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J. G. SOLA

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TRANSFORMER

Filed Aug. 27, 1930

Fig. 1.

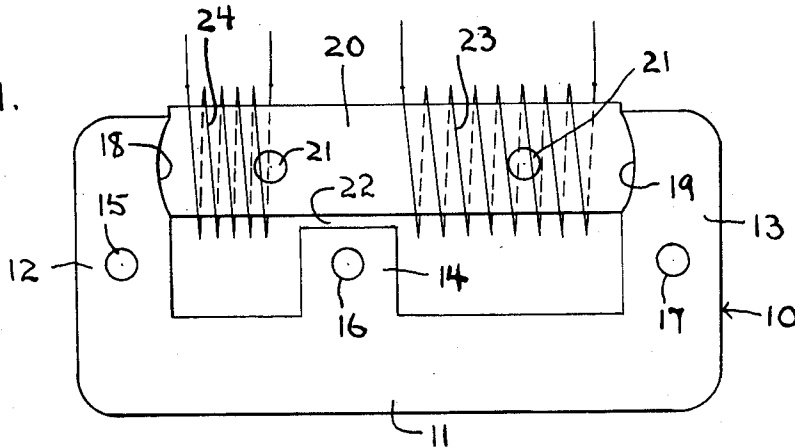


Fig. 2.

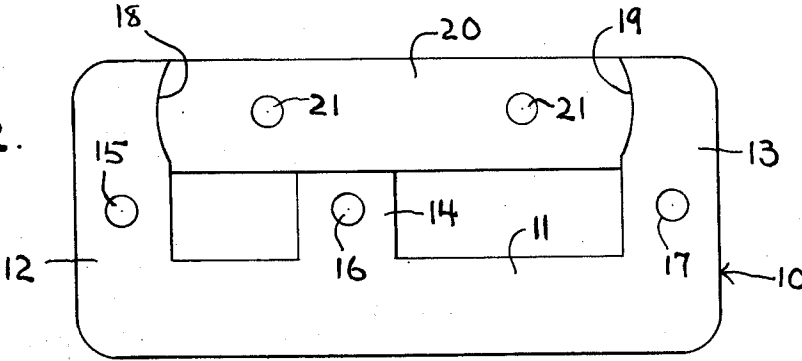


Fig. 3.

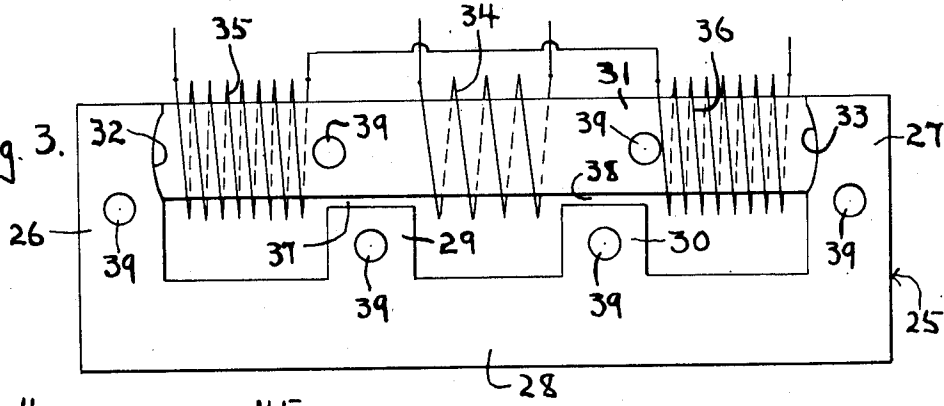
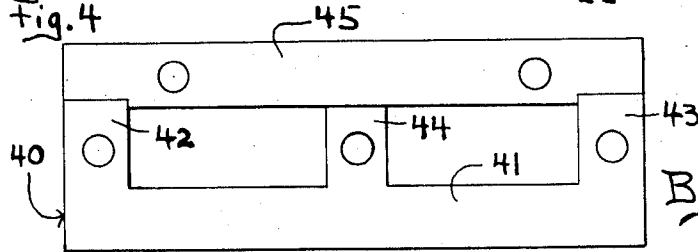


Fig. 4.



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TRANSFORMER

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My invention relates to transformers and it has for its object the provision of a new and improved form and arrangement of parts by reason of which the desired air gap may be produced in the core to the best advantage. When in stamping the thin plates making up the laminations of the core of a device of this type an attempt is made to cut out a narrow piece one-thirty-second of an inch in width, or the like, extreme difficulty is encountered in obtaining accuracy of cutting, there being a tendency for the plates to slip edgewise to such an extent with respect to the dies as to cause objectionable discrepancies in the cutting action. Moreover, in such an operation, there is a marked tendency for small pieces of the cut out metal to stick to the dies so as to prevent proper clearing when the plate is thrown out after the stamping operation, such small pieces in many instances causing undue wear upon the dies, as well as preventing clean work. It is one of the objects of my invention to provide an improved arrangement whereby a small air gap may be provided of the desired width without the necessity for cutting out a piece of metal of corresponding width.

To this end, it is one of the objects of my invention to provide an improved core structure comprising a bar member one side face of which in the normal position of the bar has snug engagement with a transversely arranged leg portion from which said bar is severed in the stamping operation, and arranged so that when the bar is inverted the opposite side edge stands in the desired spaced relation to said leg portion, the arrangement further being such that the width of the bar can be regulated as may be necessary for providing the predetermined desired width of spacing without the necessity for cutting out any narrow strip of the metal at any point.

It is another object of my invention to improve transformers in sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects are illustrated in the drawings and are hereinafter specifically described. That which I believe to be new and desire to cover

by Letters Patent is set forth in the claims.

In the drawings,—

Fig. 1 is a diagrammatic face view showing a preferred form of my improved transformer;

Fig. 2 is a view similar to Fig. 1, but with the coils omitted and with one of the core members in inverted position with respect to that shown in said Fig. 1;

Fig. 3 is a view similar to Fig. 1 but showing a modified form of construction; and

Fig. 4 is a view similar to Fig. 2, but showing a modified form of construction.

Referring now particularly to Figs. 1 and 2, in which corresponding parts are indicated by the same reference characters, 10 indicates a core member of laminated form comprising a bar portion 11 with oppositely disposed arms 12 and 13 extending from the end portions thereof, said bar 11 and arms 12 and 13 being in the general form of a U. In the form of construction as shown, the bar 11 is also provided with an intermediate arm 14 in spaced relation between the arms 12 and 13, the bar 11 and the three arms 12, 13 and 14 having substantially the form of an E. In the construction shown, the several plates of the arms 12, 13 and 14 are rigidly connected together by means of rivets 15, 16 and 17, respectively.

In the form of device as shown in Fig. 1, the inner faces of the arms 12 and 13 are provided with openings in the form of grooves 18 and 19 respectively in parallel position with respect to each other. Between the grooves 18 and 19, there extends an additional core bar 20 also of laminated form having end portions fitting snugly within the grooves 18 and 19. The several plates of the laminated bar 20 are connected together by rivets 21.

The arrangement of the several arms and bars comprising the core of my improved transformer as above described is such with respect to each other that when the bar 20 is in position as shown in Fig. 1 such bar provides a complete metallic connection between the arms 12 and 13 of the core member 10. In such position, the intermediate arm 14 is in spaced relation to the side face of the bar

20, providing an air gap 22. When the core bar 20 is in the position as shown in Fig. 2, such bar 20 provides a complete metallic connection between the arms 12 and 13, but in this arrangement the intermediate arm 14 stands in snug engagement with the side face of the core bar 20. As will be readily appreciated from a comparison of Figs. 1 and 2, the core bar 20 in the position as shown in Fig. 1 is in transversely inverted position with respect to the position of the bar as shown in Fig. 2, with each end of the bar 20 having an effective bearing magnetically upon the same one of the arms 12 and 13 in the different positions. In the construction shown, the plates making up the core member 10 and the core bar 20 are stamped from a sheet of metal so as to produce the parts as shown in Fig. 2, such operation requiring merely a shearing cut between the end of the arm 14 and the side face of the bar 20. Upon the inversion of the bar 20, the air gap 22 is provided between the end of the arm 14 and the side face of the bar 20 as shown in Fig. 1, such air gap resulting by reason of the differential arrangement of the side faces of the bar 20 at the point therealong opposite the arm 14 with respect to the bearings of said bar on the arms 12 and 13. As will be readily understood, the size of the air gap depends upon the position of the cut defining the end of the arm 14. It will be appreciated that by controlling the position of the cut at the end of the arm 14 the length of such arm can be controlled for regulating the size of the air gap 22.

In the arrangement shown in Figs. 1 and 2, the intermediate arm 14 serves to provide a complete metallic connection between intermediate portions of the core bar 20 and the core member 10 when the bar 20 is in the position as shown in Fig. 2; when, however, the bar 20 is in inverted position as shown in Fig. 1, the intermediate arm provides only a combination metallic and air gap connection between the bar 20 and the core member 10.

Upon the core bar 20 I have provided a primary coil 23 and a secondary coil 24, the number of turns in such coils being determined in accordance with well-known principles for attaining the desired variation in voltage. The coils 23 and 24 are mounted upon the bar 20 so as to stand at opposite sides of the intermediate arm 14, as shown in Fig. 1.

In Fig. 3, a core member 25 is provided comprising spaced arms 26 and 27 at the ends of a core bar 28, intermediate arms 29 and 30 being provided in spaced relation to the side arms 26 and 27 of the member 25 and in spaced relation to each other. A core bar 31 is fitted snugly between grooves 32 and 33 formed in the inner faces of the arms 26 and 27, such core bar 31 being provided with a

primary coil 34 thereon between the arms 29 and 30 and secondary coils 35 and 36 located on said bar 31 between the end arms and the intermediate arms of the core member 25. In the construction shown the secondary coils 35 and 36 are of similar size and arrangement and are connected in series with each other. In the construction shown in Fig. 3, the core bar 31 is in inverted position with respect to the normal position in which it was cut from the plate material, the inversion of said bar 31 having served to provide the air gaps 37 and 38 as is described above in connection with the air gap 22 of the arrangement shown in Figs. 1 and 2. The several plates of the core members in Fig. 3 are connected together by means of rivets 39.

The arrangement shown in Fig. 4 is different from that shown in Figs. 1 and 2. In this construction, a core member 40 in the form of a U is provided comprising a bar 41, end arms 42 and 43 in spaced relation to each other and an intermediate arm 44 in spaced relation to the arms 42 and 43. A core bar 45 is provided adapted in its normal position in which it is stamped to have snug engagement with the end of the intermediate arm 44 and to have in such position snug engagement with the ends of the arms 42 and 43. As will be readily understood, upon the inversion of the bar 45, the ends of the arms 42 and 43 will have snug engagement with the opposite side face of the core bar 45, while the end of the arm 44 will stand in spaced relation to the side face of the core bar 45.

By my invention, I have provided a transformer which can be produced very readily and cheaply so as to be appropriate for use in connection with neon signs, and the like, the arrangement being such that no difficulty at all is encountered in the matter of stamping the core plates so as to provide an air gap of the desired width.

While I prefer to employ the construction as shown in my drawings and as above described, it is to be understood that I do not limit my invention to such construction except so far as the claims may be so limited by the prior art.

I claim:—

1. A transformer comprising in combination a core member having two arms in spaced relation to each other, a second core member having effective bearings magnetically on said arms at its opposite ends respectively and adapted when inverted transversely of the member likewise to have effective bearings magnetically on said arms at the same ends respectively, a primary coil mounted on said second core member, a secondary coil mounted on said second core member in spaced relation to said primary coil, and a third core arm providing an intermediate magnetic path from said first named core member to

said second core member between said first named arms and between said coils, the side faces of said second member being differentially arranged with respect to the bearings of said second member on the arms of said first named member whereby a variable break is provided in said intermediate magnetic path by the inversion of said second core member.

2. A transformer comprising in combination a core member having two arms in spaced relation to each other, a second core member having effective bearings magnetically on said arms at its opposite ends respectively and adapted when inverted transversely of the member likewise to have effective bearings magnetically on said arms at the same ends respectively, a primary coil mounted on said second core member, a secondary coil mounted on said second core member in spaced relation to said primary coil, and a third core arm carried by said first named core member between said first named arms extending between said coils, the side faces of said second core member being differentially arranged with respect to the bearings of said second member on said first named arms whereby the relative position of the end of said third arm with respect to the adjacent side face of said second core member is changed by the inversion of said second core member.

3. A transformer comprising in combination a core member having two arms in spaced relation to each other, a second core member having effective bearings magnetically on said arms at its opposite ends respectively and adapted when inverted transversely of the member likewise to have effective bearings magnetically on said arms at the same ends respectively, a primary coil mounted on said second core member, a secondary coil mounted on said second core member in spaced relation to said primary coil, and a third core arm carried by said first named core member between said first named arms extending toward said second core member between said coils, the side faces of said second member at the point therealong opposite said third arm being differentially arranged laterally with respect to the bearings at the ends of said second member, and said third arm being of such length as to bridge the space between said core members in one position of said second member and to stand in spaced relation to said second member in its inverted position.

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