Feb. 9, 1965 N. OULETTA 3,169,235

HEAT DISSIPATING BALLAST CONSTRUCTION EMBODYING CORE CLAMP HAVING COPLANAR SPACER LUGS

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FIG. 1

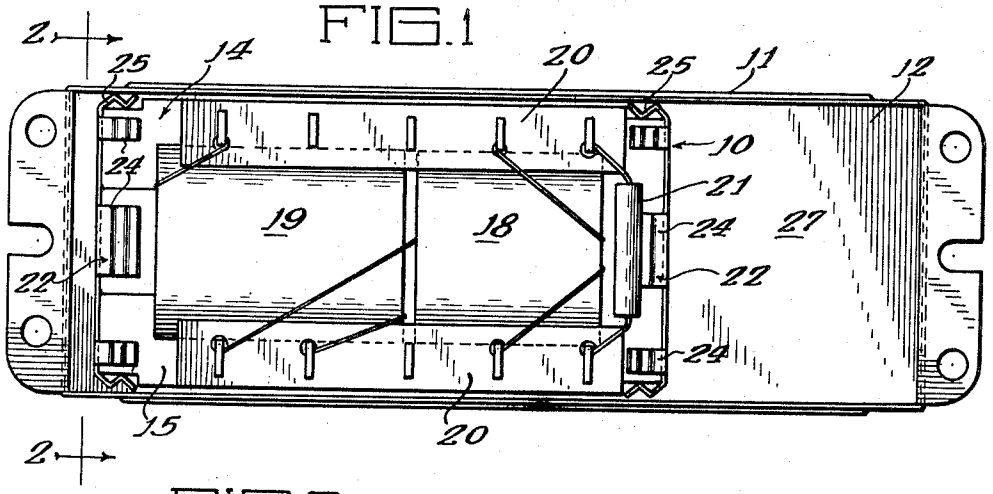


FIG. 2

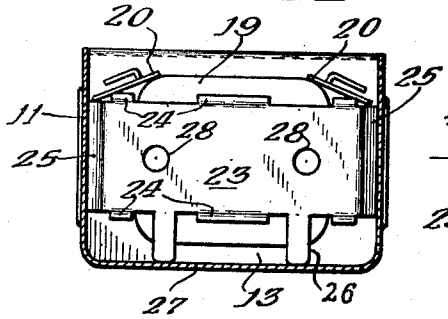


FIG. 3

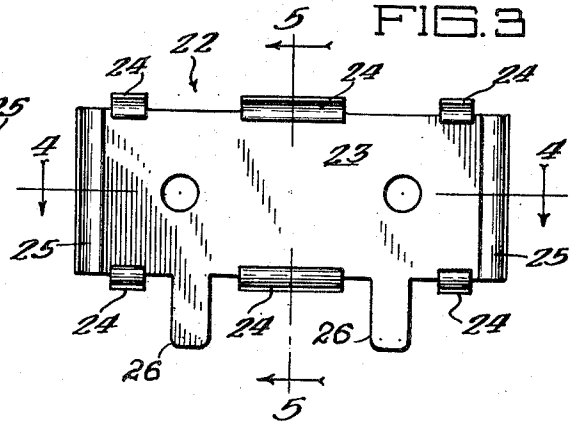


FIG. 4

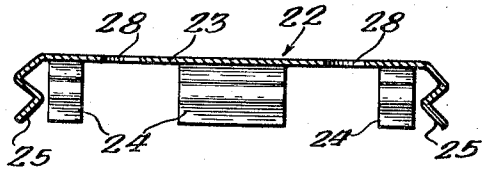


FIG. 5

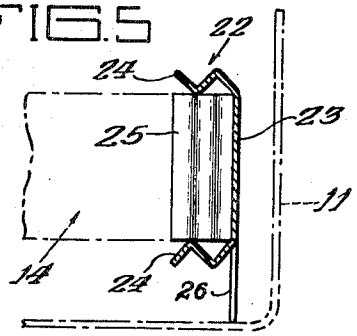
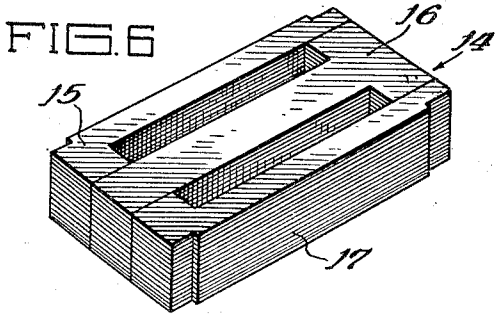


FIG. 6



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HEAT DISSIPATING BALLAST CONSTRUCTION EMBODYING CORE CLAMP HAVING COPLANAR SPACER LUGS

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This invention relates to improvements in ballast construction, the term "ballast" being the term commonly employed for high reactance devices used to ballast gaseous discharge devices such as the ordinary fluorescent lamp.

It is an object of the present invention to provide a ballast construction of improved temperature characteristics.

Another object of my invention is to provide improved means for mounting the core and coil assembly of the ballast in the casing so as to facilitate the potting operation and also to improve temperature distribution.

One of the problems inherent in the operation of ballasts is the dissipation of heat which is generated in the core and coil assembly of the ballast.

The core and coil assembly is embedded in the casing by a potting compound, and the potting compound serves as a heat conductor to dissipate the heat. However, the spacers which are used to maintain the core and coil assembly spaced from the supporting wall of the casing during the potting operation interfere with heat dissipation and tend to produce localized overheating of the core and coil assembly.

Heretofore, the spacers have been fabricated from fiber or corrugated paperboard and they have been applied in either one of two ways. According to one way, the corrugated spacer is merely placed on the supporting wall of the casing, and then the core and coil assembly is placed on top of the spacer, and then the compound is poured. According to the second method, the fiber spacer is secured to the coil by means of the coil wrapper. In the first method, it is very difficult to get the potting compound to flow into all of the spaces on both sides of the corrugated spacer, and in the second method there will be a fillet of triangular cross section into which the compound will not readily flow. If all the spaces are not filled, the resulting voids act as barriers to heat conduction through the potting compound.

In both methods, not only does the spacer itself serve as a heat barrier, but the main purpose of the spacer is to provide space for a heat dissipating layer between the hottest portion of the coil and core assembly and the casing. In other words, although heat dissipation in general is the object, heat dissipation is retarded at the critical point by insulation. Therefore, the spacer causes uneven temperature distribution or localized overheating of the core and coil assembly.

According to my invention, I provide spacers which are located at the ends of the core and coil assembly and are of small cross sectional area with the result that the spacers do not serve as barriers to heat conduction through the potting compound and also they do not obstruct the flow of potting compound as in the case of the much larger paperboard or fiber spacers. The small cross sectional area is obtained by the use of metal spacers in the form of vertically oriented spacer lugs. The metal spacer lugs also provide greater accuracy of location.

Heretofore, the use of metal spacers has been considered undesirable from the noise standpoint, since a rigid metal spacer extending from the core structure to the casing will serve to transmit the vibrations of the core structure to the metal casing. Core vibration is

caused by magnetostriction. However, I have found that if the spacers are located at the ends of the core, the use of metallic spacers is not objectionable from a noise view point. In a sense, the core ends are nodal points.

It is another object of my invention to provide spacing means for the core and coil assembly which do not involve the fabrication of a separate spacer member and which do not require additional labor in connection with assembling the parts. According to this aspect of my invention, the spacing means is in the form of spacer lugs which are formed integrally with the core clamp and which are stamped of material which would otherwise be scrap. Thus, the manufacturing cost of the ballast is reduced by use of my improved construction.

Also, by forming the spacers integrally with the core clamp, not only is the desired end location obtained, but also the core can be located much more accurately with respect to the casing.

Other objects, features, and advantages of my invention will become apparent as the description proceeds.

With reference now to the drawings which show a preferred embodiment of my invention, and in which like reference numerals designate like parts:

FIG. 1 is a plan view of a ballast shown with the cover removed and before potting;

FIG. 2 is a vertical section taken along line 2—2 of FIG. 1;

FIG. 3 is an enlarged view of the core clamp;

FIG. 4 is a horizontal section taken along line 4—4 of FIG. 3;

FIG. 5 is a vertical section taken along line 5—5 of FIG. 3; and

FIG. 6 is a perspective view of the core, showing the three lamination stacks thereof.

In FIGS. 1 and 2, the reference numeral 10 designates a core and coil assembly which is located in a casing 11. The core and coil assembly is located at one end of the casing 11 providing a space 12 at the other end for an operating condenser, not shown. A space 13 is provided between the bottom of the core and coil assembly 10 and the supporting wall 27 of the casing 11. This space 13 and all of the other unoccupied space in the ballast is filled with a potting compound, not shown.

The core and coil assembly 10 comprises a core structure 14, a primary winding 18, a secondary winding 19, and terminal panels 20. A small condenser 21 may be connected across two of the terminals to facilitate starting of the first lamp, in accordance with usual practice.

The core structure 14 as shown in FIG. 6 comprises three lamination stacks 15, 16 and 17. These lamination stacks are maintained in abutting engagement with each other by core clamps 22 (FIG. 1), one at each end of the core. The whole assembly is suitably impregnated in accordance with usual practice.

The core clamp 22 is preferably fabricated from cold rolled sheet steel of about .035 inch thick. It comprises a body portion 23 having integrally formed therewith top and bottom clips 24, side clips 25, and spacer lugs 26. The clamp as a whole can be fabricated by a stamping operation. The clips 24 and 25 have a certain amount of resilience so that the laminations of each stack are urged into contact with each other by the top and bottom clips 24, and so that the stacks will be urged into abutting engagement with each other by the side clips 25.

After the various elements have been assembled, the core clamps 22 applied and the assembly impregnated, the resulting core and coil assembly 10 is provided with four supporting legs in the form of the spacer lugs 26. Thus the core and the coils may be supported a fixed distance above the supporting wall 27 of the casing 11. The spacer lugs 26 are of small cross section and do not interfere materially with the flow of the potting compound into

the space 13. Holes 28 in the body portion 23 permit penetration of the potting compound into the space between the body portion and the core structure 14.

As pointed out previously, the location of the spacer lugs 26 at the ends of the core structure result in improved temperature characteristics over the prior art spacers. Furthermore, the heat conductivity of the metallic spacer lugs 26 contributes to the improved temperature distribution because the spacer lugs 26 are located at a point remote from the point of maximum heat generation, namely, the center of each coil. There is no heat barrier interposed between this point and the adjacent casing wall.

Although only a preferred embodiment of my invention has been shown and described herein, it will be understood that various modifications and changes may be made in the construction shown without departing from the spirit of my invention, as pointed out in the appended claims.

I claim:

1. In a potted ballast for a gaseous discharge device, which ballast includes an elongate core structure comprising a plurality of lamination stacks, the combination of a casing in which said core structure is located, the plane of the laminations of said lamination stacks being disposed parallel to the bottom wall of said casing, a core clamp located at each end of said core structure and having clip portions engaging with said lamination stacks to maintain them in abutting engagement, and supporting legs formed integrally with said core clamps and providing edge engagement with the surface of said bottom wall for supporting said core structure in said casing during the potting operation, said legs extending in a direction perpendicular to the plane of laminations of said lamination stack, and being located substantially in the plane of the end surface of said lamination stack, and being spaced from each other to provide an opening therebetween for the flow of potting compound.

2. In a potted ballast for a gaseous discharge device, which ballast includes an elongate core structure, the combination of a casing in which said core structure is located, a core clamp located at each end of said core structure and having clip portions engaging said core structure, spacer means for supporting said core structure on a wall of said casing, and potting compound filling the space between said core structure and said casing, said spacer means being located at the ends of said core structure in order to improve temperature distribution and being formed integrally with said core clamps and extending edgewise therefrom and presenting edges which engage said wall.

3. In a potted ballast for a gaseous discharge device which includes a casing and an elongate core and coil assembly, and in which said core and coil assembly includes a plurality of lamination stacks, and two core clamps, one being located at each end of said core and coil assembly to maintain said lamination stacks in abutting relationship to each other and to maintain the laminations of each stack in contact with each other, the improvement which comprises a pair of spacer lugs integrally formed with said core clamp for maintaining said core and coil assembly a predetermined distance away from the bottom wall of said casing, and supporting said core and coil assembly in said casing during the potting operation, the laminations of said lamination stacks being oriented parallel to said bottom wall, said spacer lugs being coplanar elements which extend edgewise from said core clamp and having end edges which engage said bottom wall.

4. A ballast comprising a casing having a bottom wall and four side walls, an elongate core structure comprising a plurality of laminations arranged in stacks, the plane of said laminations being disposed parallel to said bottom wall, said stacks being abutted to each other along the edge surfaces thereof, a winding surrounding one of said lamination stacks, two core clamps overlying opposite ends of said elongate core structure, each comprising a sheet metal member having a body portion of generally rectangular shape, resilient clip portions extending away from the plane of said body portion at each of the four edges of said body portion and engaging said lamination stacks, and having spacer lugs disposed in the plane of said body portion and extending downwardly from the lower edge thereof, the lower ends of said spacer lugs providing edge engagement with the surface of said bottom wall and maintaining the periphery of said winding elevated above said bottom wall, and potting compound filling the space between said bottom wall and the periphery of said winding.

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