(No Model.) 2 Sheets—Sheet 1.

R. M. GARDNER.

ARMATURE FOR ELECTRIC MACHINES.

No. 553,557. Patented Jan. 28, 1896.

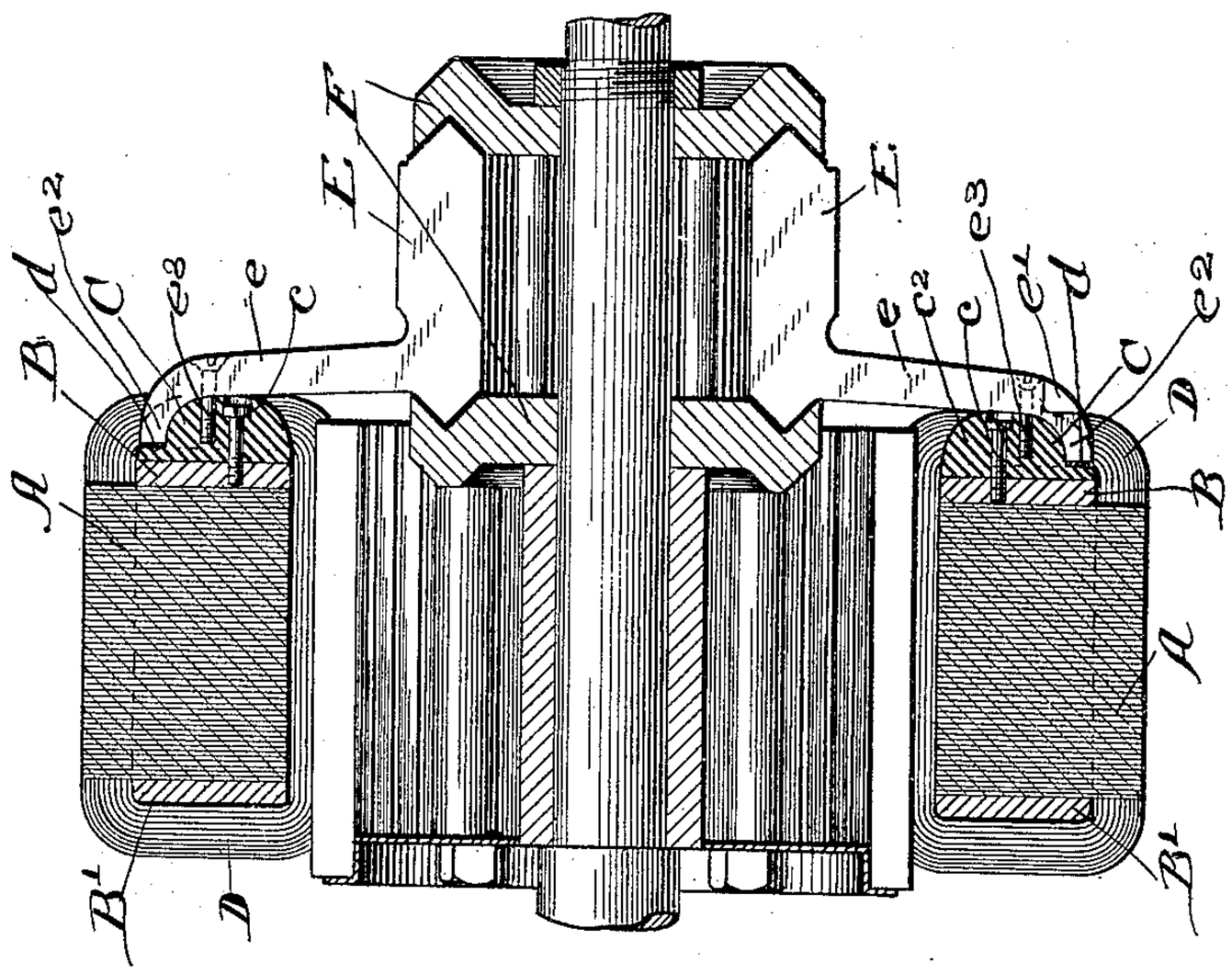

Fig. 2.

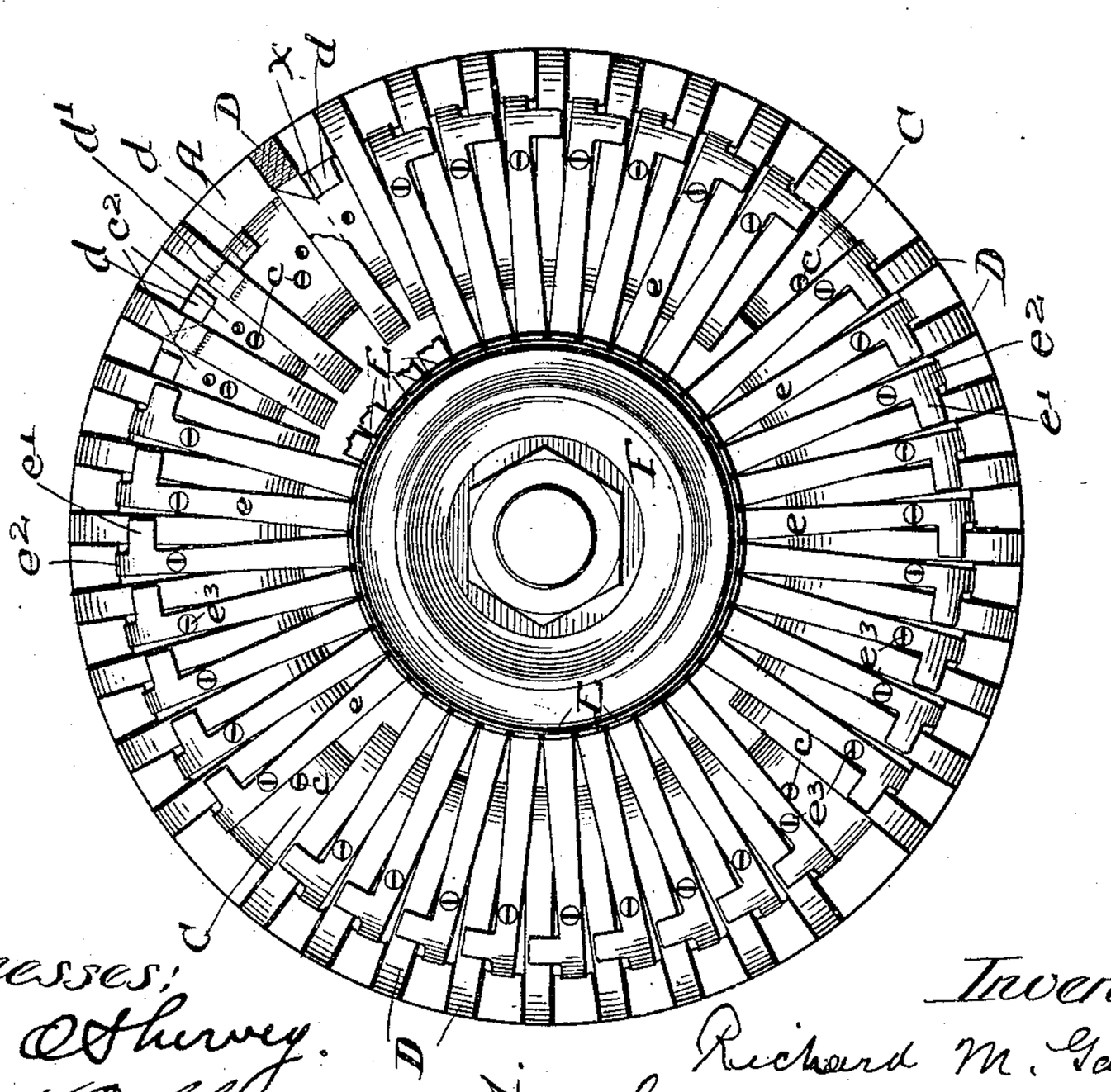

Fig. 1.

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Inventor:
Richard M. Gardner
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(No Model.) 2 Sheets—Sheet 2.

R. M. GARDNER.

ARMATURE FOR ELECTRIC MACHINES.

No. 553,557. Patented Jan. 28, 1896.

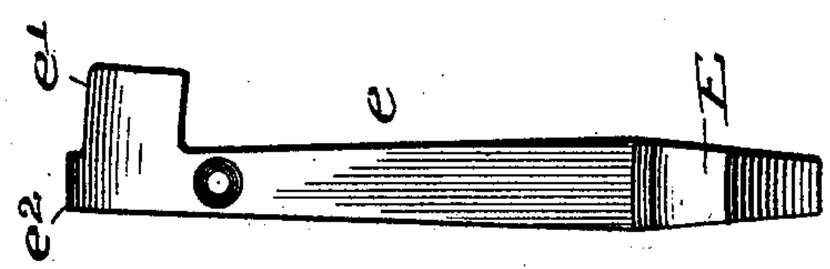

Fig. 6.

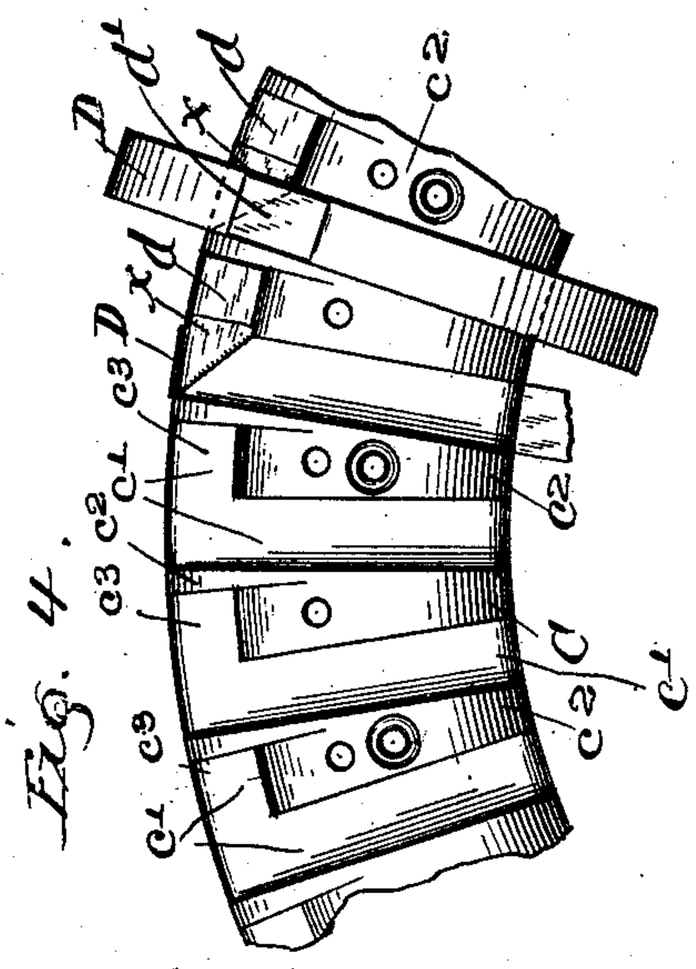

Fig. 4.

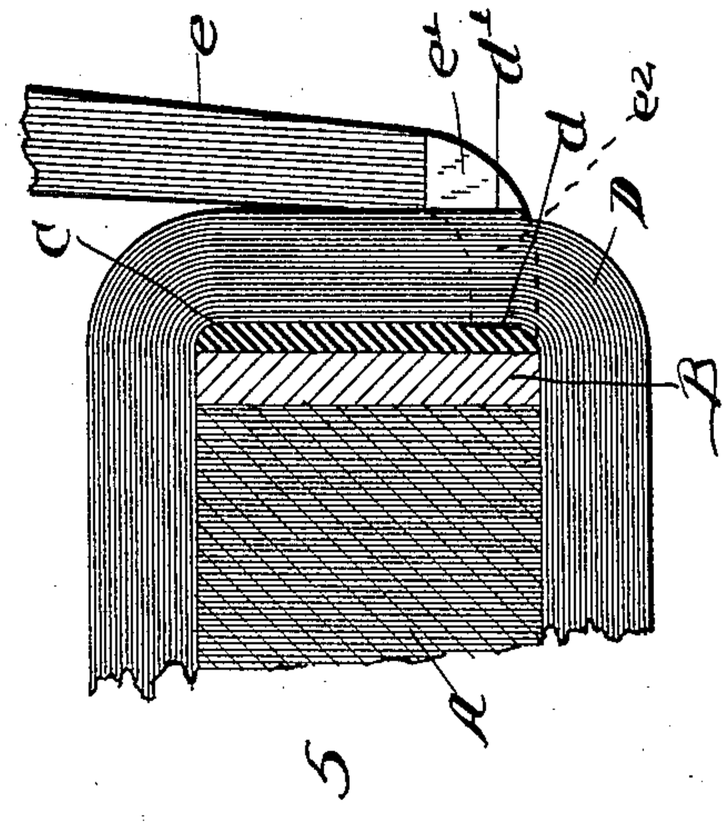

Fig. 5

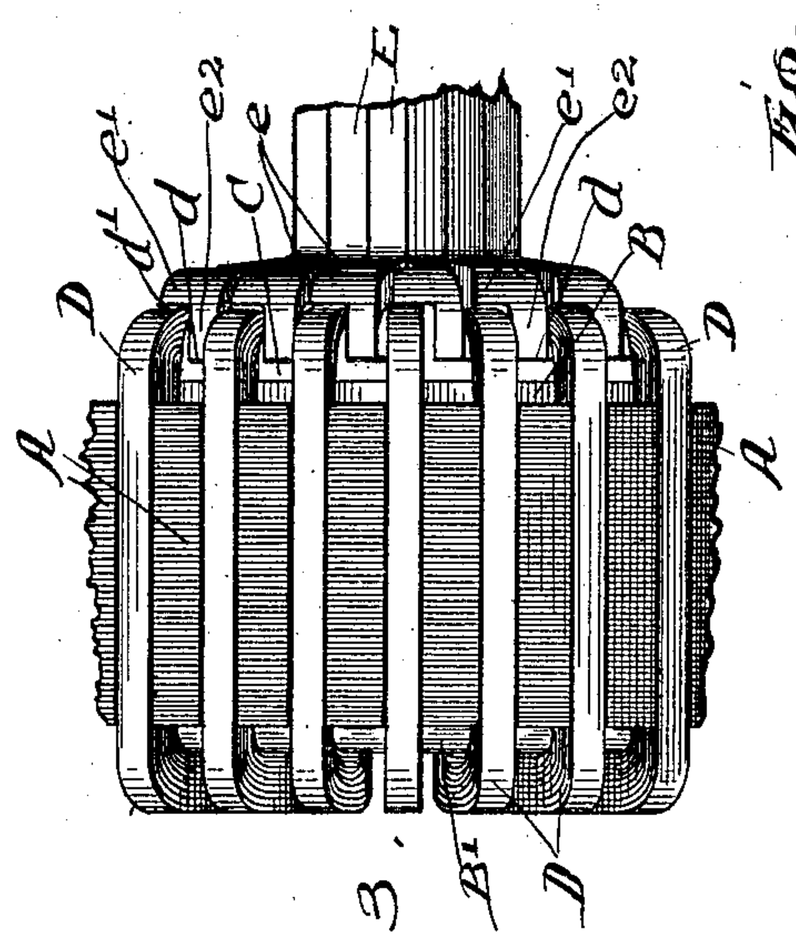

Fig. 3.

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UNITED STATES PATENT OFFICE.

RICHARD MORGAN GARDNER, OF CHICAGO, ILLINOIS.

ARMATURE FOR ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 553,557, dated January 28, 1896.

Application filed May 27, 1895. Serial No. 550,737. (No model.)

To all whom it may concern:

Be it known that I, RICHARD MORGAN GARDNER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Armatures for Electric Machines, of which the following is a specification.

My invention relates to armatures for electric machines; and the purpose of the invention is to avoid possibility of the breaking of the wires which connect the commutator-segments with the armature-coils.

The invention is particularly valuable in motors which are subject to a great deal of jarring or jolting—as, for instance, those used upon mining machinery, cars, and the like.

The invention is illustrated in the drawings by means of six figures, of which—

Figure 1 is an end elevation of an armature. Fig. 2 is an axial section. Fig. 3 is a broken side elevation. Fig. 4 is an end elevation on a larger scale of a portion of the armature with certain parts removed. Fig. 5 is a portion of an axial section upon a similar scale, and Fig. 6 is an end elevation of one of the commutator-segments.

The armature core and frame may be of any desired construction. A laminated core is shown at A and the plates of the same are held together by rings B B′. A third ring, C, of insulating material—as, for instance, fiber—is secured to the plate B by means of screws *c*, and said insulating-plate is preferably formed, as shown in Fig. 4, to the best advantage where the L-shaped grooves *c′* are separated by the ridges c^2. The grooves are intended to receive the windings and the shorter arm, which is marked c^3, to permit the inner end of each winding to be turned at right angles, so that said end may be within reach. This is shown in Fig. 4 at *x*, where the inner end of an insulated copper ribbon D is shown as turned at right angles and having its end *d* bared to expose the copper. The ridges c^2 help to space the windings apart. In the same figure the outer end of one of the windings or coils is seen at *d′*, and said end is also bared to expose the conducting material.

The commutator is composed of a number of segments E, one of which is shown in Fig. 6, and which are properly insulated from each other and held in a suitable clamping device F. Each segment has a projecting arm *e*, which reaches to the coils and is provided at its outer end with two tongues e' e^2, the former of which extends laterally from the arm and rests upon the outer end of one coil and the latter of which extends in between the coils and rests upon the inner end of the adjacent coil. This is clearly shown in Figs. 1 and 3. Each arm is provided with a screw e^3, (see Figs. 1 and 2,) by means of which said arm may be clamped securely upon the ends of the coils. In some cases these screws may be unnecessary, as it is obvious that the entire commutator may be moved toward or away from the coils to get the desired pressure, and the length of the arm *e* is sufficient to give all the elasticity necessary to insure a perfect contact of every arm. In this way I dispense entirely with any connections other than that furnished by the commutator itself between the armature coils, and there is therefore no opportunity for any breaking of such connection by jarring or other means.

I claim as new and desire to secure by Letters Patent—

1. The combination in an armature of the class described, of a series of coils, each of which has its inner end turned laterally to project from beneath the coil and both this projection and its outer end freed from the insulation, and a series of commutator segments, each of which has a projecting arm, a portion of which extends to and is tightly clamped upon the inner end of one coil and another portion extends to and is tightly clamped upon the outer end of the adjacent coil; substantially as described.

2. The combination in an armature of the class described, of a series of coils having their inner ends turned laterally in the same direction and bared at the end and their outer ends also freed from insulation and a series of commutator segments, E, having radially projecting arms, *e*, provided with the lips, e', e^2, the former of which all project laterally in the same direction and rest upon the outer ends of the respective coils and the

latter of which project inwardly between the coils and rest upon the inner ends of the next adjacent coils; substantially as described.

3. The combination in an armature of the class described, of the insulating ring, C, having the grooves, c', and intervening ridges, c^2, the coils, D, wound in the grooves and having their inner ends turned laterally to project from beneath the coils and the commutator segments E, having the projecting arms, e, and tongues, e', e^2, the tongues, e', resting upon the bared outer ends of the respective coils and the tongues, e^2, resting upon the bared inner ends of the adjacent coils; substantially as described.

RICHARD MORGAN GARDNER.

Witnesses:
CHAS. O. SHERVEY,
A. I. H. EBBESEN.