8, 1907.

907,715.

Patented Dec. 29, 1908.

2 SHEETS—SHEET 1.

Fig. 1



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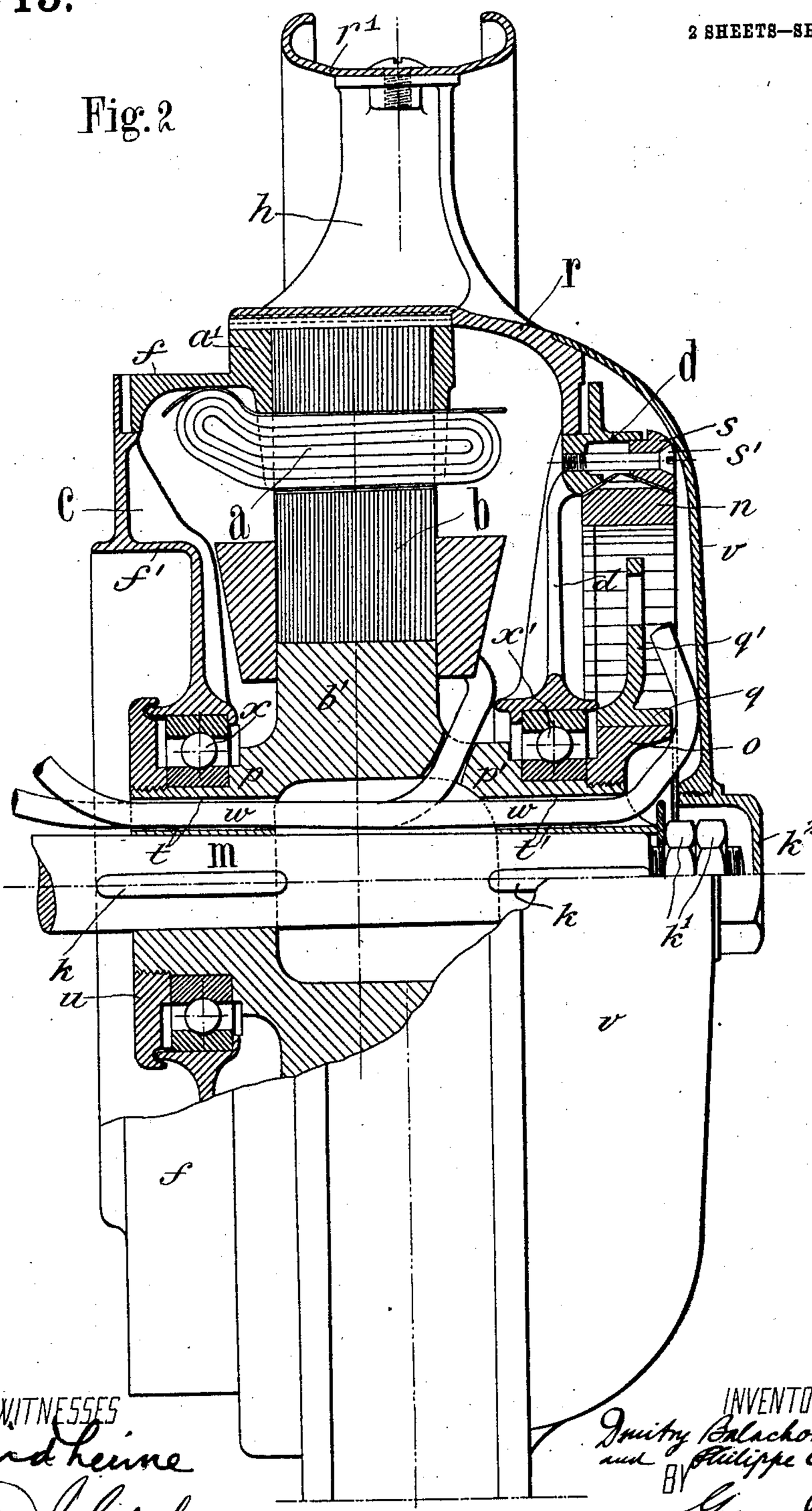
2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

DMITRY BALACHOWSKY, OF PARIS, AND PHILIPPE CAIRE, OF LEVALLOIS-PARIS, FRANCE.

DRIVING-WHEEL FOR ELECTRICALLY-PROPELLED VEHICLES.

No. 907,715. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed May 8, 1907. Serial No. 372,576.

To all whom it may concern:

Be it known that we, DMITRY BALACHOWSKY, a subject of the Emperor of Russia, and resident of Paris, France, and PHILIPPE CAIRE, a citizen of the Republic of France, and resident of Levallois-Paris, France, have invented new and useful Improvements in Driving-Wheels for Electrically-Propelled Vehicles, which improvements are fully set forth in the following specification.

The present invention has for its object the provision of an improved motor-driven wheel for electrically propelled vehicles in which the motor is embodied in the wheel structure, the improvements being intended to render the wheel and its motor readily separable as a unit from the axle.

The invention also aims to provide a construction in which certain of the essential members are utilized as brake-rings and in which the commutator is arranged and mounted in such a manner as to withstand the shocks which are transmitted to it directly.

With these ends in view the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawing, in which the same parts are denoted by the same reference characters in both views: Figure 1 is a composite side-elevation of a motor-driven wheel constructed in accordance with the invention. In this figure, 1 represents the exterior of the wheel, 2 the armature and the magnetic field, 3 an interior view with the casing removed, and 4 the same view with the brushes and their supporting devices removed. Fig. 2 is a transverse vertical section with the brushes removed.

In a motor constructed in accordance with the invention the armature a is at the outside and constitutes the movable member, the frame a^1 of the armature being connected with a metal crown r from which the spokes h of the wheel extend to the rim r^1. The field magnet b is keyed on the fixed axle or shaft m.

At one side the motor is incased by a ribbed plate c connected at its periphery with the rotary armature and rotating on a lateral sleeve-shaped extension p of the hub b^1 of the field magnet. On this extension is mounted the inner ring of a ball-bearing x to the outer ring of which said side-plate c is connected, so that a ball-bearing for said plate in its rotary movement is afforded. Said ball-bearing is maintained in position with respect to the extension p by means of a threaded sleeve u, as shown in Fig. 2. At the point where the ribbed side-plate and the armature are connected the frame of the latter is provided with a lateral flange forming a brake-ring f. A second brake-ring f^1 is formed by a depression in the side-plate c. At the opposite side of the motor the commutator and the brushes are arranged. The hub b^1 of the field magnet has an extension p^1, corresponding to the extension p on the opposite side. Said extension p^1 forms the support for a ball-bearing x^1 by which the commutator-supporting frame d is rotatably mounted on the hub b^1. Said frame d consists of a central hub movable on the ball-bearing x^1 and an outer rim connected with said hub by means of spokes. The ball-bearing x^1 is held in position by a threaded sleeve o upon which is mounted a collar q from which the brushes are supported by means of arms q^1.

The commutator-ring n is clamped in position between the supporting frame d and a ring s, these parts being connected by screws s^1. The segments which form the commutator-ring or crown n are connected by the pressure between the rim of the frame d and the clamping ring s. The cross-section of these segments is that of a rectangle of which two corners at the side opposite the contact-surface are cut away, these cut-away parts conforming with the adjacent inclined surfaces of the parts d s in such a manner that the pressure between these parts increases the pressure between the segments themselves, forcing said segments toward the center. Fig. 1 shows the manner in which the brushes q^2 are mounted on the arms q^1 and contact with the commutator-ring.

The hub b^1 is bored out in such a manner that the axle m may be readily locked thereto by means of keys k, so that the wheel and its motor can be placed on the axle or shaft as readily as an ordinary pulley. The wheel is also held on the axle by means of nuts k^1. Between this axle and the inner rings of the ball-bearings are drilled openings t t^1 through which the conducting wires w pass.

The commutator and brushes are incased in a cover v connected with the crown r, and which in connection with the side-plate c at the opposite side of the motor produces the hermetic inclosure of the latter. A cap-nut k^2 in the cover v affords access to the nuts k^1, so

that the wheel and its motor may be readily removed from the axle when desired.

When the wheel is in operation the axle *m* and field magnet *b* remain stationary, as will be understood, the armature *a* rotating around the field magnet and carrying with it the wheel structure. At one side the inclosing plate *c* with its brake-rings is rotated by the armature, while at the opposite side the latter rotates the commutator-ring which moves in contact with the brushes in the well-known manner. The location of the brake-rings at the side opposite the commutator-ring is of considerable importance as this simplifies the construction and equalizes the mechanical stresses on the motor. The electrical connections are made in the well-known way, the invention going to the mechanical rather than the electrical features of the construction.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In a motor-driven wheel, the combination of a fixed field magnet, a rotary armature, a frame at the outer part of the armature by which the same is carried, a commutator carried by said frame at one side of the motor, and a plate carried by the frame and inclosing the motor at the opposite side, said plate being provided with a lateral flange and also with a central depression forming brake-rings located oppositely to the commutator.

2. In a motor-driven wheel, the combination of a fixed field magnet having a lateral extension, a rotary commutator-frame, a ball-bearing for said frame on said extension, a sleeve threaded on said extension and abutting against said bearing to maintain the same in position, and a brush holding collar mounted on said sleeve.

3. In a motor-driven wheel, the combination of a fixed field magnet having a lateral sleeve-shaped extension, a rotary armature, a commutator-frame connected with the armature and comprising a central hub rotatable on said extension, an annular rim and spokes connecting said hub and said rim, a commutator-ring, and a clamping ring between which and said rim said commutator-ring is clamped.

4. In a motor-driven wheel, the combination, with a commutator-rim and a clamping ring, of a commutator-ring formed of segments interposed between said rim and said clamping ring and having their corners at the side opposite the contact-surface cut away and conforming with inclined surfaces on said rim and clamping ring so that pressure between the two latter causes the segments to be pressed together.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

DMITRY BALACHOWSKY.
PHILIPPE CAIRE.

Witnesses:
EMILE LEDRET,
DEAN B. MASON.