No. 771,260. PATENTED OCT. 4, 1904.

C. R. MESTON & H. I. FINCH.

FIELD MAGNET CORE.

APPLICATION FILED MAR. 21, 1904.

NO MODEL.

Fig. 1.

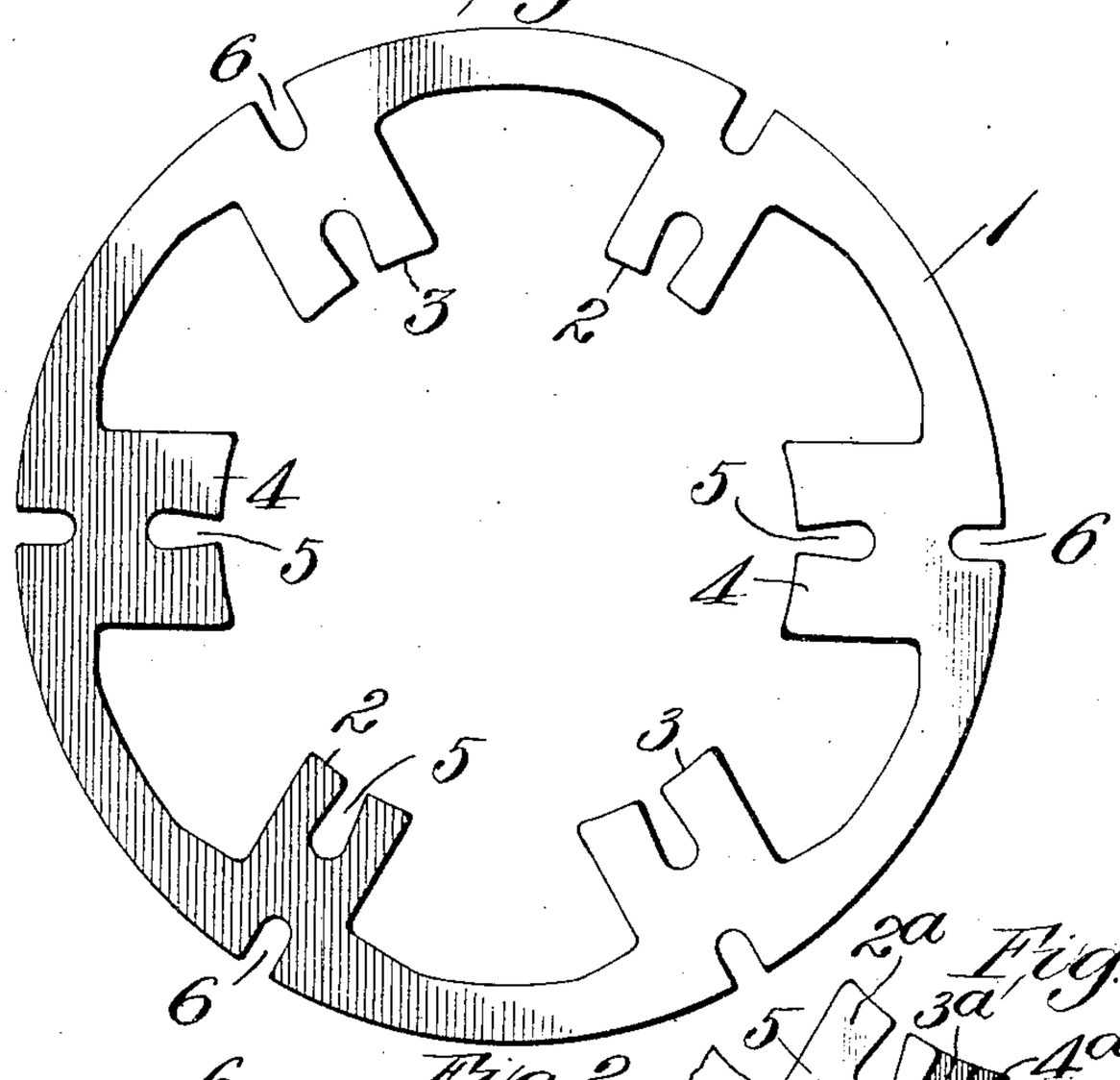


Fig. 2.

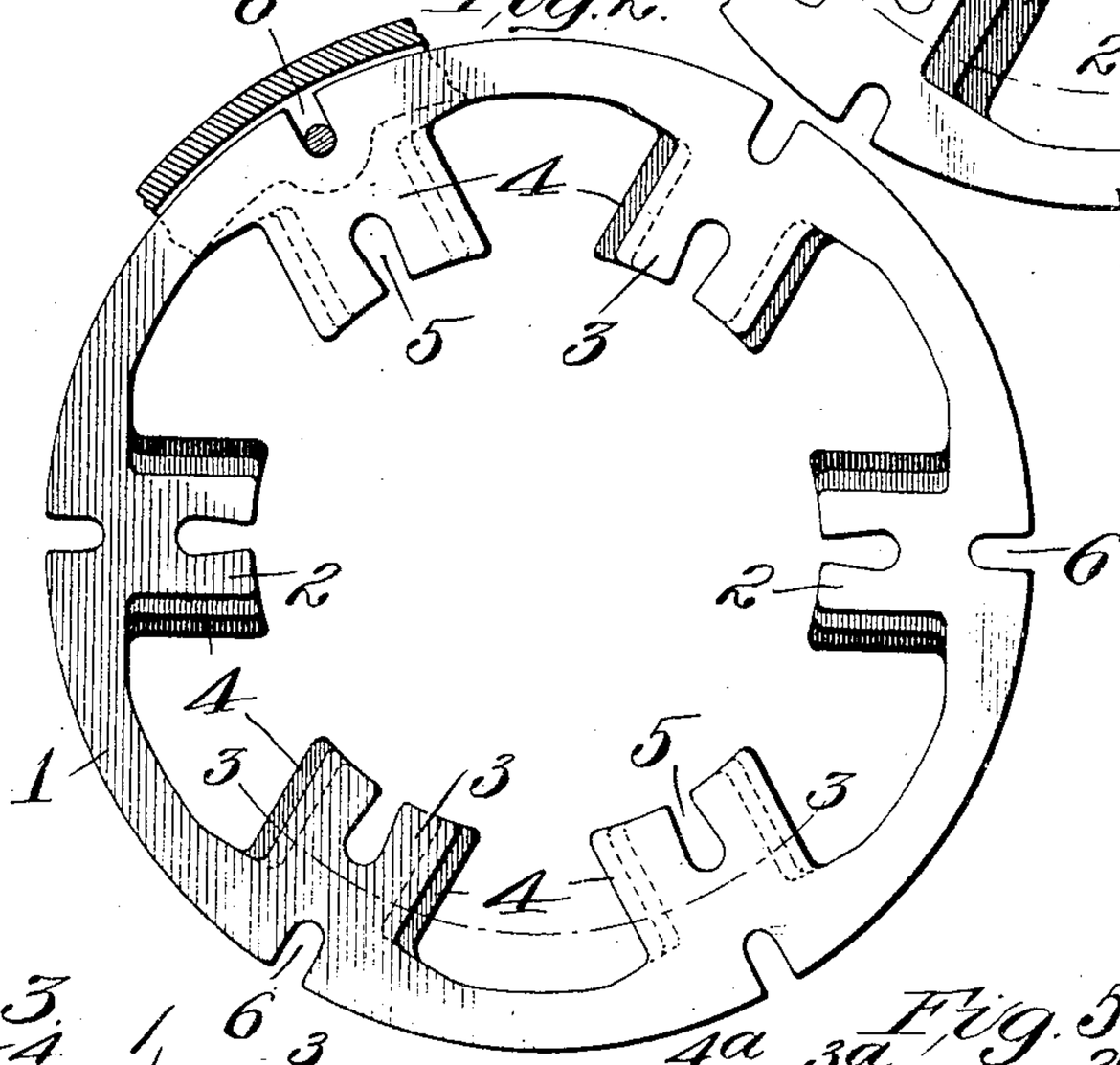


Fig. 4.

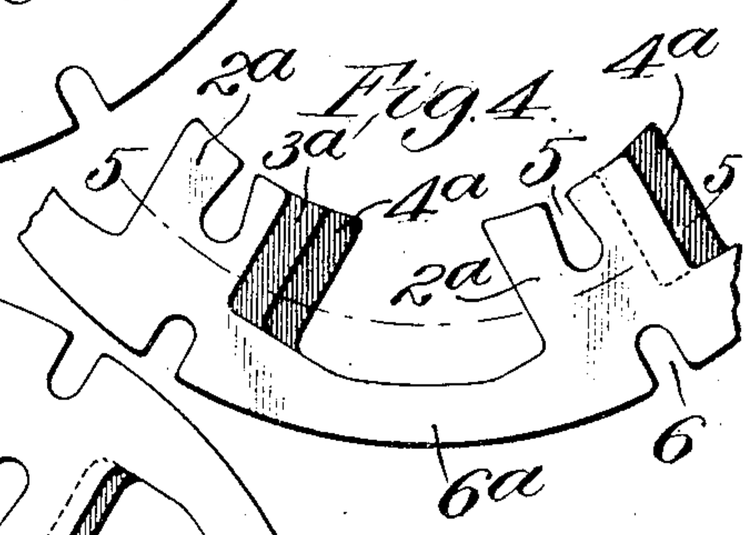


Fig. 3.

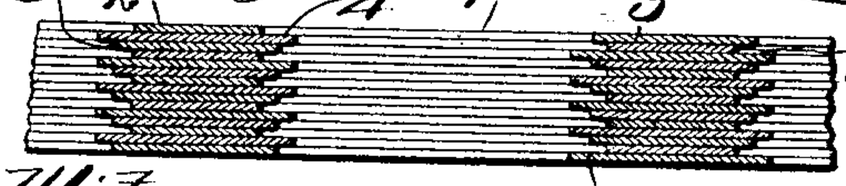
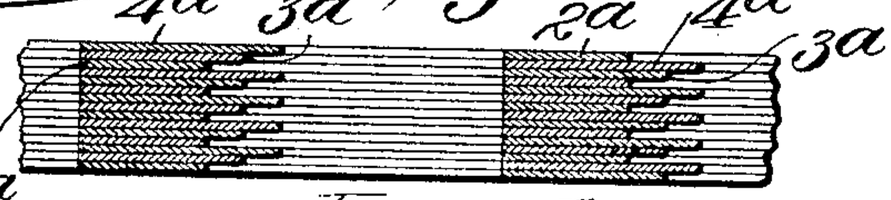


Fig. 5.



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No. 771,260. Patented October 4, 1904.

UNITED STATES PATENT OFFICE.

CHARLES R. MESTON AND HERBERT I. FINCH, OF ST. LOUIS, MISSOURI, ASSIGNORS TO EMERSON ELECTRIC MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

FIELD-MAGNET CORE.

SPECIFICATION forming part of Letters Patent No. 771,260, dated October 4, 1904.

Application filed March 21, 1904. Serial No. 199,148. (No model.)

To all whom it may concern:

Be it known that we, CHARLES R. MESTON and HERBERT I. FINCH, citizens of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Field-Magnet Cores, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of one of the laminæ of the field-core. Fig. 2 is a plan view of the field-core complete. Fig. 3 is a sectional view on the line 3 3 of Fig. 2. Fig. 4 is a fragmentary plan view of the slightly-modified form of field-core, and Fig. 5 is a sectional view on the line 5 5 of Fig. 4.

This invention relates to a new and useful improvement in field-magnet cores designed especially for use in connection with motors operated by alternating currents.

The object of our present invention is to construct a field-magnet core in such manner that one side of each polar projection shall exert a less or weaker magnetic pull upon the armature than the other side of the same polar projection or to have both sides relatively weaker than the center and also permit of constructing this field-magnet core so that each core will be uniform in mechanical construction and electrical action. The relative difference between the strength of the polar face can also be varied as desired. Heretofore the general practice on fields of this class has been to build up the cores with laminations of uniform dimensions throughout, and while in some types of cores the desired effect has been produced by constructing the polar projection so that one or both sides of the pole-face was at a gradually-increasing distance from the armature of the other side of the pole-face in certain types of motors this plan could not be followed practically on account of the required distance from the armature being too slight to be produced by machinery. In such types of cores it has generally been the practice to build up the core with pole-pieces of uniform dimensions throughout, and after the laminations of the core are assembled one or both sides of each uniform pole-piece was filed off, so as to cause the pole-faces to recede from the armature on one side. While a pole having a greater magnetic strength at one part of the pole-face than at others is necessary in order to produce the proper shifting field when the motor is starting, the above-mentioned practice of removing part of each pole-face is not desirable, not only because it requires time and necessitates what is practically another operation of the manufacture of the core, but in being done by hand it frequently occurs that more or less metal is removed, so that the desired results are not uniform and consequently not satisfactory. Furthermore, this filing is done by hand, the extent of metal removed being about to the depth of a few thousandths of an inch from the side of the faces of the polar projection. The small amount of metal necessary to be removed renders it impossible on commercial work of this character to determine with any degree of accuracy whether the proper amount has or has not been removed from any given pole-piece, and consequently the practice has been to guess at the amount of metal filed off and then try the motor to determine whether or not a sufficient amount of metal has been removed. It is apparent that under this method errors are frequent, especially when we consider that in a field-core the number of mistakes likely to occur are proportionate to the number of polar projections carried thereby. Under the method just described the most objectionable feature was that reliance had to be placed upon the errors counterbalancing each other on diametrically opposite sides of the machine; but in the event that errors happened to be grouped the result was found to be unsatisfactory, as no practical method is at present known for ascertaining where the error exists. The close work required on such machines, when we consider that the clearance between the polar projections, the

field-magnet core, and the armature is about five-thousandths of an inch, makes it highly desirable to produce a field-magnet core having features which will not necessitate indefinite manual operations after assemblage to adjust it to produce desirable results. The objections heretofore enumerated were avoided by employing a construction similar to that disclosed in the patent to Charles R. and Thomas M. Meston, No. 724,484, April 7, 1903, the chief objection being that the laminæ vere of different configurations, necessitating the use of a plurality of dies or patterns. The structure forming the subject-matter of the present application includes a plurality of laminæ, each a counterpart of another, thereby avoiding the necessity of assorting the laminæ in "sets," thereby facilitating the manufacture of the core and the assemblage of the parts thereof.

It is the purpose of the present invention to overcome all of these defects heretofore enumerated and to construct a field-magnet core the degree of pull of which can be determined beforehand to the minutest degree.

Another object of the invention is to construct all of the laminations by a single die or at any rate have the contour of each lamination conform to the contour of the cooperating ones and provide the polar projections on each lamination of varying areas, so that when the laminations are assembled to complete the core the polar projections will be so disposed with relation to each other that those of like areas will be out of line with their coinciding polar projections on adjacent laminations.

In Figs. 1, 2, and 3 the preferred form of the core is illustrated, which preferably consists of a plurality of laminated rings 1, having inwardly-disposed polar projections arranged in gradually-increasing areas—that is to say, one of the polar projections 2 will be formed as having the narrowest width or smallest area, and the succeeding ones (designated by the numerals 3 and 4) will gradually increase in width or area. For the sake of illustration we have shown these polar projections as consisting of six in number and divided into two series, the size of the polar projection in each series gradually increasing. We would have it understood, however, that we do not limit ourselves to the precise arrangement shown, but reserve the right to construct the core of any number of polar projections. By reference to Figs. 2 and 3 it will be observed that the built-up core is constructed by disposing the laminations in close parallel relation, but so that a relatively narrow polar projection is disposed adjacent to a relatively wide polar projection. In the event that a core is constructed with but three of the polar projections varying in width with relation to the others the narrowest polar projection will lie against one of the polar projections 2 (this being the next in size) of the adjacent lamination. The polar projection 3 on the first ring will lie against the polar projection corresponding to the one designated by 4 on the adjacent ring, and the polar projection 4 of the first ring will lie against the one corresponding to the polar projection 2 on the adjacent ring, and so on, according to the number of polar projections used in the construction of the particular core. The built-up polar projections shown in the drawings are characterized by recesses or slots 5, preferably located in the center, which slots are designed to receive a coil for producing a lag in the phase of the current in one portion of said magnetized polar projection, which results in a shifting field necessary in a split-phase self-induction motor.

By constructing a core in accordance with the plan just described the motor can be wound to operate in either direction or reversed in the ordinary manner if an energized phase-coil is used. Means is also provided for retaining the polar projections in their relative positions when forming the component parts of the built-up field, which means is illustrated as comprising the slots 6 in the peripheries of the rings, so that in whatever positions the rings are with relation to each other the slot 6 will aline with similar slots in the adjacent ring, so that fastening devices may be inserted in the slots to clamp the laminated rings together.

In Figs. 4 and 5 we have illustrated a slightly-modified form in which the same principle is involved as heretofore described; but in this form the field is shown as constructed for a motor driven in one direction, the polar projection 2^a, forming a part of the lamination 6^a, having one edge parallel with an edge of the polar projections 3^a and 4^a.

It will be observed from the above that the core when built up has one side of each polar projection naturally produced, so as to form a weaker magnetic action on the armature at one side of the pole, thereby avoiding the necessity of removing the metal after the laminæ are assembled. While we have shown the polar projections 2 and 3 as being narrower throughout their lengths than those designated by the reference-numeral 4, it is obvious that the said narrower polar projections can be of the same width as those designated by the numeral 4 to a point near the pole-faces, the pole-faces being reduced by cutting away the material at one corner and at the inner edges of the polar projections 2 and 3. The particular advantage resulting from constructing the laminations all of a uniform size and then assembling them so that the polar projections will be in staggered relation to each other greatly facilitates the assemblage of the parts and permits the core to be constructed by any one in a minimum space of time.

We are aware that minor changes in the construction, arrangement, and combination of the several parts of our device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of our invention.

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

1. A field-magnet core, consisting of laminations whose polar projections have faces of varying widths, each lamination being a counterpart of the other and whose polar projections have faces of varying widths adjacent to the faces of different widths on the coöperating laminations; substantially as described.

2. A laminated field-magnet core composed of laminations having polar faces of varying widths and arranged in groups, each lamination being substantially a counterpart of the other, and each group of polar projections on each respective lamination being disposed in staggered relation to the projections of the remaining laminations; substantially as described.

3. A laminated field-magnet core, each lamination of which is provided with a series of successively larger polar projections, and the coöperating laminations having alining polar projections of widths relatively different to the polar projections on the first-named laminations; substantially as described.

4. A laminated field-magnet core having polar projections of varying areas, the edges of the respective projections being out of line with the adjacent ones; substantially as described.

5. An element for a laminated field-magnet core having a plurality of series of polar projections, the polar projections in each respective series being of gradually-increasing areas; substantially as described.

6. An element for a laminated field-magnet core having a plurality of series of polar projections, the polar projections in each respective series being of successively-increasing widths; substantially as described.

7. An element for field-magnet cores comprising a ring having converging polar projections arranged in series from a relatively narrow to a relatively wide polar projection, and intermediate projections between the relatively narrow and relatively wide projections and of intermediate widths; substantially as described.

8. A field-magnet core comprising laminations of approximately like configurations, each lamination having polar projections of different areas, said polar projections on one lamination being arranged in staggered relation with those on the other lamination, said lamination having means for insuring the proper positions of the staggered polar projections with relation to each other; substantially as described.

In testimony whereof we hereunto affix our signatures, in the presence of two witnesses, this 18th day of March, 1904.

CHARLES R. MESTON.
HERBERT I. FINCH.

Witnesses:
GEORGE BAKEWELL,
SELMA SCHWARTZ.