

No. 744,680.

PATENTED NOV. 17, 1903.

R. EICKEMEYER, DEC'D.

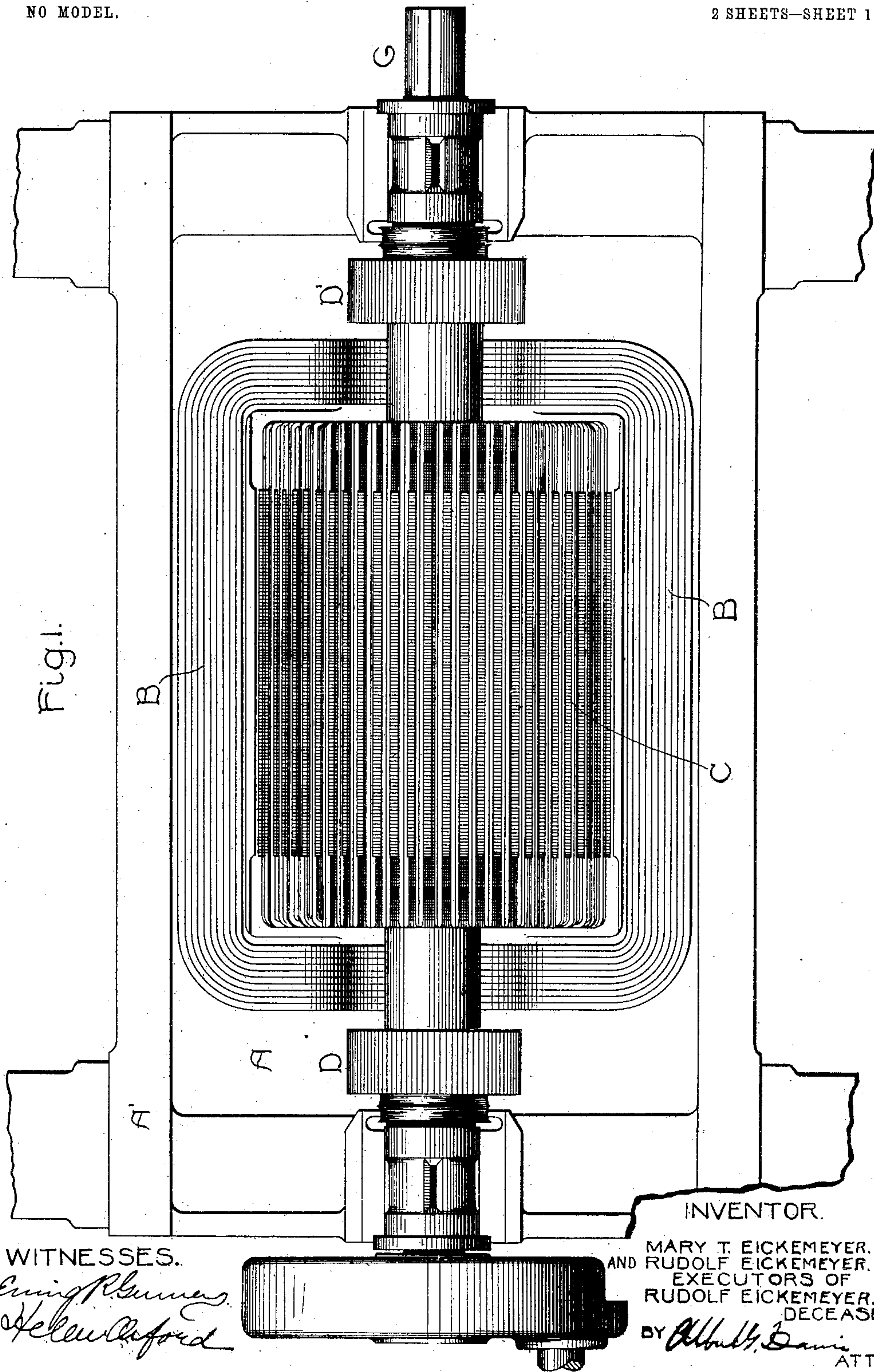
R. EICKEMEYER, JR. & M. T. EICKEMEYER, EXECUTORS.

ELECTRIC MOTOR.

APPLICATION FILED MAY 13, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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2 SHEETS--SHEET 2.

Fig. 2

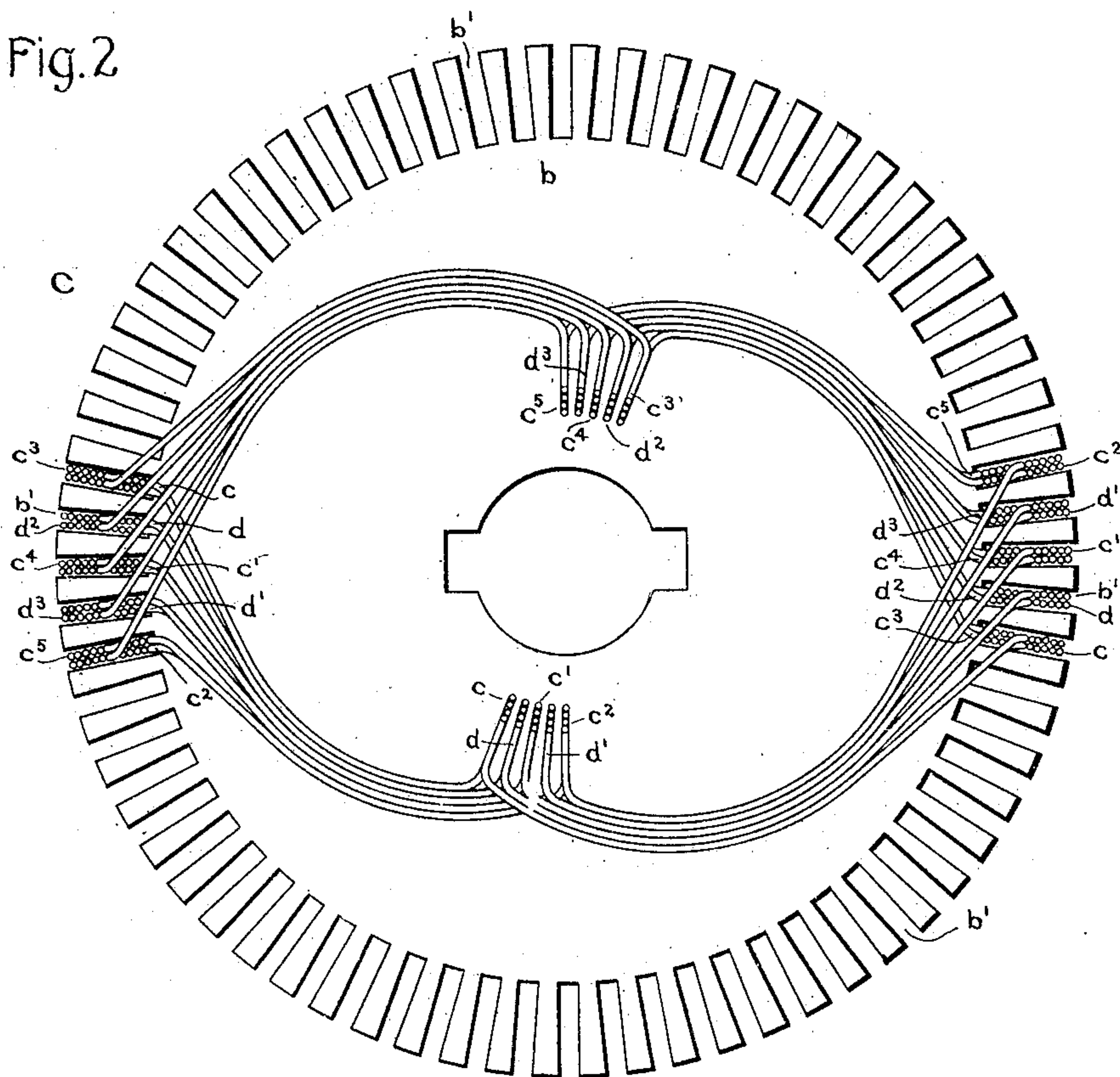
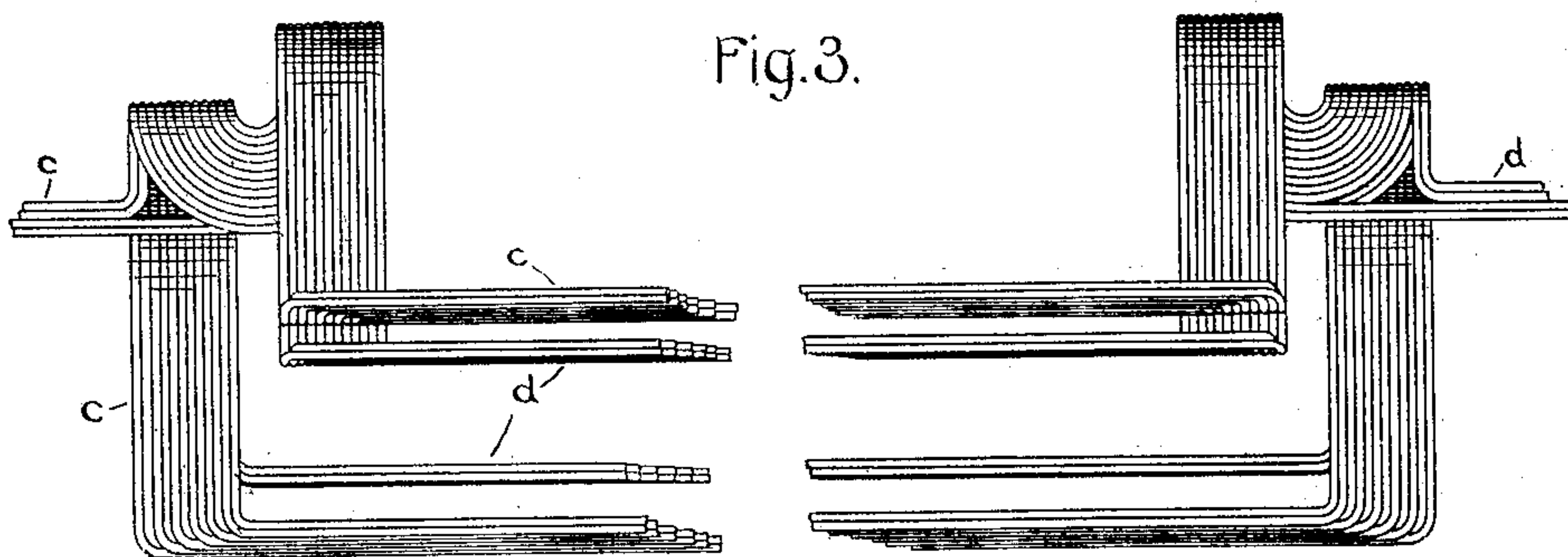


Fig. 3.



WITNESSES

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EXECUTORS OF
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DECEASED

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UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, JR., AND MARY T. EICKEMEYER, OF YONKERS,
NEW YORK, EXECUTORS OF RUDOLF EICKEMEYER, DECEASED.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 744,680, dated November 17, 1903.

Original application filed June 2, 1893, Serial No. 476,351. Divided and this application filed May 13, 1902. Serial No. 107,147. (No model.)

To all whom it may concern:

Be it known that RUDOLF EICKEMEYER, deceased, late of Yonkers, in the county of Westchester and State of New York, during his lifetime invented certain new and useful Improvements in Electric Motors, and that we, RUDOLF EICKEMEYER, Jr., and MARY T. EICKEMEYER, executors under the last will and testament of the said RUDOLF EICKEMEYER, do hereby declare, to the best of our knowledge and belief, that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of said improvements.

This application is a division of application, Serial No. 476,351, filed June 2, 1893.

The object of the present invention is to provide electric-motor organizations which can be efficiently operated under widely-varied conditions with respect to speed and working duty.

The invention comprises an armature-core provided with two separate windings, each two coils in each winding having sides which reversely overlies each other and are located between similarly reversely overlaid sides of coils belonging to the other windings. Each of the separate windings is provided with its own commutator, and by means of a controlling-switch, such as is shown in the original application of which this is a division, the two windings may be connected either in series or in parallel.

The invention will be better understood by reference to the following description, taken in connection with the accompanying drawings, in which—

Figure 1 illustrates a bipolar motor embodying the present invention in plan view, but without the top of the motor casing or shell and also without a portion of the field-coils. Fig. 2 illustrates the armature-core of the motor in end view with portions of two separate sets of windings thereon. Fig. 3 illustrates in side view one of the counterpart coils of each of the two sets of coils constituting the armature-winding, the central portions of the sides of the coils being broken away and the end con-

nections being broken off where they are led out for connection to the two commutators.

In Fig. 1 the motor A includes a part of such a frame A' as has been employed for street-car motors, it being understood that said frame constitutes a portion of the magnetic system, as in machines heretofore patented to said Rudolf Eickemeyer, and that the field-coils B, as in said machines, surround the armature C longitudinally within the shell or casing, and that said field-coils include several sections massed and divided into two portions which at their ends are located on opposite sides of the armature-shaft. It is to be understood, however, that the present improvements are not restricted either to street-car motors or to machines having field-coils thus arranged with reference to the frame and armature nor to one in which the frame constitutes a portion of the magnetic system.

As here shown, the drum-armature C carries a crank-wheel on its shaft, as for a pitman connection; but it is immaterial to the present invention in what manner power may be communicated from the armature.

The armature-core *b* is notched longitudinally on its periphery, as provided for in Letters Patent No. 377,996, February 14, 1888, for the reception of the sides of the armature-coils, each notch or recess *b'* containing the sides of two separate coils or sections of winding and securely confining them in position as against rotative displacement. As indicated in Fig. 2, one side of each coil in a notch *b'* underlies the appropriate side of another coil, the relative positions of the other sides of these two coils being reversed at the opposite side of the armature-core, or, in other words, one side of each coil or section overlies one side of another coil at one side of the core, and on the other side of the core the overlying of the other sides of the same coils is reversed, as disclosed in said Letters Patent No. 377,996. It is to be understood that these coils are counterparts. As shown in the drawings, they have each a long side and a short side and are flattened, curved, and offset at their ends and are otherwise in ac-

cordance with the invention disclosed in my said Letters Patent. In this armature, however, these coils are so assembled on the core as to constitute two separate sets of windings, and hence two independent commutators D and D' are employed. If the terminals of the several winding-sections should be assembled at one end of the armature, these commutators would then be located side by side; but, as here shown, the winding-terminals are alternated in position, so that a commutator is required at each end of the armature, thus greatly simplifying the connection of the coils with the commutator-bars.

Referring to Figs. 2 and 3, it is to be understood that although the coils or winding-sections are all alike they are designated c , c' , c^2 , &c., and d , d' , d^2 , &c., for indicating the two separate sets of windings and also the sections or coils in each set. In Fig. 3 the long (or outer) side of the coil is clearly indicated, as well as the short (or inner) side, both being broken away centrally. This figure also shows the two ends of the coil, the central off-sets, and the laterally-projecting terminal at one end. The coil c has its terminal at the left-hand side of the coil, and hence it will be assumed to belong to the c series of the coils, Fig. 2. The coil d has its terminals at the right-hand side of the coil, and therefore it belongs to the d series of the coils, Fig. 2; but either of these coils if turned end for end, so that its terminals would be at the opposite end of the core, would then belong to the other series of coils. These coils or sections are composed of two wires wound in six turns; but if a single wire was used there would be twelve turns, or if six wires were used there would be two turns, and with but one turn twelve wires could be used, or the two wires of each coil may be connected to separate but adjacent commutator-bars, so that each armature-coil with respect of commutation will in substance constitute two adjacent coils of the same winding and be what will be termed a "double coil," it being understood that variations as to the number of wires and turns will involve no portion of the present invention so long as two or more separate sets of windings and two or more commutators are employed.

As shown in Fig. 2, coil c has its long side in a core-notch overlying the short side of

the coil c^3 , the long side of the latter on the other side of the armature overlying the short side of the coil c . The next coil d has its long side in the next core-notch overlying the short side of the coil d^2 , the long side of the latter at the other side of the core overlying the short side of the coil d , and so on throughout the entire winding, a long and a short side of each coil in each set occupying alternate notches, the intervening notches being occupied by short and long sides of the coils in the other set throughout the entire two sets of windings, as shown in Fig. 1. This combination with an armature-core of two separate sets of windings and their commutators, each two coils in each winding having sides which reversely overlie each other and are located between similar reversely-overlaid sides of coils belonging to the other winding, constitutes the present invention, whether the sides of said coils occupy longitudinal recesses in the core or are otherwise secured thereon against rotative displacement.

What is claimed as new, and desired to be secured by Letters Patent of the United States, is—

1. The combination with an armature-core, of two separate windings, each two coils in each winding having sides which reversely overlie each other and are located between similar reversely overlaid sides of coils belonging to the other winding, substantially as described.

2. The combination with an armature-core, of two separate windings, each two coils in each winding having sides which reversely overlie each other and are located between similarly overlaid sides of coils belonging to the other winding, and two commutators, one connected to each winding, substantially as described.

In witness whereof we have hereunto set our hands this 10th day of May, 1902.

RUDOLF EICKEMEYER, JR.

MARY T. EICKEMEYER.

Witnesses to the signature of Rudolf Eickemeyer, Jr.:

LOUIS R. TAYLOR,

ARTHUR A. BUCK.

Witnesses to the signature of Mary T. Eickemeyer:

GEO. EICKEMEYER,

THOMAS W. IVERS.