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METHOD OF MANUFACTURING CYLINDRICAL MAGNET FRAMES AND THE LIKE.

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1,297,271.

Patented Mar. 11, 1919.

Fig. 1.

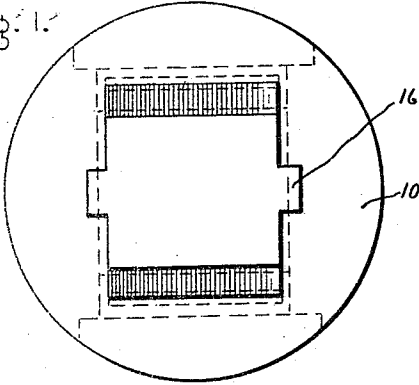


Fig. 4.

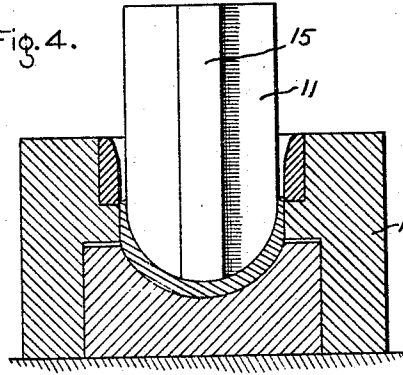


Fig. 2.

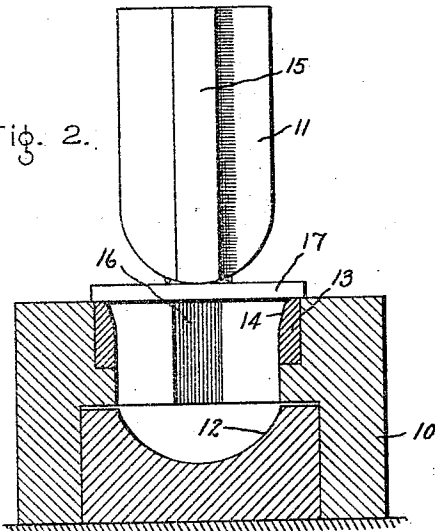


Fig. 5.

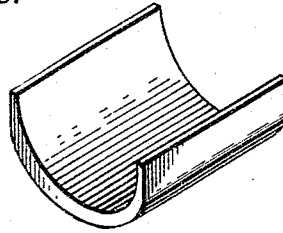


Fig. 6.

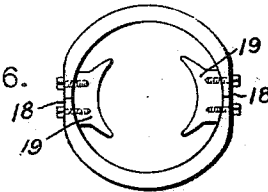


Fig. 3.

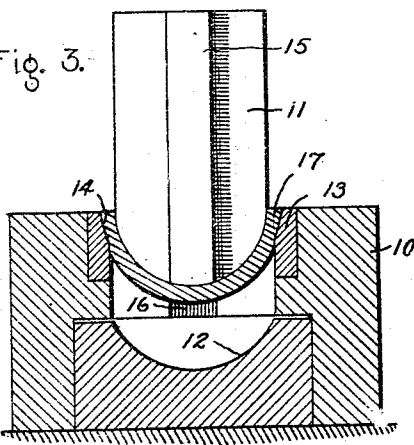
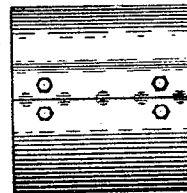


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METHOD OF MANUFACTURING CYLINDRICAL MAGNET-FRAMES AND THE LIKE.

1,297,271.

Specification of Letters Patent.

Patented Mar. 11, 1919.

Application filed October 12, 1917. Serial No. 196,299.

To all whom it may concern:

Be it known that I, GEORGE E. STEVENS, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Methods of Manufacturing Cylindrical Magnet-Frames and the like, of which the following is a specification.

The present invention relates particularly to magnet frames, such as are found in small motors and generators, and which comprise essentially a cylinder of magnetic material into which the pole pieces are fastened.

The object of the invention is to provide an improved method of manufacturing such frames or cylinders which will be cheap to carry out and very economical of material.

According to my improved method, I form a magnet frame from two half cylinders which are placed edge to edge and suitably fastened together, preferably by spot welding, to form a complete cylinder or magnet frame into which are fastened the pole pieces. In forming the half cylinders I take a piece of flat material of the required thickness and cut it into pieces of the length of the magnet frame and of a width somewhat less than half the circumference of the frame. Then, by means of a suitable die or dies, for example, I form each flat piece or strip into a half cylinder of the desired diameter; and to provide the necessary width of material for this purpose, I cause the material along the longitudinal edges of the strip to flow, or be stretched or expanded so that such edges become thinner and the strip in substance widened. The operation of causing the longitudinal edges of the material to flow to widen the strip is preferably performed at the same time or during the same operation that the strip is being bent or curved up into shape, but it may be performed before or after, if found desirable. This forms a magnet frame which is cylindrical on its inner surface but has two opposed flattened sides on the outer surface due to the longitudinal edges of the strips having been caused to flow, as referred to above. As will be obvious, the cylinder instead of being formed of two half cylinders may be formed from more than two parts or sections. For example, it may be formed of

four quarter cylinders, each made after the manner described and welded together, in which case there would, of course, be four flattened outside surfaces.

In the drawing, Figure 1 is a top plan view of one part of a die which may be used in carrying out my improved method; Fig. 2 is a side elevation partly in section of the complete die with a piece of material from which a half magnet frame is formed in place thereon; Fig. 3 is a view similar to Fig. 2 showing the die in the act of curving or forming up a strip of material into a half cylinder; Fig. 4 is a view similar to Fig. 3 showing the completion of the forming operation; Fig. 5 is a perspective view of a strip of material after it has been formed into a half cylinder for a magnet frame; Fig. 6 is an end view of a completed magnet frame, and Fig. 7 is a side view thereof.

Referring to the drawing, 10 indicates the stationary member and 11 the movable member of a die which may be utilized in carrying out my improved method. The stationary member 10 has a socket which is rectangular at its outer end and has a curved bottom, as indicated at 12, which has a radius equal to the radius of the outside of the magnet frame. This socket is of a length equal to the length of the magnet frame and is of a width equal to the outside diameter of a finished magnet frame measured across the flat sides thereof. At its outer edge the socket is provided with set-pieces 13 of hard material, cut back, as indicated at 14, in order to facilitate the forcing into the socket of the metal operated upon. The movable member of the die has a rounded end of a curvature equal to the inside diameter of the magnet frame. It is also provided with tongues 15 on opposite sides which slide in grooves 16 in the stationary die member in order to guide the movement of the die.

In forming a half cylinder for a magnet frame a piece of material, as shown at 17, is placed in the die, as indicated in Fig. 2. This piece of material is of the thickness desired for the thicker portion of the magnet frame and is of a length equal to the length of the magnet frame. It is of less width, however, than half the circumference of the finished magnet frame. The pieces of material may be readily cut from

strips of flat stock. The members of the die are then forced together, as indicated by Figs. 3 and 4, causing the piece of material to take the form indicated in section 5 in Fig. 4, and in perspective in Fig. 5. As will be noted from Figs. 3 and 4, the spaces between the sides of the socket and the movable member of the die are of less width than the thickness of the strip of material 17, and as a consequence the longitudinal edges of the strip are squeezed between the surfaces of the die and the material thereof caused to flow. This serves to widen the strip, as is obvious, and to expand it so as to form a complete half cylinder. Such half cylinder is evenly curved on its inner surface but is flattened at two points on its outer surface.

Two of the half cylinders are then placed together, as shown in Figs. 6 and 7, and suitably joined, preferably by spot welding. This forms a complete cylindrical magnet frame having opposed flattened sides, as indicated at 18 in Fig. 6, and pole pieces 19 are fastened in the magnet frame at these points.

By the above described method magnet frames can be very expeditiously manufactured and with a substantial saving in material due to the thinning out of the longitudinal edges of the strips to bring them to the necessary width to form a complete half cylinder thereby enabling strips of less width than half the circumference of the magnet frame to be used. At the same time, the magnetic path through the frame is not affected since the pole pieces are placed at the points where the frame is flattened and less thick.

While I have described my invention as particularly applicable to the manufacture of cylindrical magnet frames, it will be understood, of course, that it is not necessarily limited thereto, but may find application elsewhere.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In the manufacture of cylinders formed of arc-shaped strips with their edges welded together, the step which comprises taking a curved strip having a length of arc less than that of the given arc and causing its longitudinal

edges to flow to expand such strip until its arc equals the given length of arc.

2. The method of manufacturing a cylindrical magnet frame which comprises forming two half cylinders from two strips of material which are initially of less width than half the circumference of the frame, the material along the longitudinal edges of the strips being caused to flow to bring the material to the necessary width, and welding the edges of them together to form a complete cylinder.

3. In the manufacture of cylinders formed from two half cylinders welded together, the step which comprises taking a strip of material of suitable length and of less width than the length of arc of the half cylinder, and bending the strip and causing its longitudinal edges to flow to widen the strip to the length of the arc of the half cylinder.

4. The method of manufacturing a cylinder of given diameter which comprises taking strips of material of a suitable length and of less width than half the circumference of the cylinder, bending the strips to semi-circular form and causing their longitudinal edges to flow to widen the strips so as to form complete half cylinders, and welding the edges of two half cylinders together.

5. The method of manufacturing a cylinder of given diameter which comprises taking strips of material of suitable length and of a width less than a given arc of the cylinder, bending the strips and causing their longitudinal edges to flow so as to bring the strips to a width equal to the given arc and to arc form, and welding together the edges of the arc shaped strips thus formed to make a complete cylinder.

6. In the manufacture of cylinders formed of arc-shaped strips having their edges welded together, the step which comprises taking a flat strip of less width than the given length of arc, bending it to curved form, and causing its longitudinal edges to flow to expand the strip to a width equal to the desired length of arc.

In witness whereof, I have hereunto set my hand this 10th day of October, 1917.

GEORGE E. STEVENS.