No. 724,484. PATENTED APR. 7, 1903.

C. R. & T. M. MESTON.

FIELD MAGNET CORE.

APPLICATION FILED JUNE 14, 1902.

NO MODEL.

Fig. 1.

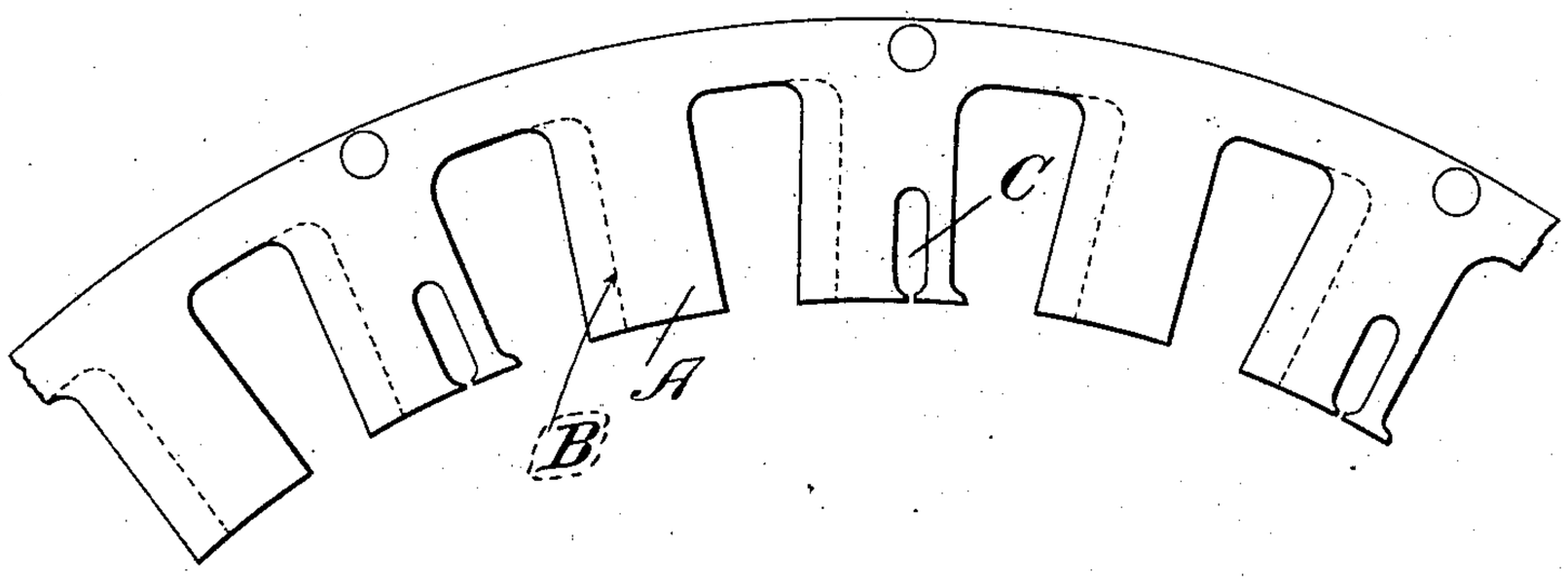
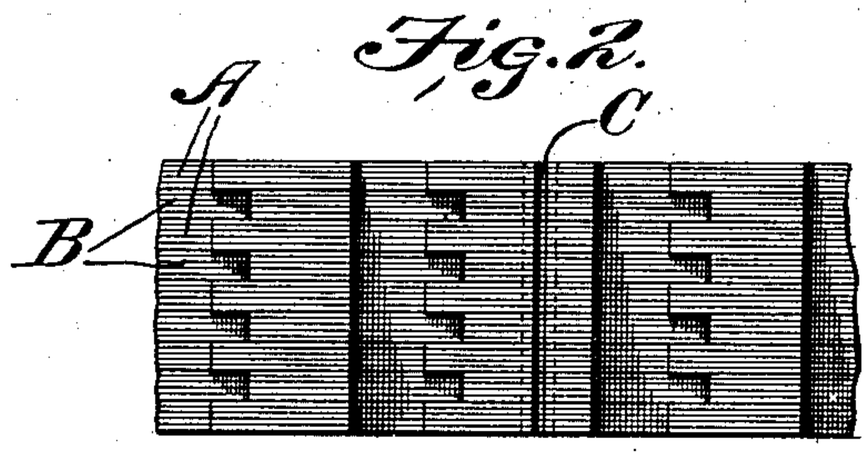


Fig. 2.



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UNITED STATES PATENT OFFICE.

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FIELD-MAGNET CORE.

SPECIFICATION forming part of Letters Patent No. 724,484, dated April 7, 1903.

Application filed June 14, 1902. Serial No. 111,666. (No model.)

To all whom it may concern:

Be it known that we, CHARLES R. MESTON and THOMAS M. MESTON, 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—

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 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 in strength between the two sides of the pole-face can also be varied as desired.

Heretofore in the construction of field-magnet cores of the character described it has been the practice to build up the core 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 side of the pole-face was at a gradually increasing distance from the armature than the other side of the pole-face, in certain types of motors this plan could not be followed practically by reason of the required difference in distance from the armature being too slight to be produced by machinery. In such types of cores it has 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 side 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 on one side of the pole-face than on the other 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 in 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 face of the polar projections. The small amount of metal necessary to be removed renders it impossible on commercial work of this character to determine with any degree of certainty 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 try the motor to determine whether or not enough metal has been taken away. In these matters it follows that errors are frequent, especially when we consider that in the field-core shown in the drawings, where twenty-eight polar projections are used and in the old way would have to be filed off, there are twenty-eight opportunities to make the mistake of removing too much or too little metal. This fact necessitated reliance being placed upon these errors counterbalancing each other on diametrically opposite sides of the machine; but should such errors happen to be grouped the result may be somewhat unsatisfactory, as no way in practice 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.

With these objects in view our invention

consists in the construction, arrangement, and combination of the several parts of our device, all as will hereinafter be described, and afterward pointed out in the claims.

In the drawings, Figure 1 represents a fragmentary view of our improved field-magnet core in side elevation, and Fig. 2 represents a plan view of a portion of said core.

As shown in Fig. 2, the field-magnet core is built up of a number of laminations or stampings, the same being preferably made from two dies and grouped together, so as to produce in magnetic effect polar projections having one side receding. The receding side is formed by absence of metal in certain of the laminations.

For purposes of explanation we will state that the laminations forming our improved core being made from two dies are distinguished by the width of the faces of their polar projections, one set of laminations (indicated at A) having relatively wide pole-faces and the other set of laminations (indicated at B) having relatively narrow pole-faces. The sets of laminations are so arranged in the assembled core that one edge of the polar projections thereof preferably aline. The pole-faces of these polar projections varying in width, as they do, at the opposite edge of the polar projections produce the receding face referred to.

The built-up polar projection shown in the drawings is characterized by a recess or slot C, preferably located near one edge, which slot is designed to receive a short-circuited starting-coil. On each side of this slotted polar projection are what might be termed the "consequent" or "unwound" polar projections. The slotted polar projection after receiving the short-circuited windings also receives a coil, which when energized magnetizes said slotted polar projection, the short-circuited winding 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 self-induction motor, where no brushes are employed to commutate the current, to exert the torque on the armature to produce rotation therein.

In practice we have found that in building up our improved core good results are obtained by arranging the two sets of laminations in groups of five, alternating said sets in the assembled core, the groups or sets of laminations A, those having the wide-faced polar projections, being at the outside edges, so as to produce a more symmetrical appearance in the core.

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 that side of the pole. The absence of metal from the sets of laminations B, whose pole-faces are narrower than the pole-faces of laminations A, avoids the necessity of removing the metal after the armature is assembled, as by the use of a file heretofore employed, and, furthermore, the cores when assembled as above described are all substantially uniform and show a high standard of starting and running efficiency. In practice we have found that motors constructed as herein shown and described when tested for starting efficiency are superior to motors constructed in the old way, and, in addition, the tests do not vary from a given standard more than one or two points for each motor.

While we have in the drawings shown a particular arrangement of laminations grouped in alternate sets, the proportion of laminations A being twenty-five to twenty with relation to the laminations B, it is obvious that this proportion could be changed and the recession of one side of the polar projection varied to meet different conditions. For instance, if it is desired to strengthen the receding side of the polar projection the number of laminations A can be increased, and vice versa. Furthermore, while we have shown the polar projections of laminations B as being narrower throughout their lengths than the polar projections of laminations A, it is obvious that the polar projections of laminations B can be of the same width as those on laminations A to a point near the pole-faces, the pole-faces being reduced by cutting away the material at one corner and at the inner edge of the polar projections of laminations B.

We are aware that many 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 built up entirely of laminations having polar projections, at which polar projections said laminations are of varying widths; substantially as described.

2. A field-magnet core built up entirely of laminations arranged in groups, said groups of laminations having polar faces of varying widths; substantially as described.

3. The herein-described field-magnet core, the same consisting of laminations having slotted polar projections, certain of said laminations having a greater amount of metal to one side of said slot than other of said laminations; substantially as described.

4. The herein-described field-magnet core, the same being composed entirely of laminations formed with polar projections, the polar projections of alternate laminations having faces of different widths; substantially as described.

5. The herein-described field-magnet core composed entirely of laminations and having polar projections formed of varied widths at their polar faces; substantially as described.

6. The herein-described field-magnet core, the same consisting of laminations A provided with relatively wide-faced polar projections, and laminations B provided with relatively narrow-faced polar projections, certain of the polar projections of said laminations A and B being slotted, said slots of the polar projections of said two sets of laminations registering; substantially as described.

7. A field-magnet core formed of laminations having polar projections, the said polar projections of each lamination being of substantially the same sectional area, combined with other laminations having polar projections of a different sectional area; substantially as described.

8. A field-magnet core formed of separate laminations on which are polar projections of predetermined uniform sectional area, in combination with other laminations having polar projections, of different sectional area, and means for uniting said several laminations to form polar projections of different sectional areas; substantially as described.

9. A laminated field-magnet core having polar projections, and means for arranging a different sectional area in different portions of said polar projections; substantially as described.

10. A field-magnet core formed of laminations, a portion of the polar projections of some of said laminations being of less sectional area than the others; substantially as described.

11. A field-magnet core formed of laminations, the polar face of some of which recede at one side; substantially as described.

12. A field-magnet core formed of laminations, a portion of the polar face of some of which recede from the general line of the polar projections of said core; substantially as described.

13. A field-magnet core composed of laminations, a portion of some of which at their polar faces are of less area than others in juxtaposition thereto at that point; substantially as described.

14. A field-magnet core composed of laminations in which less metal in presented at the polar face by some of said laminations than in others; substantially as described.

In testimony whereof we hereunto affix our signatures, in the presence of two witnesses, this 12th day of June, 1902.

CHARLES R. MESTON.
THOMAS M. MESTON.

Witnesses:
WM. H. SCOTT,
F. R. CORNWALL.