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W. A. RAY

2,302,571

METHOD OF MAKING ELECTRICAL LAMINATIONS

Filed Jan. 12, 1940

Fig. 5

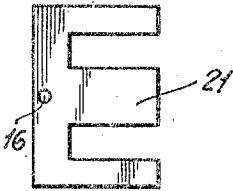


Fig. 6

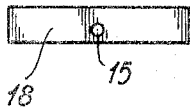


Fig. 1

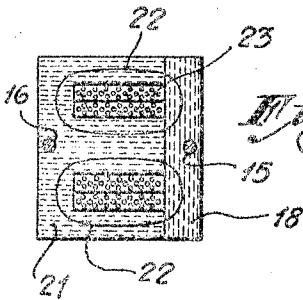


Fig. 7

Fig. 2

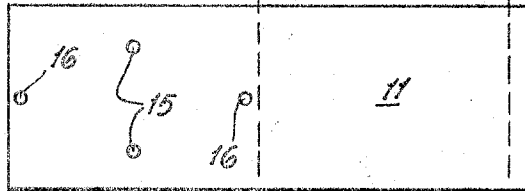


Fig. 3

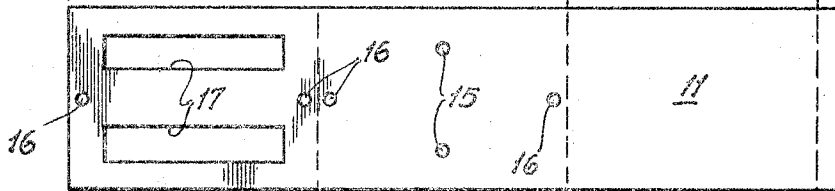
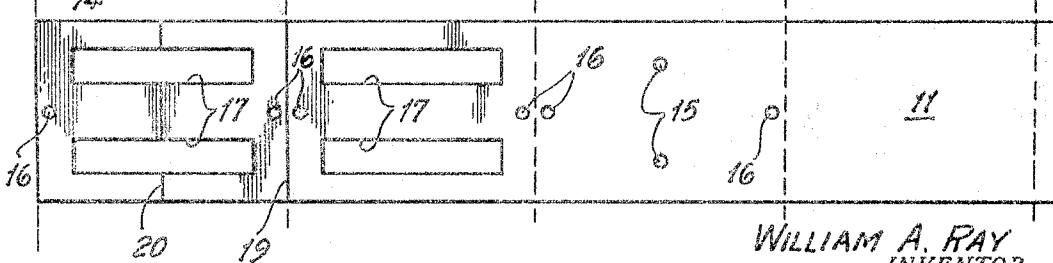


Fig. 4



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METHOD OF MAKING ELECTRICAL LAMINATIONS

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2 Claims. (Cl. 29—155.5)

My present invention relates to laminations for the construction of cores for transformers and other electrical apparatus.

Such laminations are usually punched from a long rolled band of transformer iron which, because of the method of its manufacture, has a definite "grain" running in the direction of its length. It has been found that, where such grain is present, the iron exhibits greater magnetic permeability to the flux lines which are parallel to the direction of the grain than to those which cross it.

It is, therefore, a main object of my invention to provide a method of cutting laminations from such a band so that, in the major portions of these laminations, the grain lies in substantially the same direction as that of the path of the flux lines which pass through them when the core, of which they form a part, is energized.

Another object is the provision of a method of cutting E-shaped laminations from such a band so that the arms of the E's are parallel to the direction of the grain.

Another object is the provision of a method of cutting pairs of E and I-shaped laminations from a band of sheet metal so that none of the material is wasted.

Another object is the provision of a method of producing pairs of E and I-shaped laminations from a band of transformer iron having a longitudinal grain so that the path of the flux lines produced in a core assembled from these parts will be substantially parallel to the grain in the arms of the E-shaped lamination and in the I-shaped lamination.

Other objects and advantages of my invention will be found in the description, the drawing, and the appended claims.

For complete understanding of the invention, reference may be had to the following detailed description and accompanying drawing, wherein:

Figures 1, 2, 3 and 4 are, respectively, plan views of a strip of transformer iron in the positions taken by it in the successive punching operations;

Figures 5 and 6 are plan views of the finished laminations; and

Figure 7 is a sectional view of a transformer assembled from the laminations and taken in the plane of one of the pairs of laminations.

In the drawing, the numeral 11 indicates a strip of transformer iron having a longitudinal grain. Broken lines 12, 13 and 14 indicate the positions which the end of the strip takes prior to the successive punching operations to be performed on it to produce the laminations.

In Fig. 2, four holes 15 and 16 have been punched in the strip. In Fig. 3, two rectangular openings 17 have been punched, the removed

material forming two I-shaped laminations 18, shown in Fig. 6. In Fig. 4, the strip has been cut transversely in two places 19 and 20 to form two E-shaped laminations 21, shown in Fig. 5; a pressure pad preferably being arranged so as to support the end E-shaped portion as the double-cut is made.

The operations described in the preceding paragraph are preferably performed in an automatic punch press and occur simultaneously after the strip has progressed to the position shown in Fig. 4. It will be noted that no material is wasted, other than that of the bolt holes 15 and 16.

In Fig. 7, the broken lines indicate the grain arrangement of the laminations, and lines 22 the general path of the flux produced in the laminations by coil 23. It will be noted that, other than in the vertical portion of the E-shaped lamination, the direction of the grain is substantially parallel to the path of the flux lines.

While I have described my present invention with reference to a particular punching process, it is evident that modifications thereof are possible without departing from the spirit of my invention. For instance, the width of the strip of metal employed may be two or more times the height of the E, a plurality of pairs of E-shaped portions being cut off in the final operation. I intend therefore that my invention be limited only by the scope of the appended claims.

I claim as my invention:

1. The method of producing a plurality of pairs of E and I-shaped laminations for an electrical core which consists in punching out from a strip of sheet metal, having a width equal to the height of said E, a pair of I-shaped portions from the parts of said strip corresponding to the spaces between the adjoining arms of a pair of opposed E-shaped portions arranged vertical to the axis of said strip, and then severing said strip transversely across said spaces to form said pair of E-shaped portions.

2. The method of producing a plurality of pairs of E and I-shaped laminations for an electrical core which consists in punching out from a band of lamination iron, having a longitudinal grain and a width equal to the height of each of said E and said I, a pair of I-shaped laminations from the parts of an end portion of said band corresponding to the spaces between the adjoining arms of a pair of opposed E-shaped lamination portions arranged at the end of and vertical to the axis of said band, and then severing said band transversely in two places to form said pair of E-shaped laminations, one of said severing places being across said spaces.

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