No. 788,473. PATENTED APR. 25, 1905.

C. W. JOHNSON & W. COOPER.

ARMATURE.

APPLICATION FILED JULY 16, 1903.

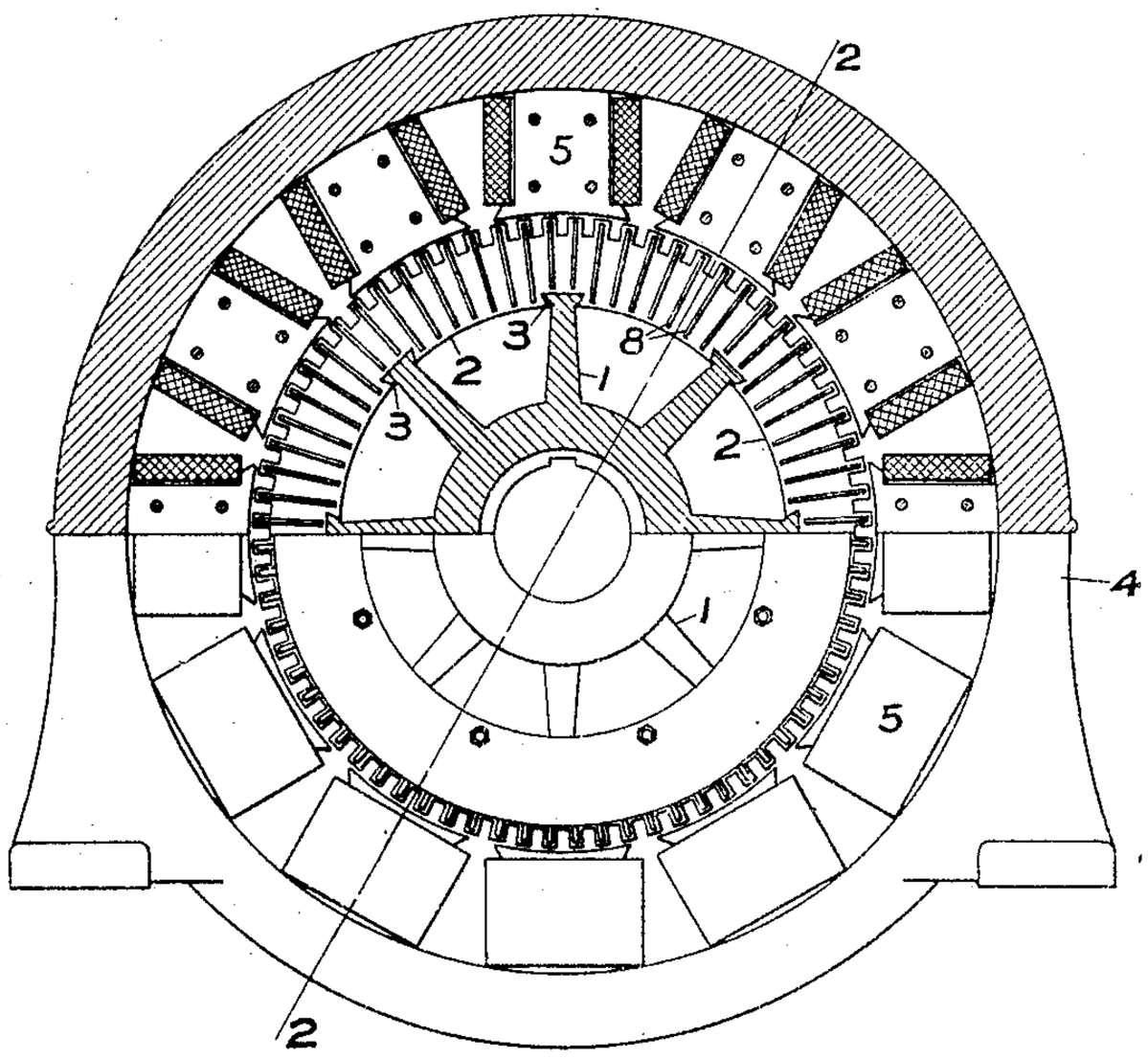

FIG. 1

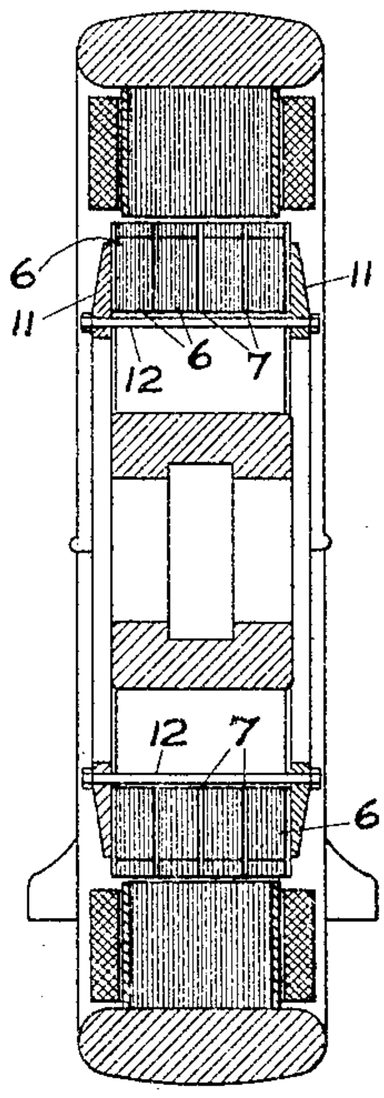

FIG. 2

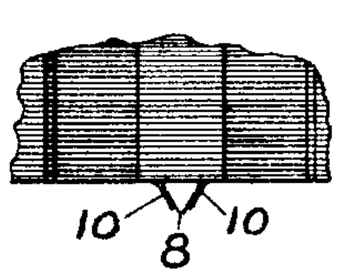

FIG. 4

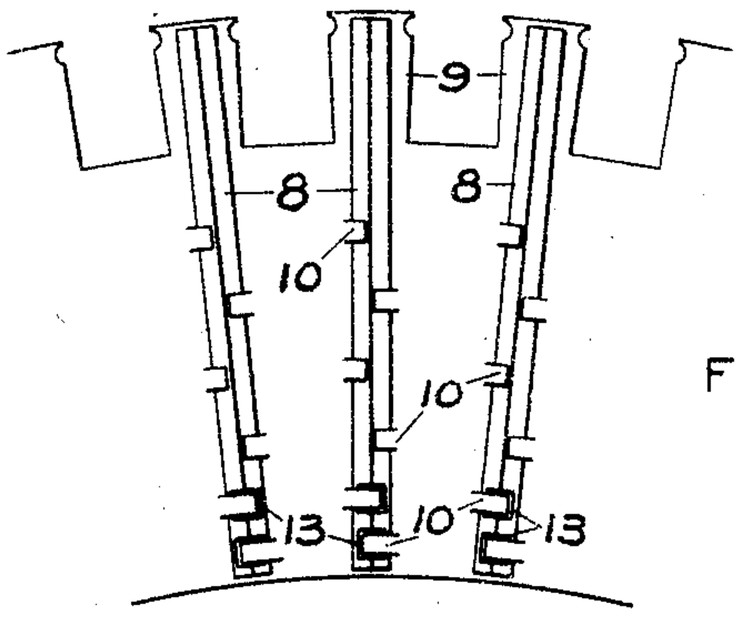

FIG. 3

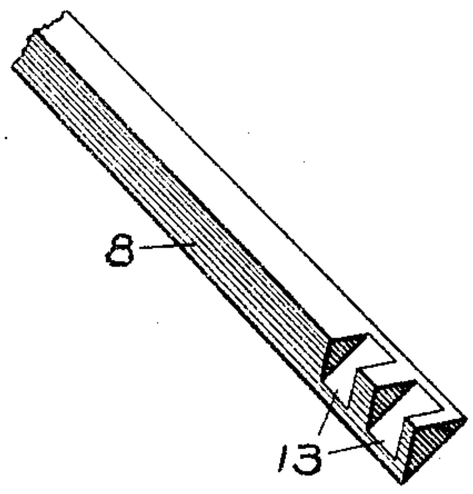

FIG. 5

WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES W. JOHNSON, OF NORWOOD, AND WILLIAM COOPER, OF CINCINNATI, OHIO, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE BULLOCK ELECTRIC COMPANY, A CORPORATION OF OHIO.

ARMATURE.

SPECIFICATION forming part of Letters Patent No. 788,473, dated April 25, 1905.

Application filed July 16, 1903. Serial No. 165,789.

To all whom it may concern:

Be it known that we, CHARLES W. JOHNSON, residing at Norwood, and WILLIAM COOPER, residing at Cincinnati, in the county of Hamilton and State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Armatures, of which the following is a full, clear, and exact specification.

Our invention relates to dynamo-electric machinery; and its object is to produce an armature for the same which shall be well ventilated, thus preventing overheating of the core and windings and eliminating the objectionable effects which would follow from such overheating.

A further object of the invention is to make the armature-core simple in construction and to have all parts firmly held in place.

This invention particularly relates to the construction of the core, which is made up of sections spaced from each other to allow a free outward flow of air. Each section is built up of laminæ, and for the purpose of separating the sections we provide a series of rods spaced suitable distances apart and extending radially from the center of the core.

The special features of our invention relate to the form of the rods and the means for securing them in place, and for this purpose we stamp out of the laminæ adjacent to the ventilating-spaces projecting lips, which are bent over the rods to prevent their radial and circumferential displacement.

For a full understanding of the invention and of the features of novelty reference may be had to the following description and the accompanying drawings, which show the preferred form of construction.

Figure 1 is a side view, partly in section, of an armature-body, showing the rods on the face of the laminæ. Fig. 2 is a section on the line 2 2 of Fig. 1. Fig. 3 is an enlarged face view of a portion of a lamina having rods clamped thereto. Fig. 4 is an enlarged end view of a section of laminæ. Fig. 5 is a perspective view of a portion of the spacing-rod.

The armature-body is composed of the spider having the radiating arms 1, and the laminated core 2 is attached to the arms by the dovetails 3. The armature is surrounded by the yoke 4 and the field-poles 5, as is customary. The core 2 is built up of a number of sections 6, with the intervening air-spaces 7, the number of air-spaces provided depending upon the size of the machine and the degree of cooling required. Each section 6 consists of a compact bundle of laminæ, each lamina being insulated from the adjacent one in the usual manner.

In order to separate the sections of laminæ from each other, and thus secure a free circulation of air from the spaces between the arms of the spider through the core, the separators or spacers 8, of fiber or metal, are provided. These in the construction shown are long bars, triangular in cross-section and extend from near the inner edges of the laminæ outwardly toward the periphery of the core. As shown in Fig. 3, there are as many separators as there are teeth on the core, each separator extending well onto the body of each tooth 9. It is evident, however, that the number of separators used may vary in different constructions without departing from our invention and may be applied to smooth as well as toothed cores. Also it is evident that the separators need not be radial, but may be inclined somewhat.

The separators are clamped in place by lips 10, which are punched out of the outside lamina of the section and turned up to permit the insertion of the separator. Several of these lips project over each side of the bar, thus clamping it firmly in position. The outside edges of the bars 8 come into contact with the face of the outer lamina of the adjacent section, which need not have separators clamped thereto. This construction will effectively prevent any circumferential displacement of the bars, and when the core is bolted up by the end plates 11 and through-bolts 12 the friction of the parts would tend to overcome radial displacement. This friction alone cannot be depended upon to prevent radial movement of the bars, as the centrifugal force is considerable even for moder-

ate speeds. We therefore provide cut-away portions in the bar, as shown at 13, these cut-away portions being of sufficient size to receive lips 10. The lips opposite these openings 13 are forced into same and any tendency to radial displacement of the bars is effectively overcome. As shown in Fig. 3, each bar has two cut-away portions 13 near the inner end, one lip being bent into each opening from opposite sides. The number and position of these cut-away portions may, of course, vary in different constructions, the essential feature being to provide a projection or projections to engage the lips.

In the operation of the machine the air has free passages between the sections and adjacent bars from the interior of the armature to the periphery. This circulation of air not only cools the core itself, but also the windings thereon and the stator surrounding the radiating part.

It is evident, therefore, from the foregoing specification that we have produced an armature simple in construction, in which all parts are firmly held in place and in which ample provision for ventilation is made.

We claim as our invention—

1. An armature-core comprising laminated sections, separators between said sections, said separators having cut-away portions, and said laminæ having lips integral therewith turned over said separators and into said cut-away portions.

2. An armature-core comprising sections, separators between sections, said separators consisting of rods triangular in cross-section, clamped to the sections.

3. An armature-core comprising sections, separators between sections, said separators consisting of rods triangular in cross-section, clamped to the sections by lips integral therewith.

4. An armature-core comprising sections, separators between sections, said separators consisting of rods triangular in cross-section, clamped to the sections by lips integral with the sections and engaging projecting portions on the rods.

5. An armature-core comprising sections, separators between sections, said separators consisting of rods triangular in cross-section, said rods having cut-away portions and lips integral with the sections turned into said cut-away portions.

6. A laminated armature-core comprising sections, separators between sections, said separators consisting of rods triangular in cross-section, clamped to the sections by lips punched out of the laminæ.

7. A laminated armature-core comprising sections, separators between sections, said separators consisting of rods triangular in cross-section, and having cut-away portions and lips punched out of laminæ turned into said cut-away portions.

8. A laminated armature-core comprising sections of laminæ spaced from each other, rods triangular in cross-section between sections, the outer laminæ of the sections having projecting lips integral therewith clamping the rods in position, said rods having cut-away portions and lips of the laminæ bent into said cut-away portions.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES W. JOHNSON.
WILLIAM COOPER.

Witnesses:
L. K. SAGER,
SANFORD KLEIN.