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J. F. McELROY.
VENTILATED ARMATURE.
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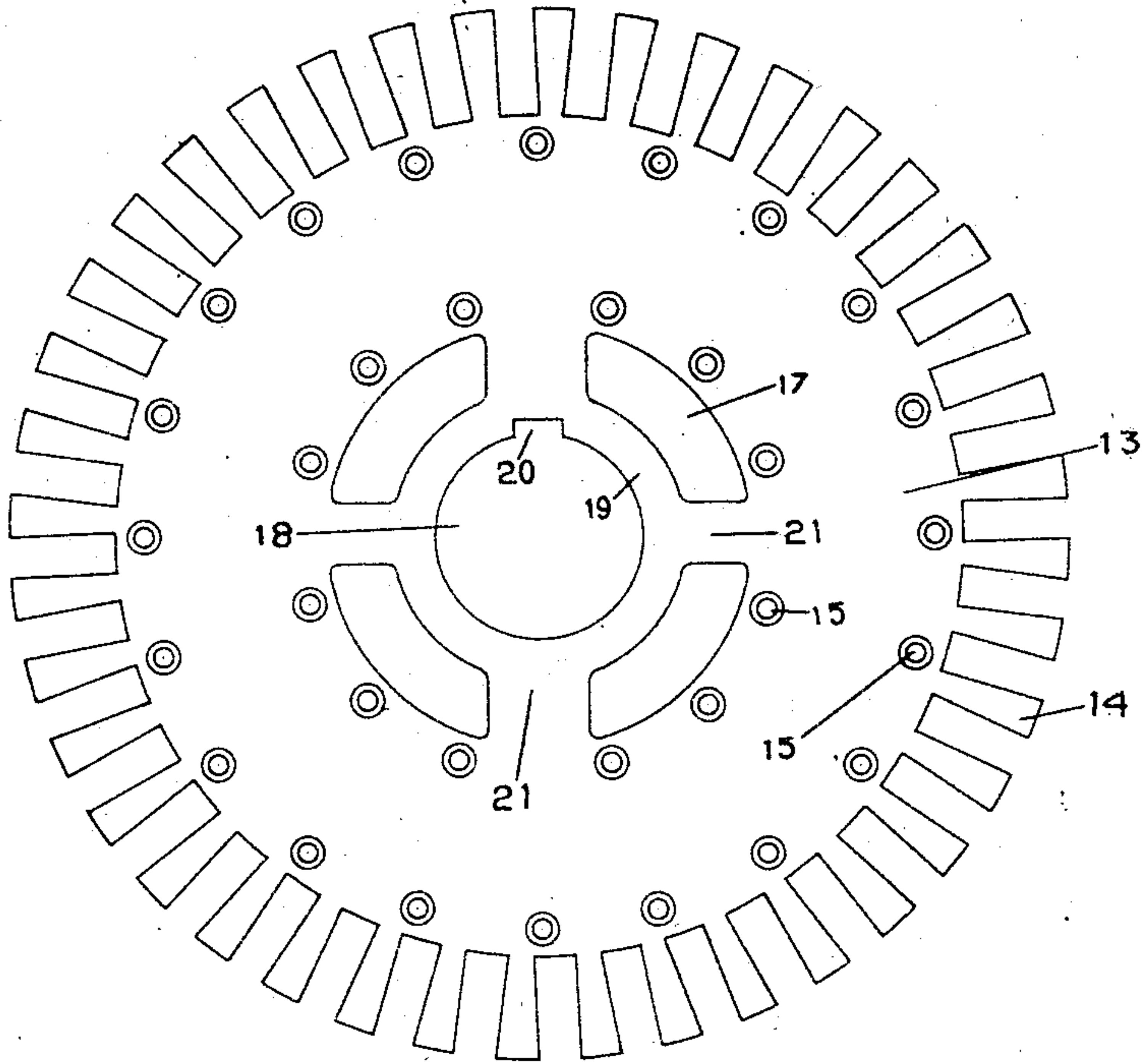


Fig. 2.

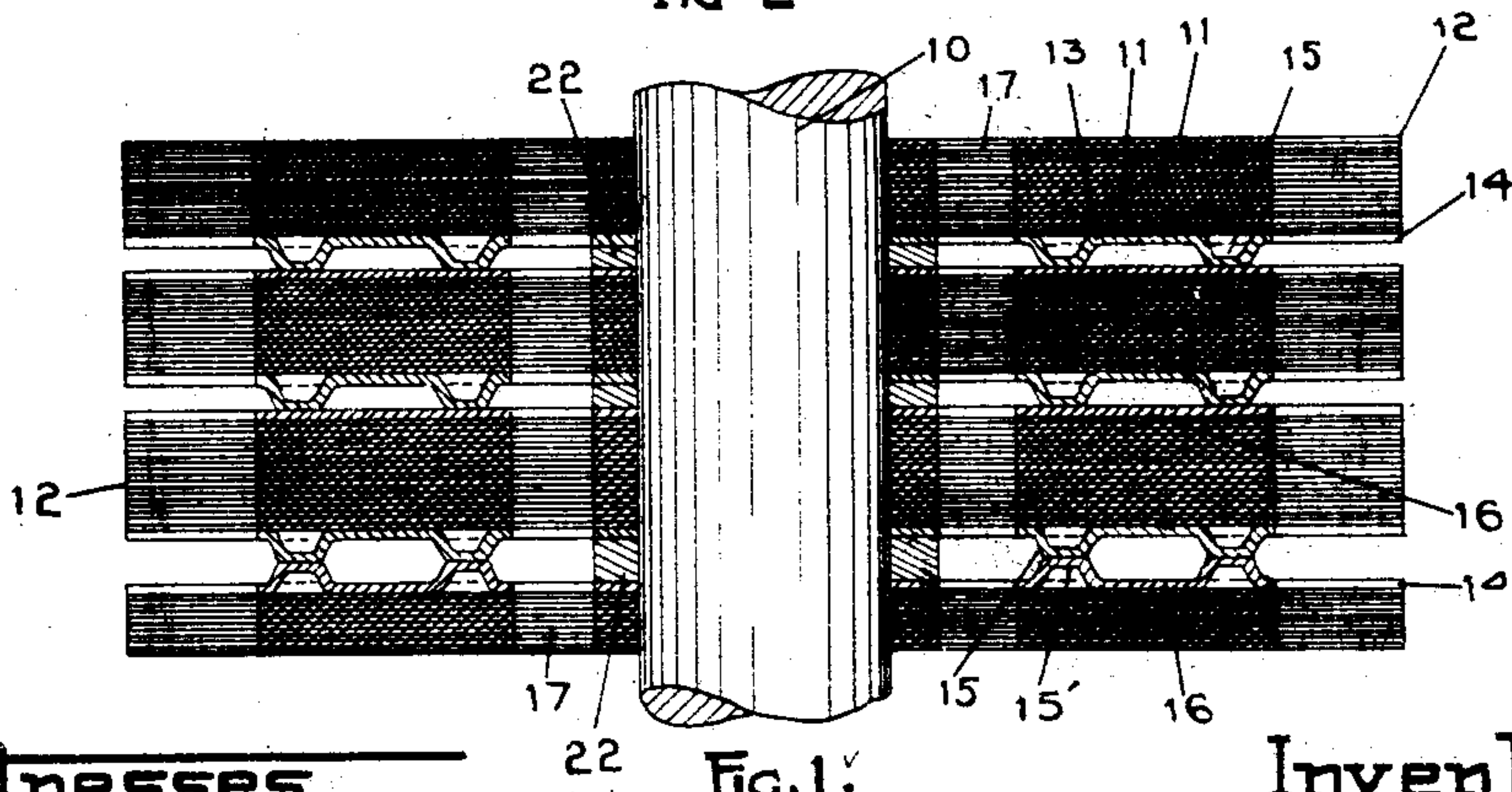


Fig. 1.

Witnesses

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VENTILATED ARMATURE.

No. 831,625.

Specification of Letters Patent.

Patented Sept. 25, 1906.

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To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Ventilated Armatures, of which the following specification and accompanying drawings illustrate the invention in a form which I now regard as the best out of the various forms in which it may be embodied.

This invention relates to the construction of ventilated laminated armatures in which are introduced at intervals between groups of the ordinary laminæ spacing-disks or laminæ having lateral projections formed in them to provide air-channels between the groups in radial direction.

The invention consists in the manner of constructing the spacing-disks, arranging them in relation to the other laminæ, and providing for the support of end thrust from the binding means which secures the whole core upon the armature-shaft.

Each spacing-disk is formed with a series of protuberances struck up with a spinning-tool or other convenient means and projecting from one side only of the disk, so that the opposite side has a firm bearing throughout most of its surface upon the adjacent one of the group of ordinary laminæ and is prevented from bending by the end thrust, while a substantially free air-channel is formed of a width equal to the amount to which the projections are offset or a width double that amount when two spacing-disks are placed with their projections in contact to give a wider channel. The spacing-disk forming one side of the air-channel and the abutting disk forming the opposite side are preferably thicker than the ordinary laminæ and of sufficient stiffness so that when the laminæ are made with teeth on their edges between which the inductors lie these teeth on the spacing-disks will support themselves and the teeth of the laminæ against lateral bending without necessitating any special formation of the teeth of the spacing-disks. Preferably the spacing-disks of a set will be duplicates, and each disk is symmetrical on opposite sides of the keyway which is formed in it, so that the disks may face in either direction, and when two of them are opposed

their projections will always abut, thus enabling either single-width or double-width air-channels to be formed with a single pattern of disks. This also brings the spacing projections in the same angular and radial positions in successive disks, so that all the points of pressure are in line.

Of the accompanying drawings, Figure 1 represents an axial section of an armature construction embodying my invention. Figure 2 represents a face view of one of the spacing-disks.

The same reference characters indicate the same parts in both views.

10 is the central armature-shaft.

11 11 are the ordinary laminæ formed with teeth 12 on their edges between which lie the inductors and arranged in groups or sections of several laminæ lying side by side in solid contact. Between the groups are located spacing-disks 13, on which I prefer to form teeth 14, similar to the teeth 12, for affording lateral support to the latter, each spacing-disk being formed with several spacing projections 15 15, extending from one side only of the disk and bearing against an opposed disk 16, these projections being cup-like depressions formed with a spinning-tool or in any other suitable manner and made without breaking the continuity of the disk, so that the projection is of maximum strength to bear strain without collapsing. These projections extend from one side only of the disk and occupy but a small portion of the total surface, so that the opposite side has a broad firm bearing against the adjacent lamina 11. There is therefore no tendency to bend the spacing-disk between its projections. The spacing-disks 13 and their abutting disks 16, forming opposite sides of the radial air-channels, are preferably made thicker than the ordinary laminæ 11, being of sufficient stiffness to afford lateral support to the teeth 12 from the bases of the teeth 14 and prevent the latter from bending without requiring any actual support across the intervening space which would obstruct the air-outlets between the inductors. The opposed disk 16 may be a plain disk without spacing projections, or it may be provided with projections 15 similar to the projections 15 and abutting the latter, as shown in the lower part of Fig. 1, which gives an air-channel of extra width.

This channel is entirely unobstructed except by the spacing projections and affords a minimum of friction to the outward passage of the air.

5 The several disks or laminae 11 13 16 are formed with apertures 17 near the shaft, separated from the shaft-hole 18 by a continuous ring of metal 19, in which the keyway or notch 20 is formed, and separated from each
10 other by connecting-arms 21, of metal, whereby the strain from the key is transmitted equally to all parts of the outer body of the disk. These apertures together make longitudinal air-channels communicating
15 with the radial air-channels formed by the spacing-disks. The edges of the notch 20 form a "keying" member on the margin of the shaft-hole 18. Between each spacing-disk 13 and its abutting disk 16 I may inter-
20 pose a spacing-washer 22 immediately adjacent the shaft 10 and of a width equal to the width of the air-channel for taking the thrust of the end nut or other locking means which holds together the whole armature-core and
25 largely relieving the spacing-disks of this strain.

This construction of armature provides for increased strength of spacers, wide and little-obstructed air-channels, and the necessary
30 amount of iron and close grouping of laminae which is required for the best magnetic properties of the armature and also affords greater solidity of the whole core than has heretofore been attained in armatures having
35 equal facilities for ventilation.

Fig. 1 shows how either a single-width or a double-width air-channel may be formed in the same armature, if desired, with spacing-disks which are duplicates of each other.
40 As seen in Fig. 2, the projections are symmetrically placed on opposite sides of the keyway 20 and are at the same radial distances from the center in any two disks, since the disks are duplicates. Hence the disks may
45 be assembled facing in either direction and will match up their projections so as to form the double-width space as shown in the lower part of Fig. 1. This of course dispenses with the necessity of having a plural-
50 ity of patterns of disk in the same armature when different widths of air-space are desired. It also brings the spacing projections in the same angular and radial positions in successive disks whether single or double, so
55 that all the points of pressure are in continuous parallel lines. It is of advantage to make the projections of frustal form, as shown, for the sake of stiffness and proper abutting surface in the projections.

60 I am aware that various kinds of spacers for forming ventilated armatures are already known, including tongues of metal turned edgewise across the planes of the disks, disks having projections facing alternately in op-
65 posite directions, separate spacer-blocks held

in sockets on the disks, &c.; but all such devices either lack the strength and solidity of my construction, are subject to greater vibration, obstruction of air-currents, or faulty heat transmission, or are less simple, less
70 easily assembled, and more expensive to build, and I am not aware of any disks capable of rigid assembly on the shaft in either single-width or double-width air-passages.

What I claim as new, and desire to secure
75 by Letters Patent, is—

1. A ventilated armature comprising a series of magnetic core-sections composed of a plurality of the usual plain laminae in solid contact, and a series of spacing-disks inter-
80 posed between said core-sections and forming radial air-channels, each spacing-disk having formed therein on one side only a series of isolated cup-shaped spacing projections continuous with the body of the disk
85 and abutting an opposite disk, said projections being sufficiently stiff to support the axial pressure, the reverse plane side of said spacing-disk seating solidly against the adjacent plain lamina.
90

2. A ventilated armature comprising a shaft, a plurality of core-sections each composed of a multiplicity of abutting plain magnetic laminae, spacing-disks between said
95 sections having stiff thrust-resisting pocket-shaped projections on one side only, abutting an opposite disk and located in the same angular and radial positions in successive spacing-disks, the other sides of said disks being
100 plane and seating solidly against the core-sections, together with means for keying said disks to the shaft to prevent their turning thereon.

3. A ventilated armature comprising core-sections composed of plain laminae, and one
105 or more air-channel spacers between adjacent sections composed of a pair of disks plane on the sides abutting the core-sections and having integral projections on their opposite sides which abut each other in the re-
110 spective disks, said disks with their projections being stiff and self-supporting so as to resist the axial pressure.

4. A spacing-disk for ventilated armatures comprising a sheet-metal plate having a cen-
115 tral aperture for the armature-shaft and an adjacent marginal keying member, said disk being plane on one face and formed on the other face with integral frustal projections distributed symmetrically on both sides of
120 the diameter through said keying member and adapted to abut the projections on a duplicate oppositely-facing disk.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing
125 witnesses, the 8th day of April, 1905.

JAMES F. McELROY.

Witnesses:

BEULAH CARLE,

ERNEST D. JANSEN.