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A. P. TALLMAN

2,023,558

NEON TUBE AND METHOD OF MAKING THE SAME

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FIG. 1

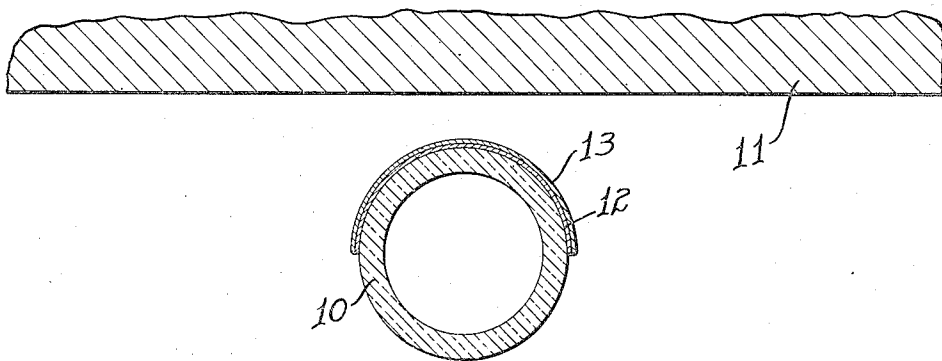


FIG. 2

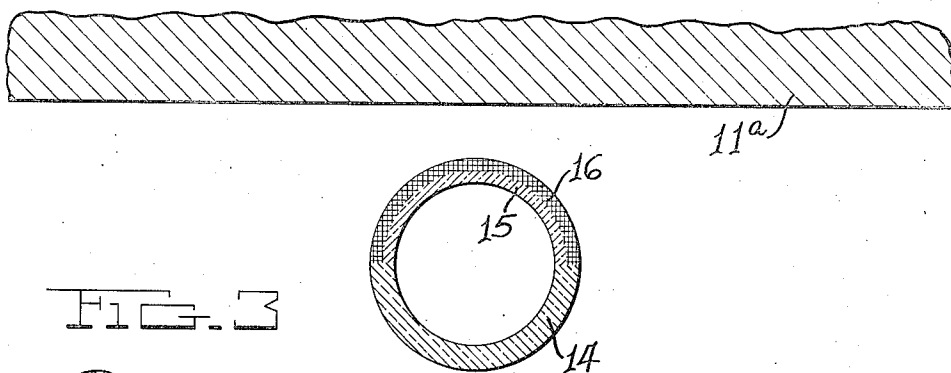
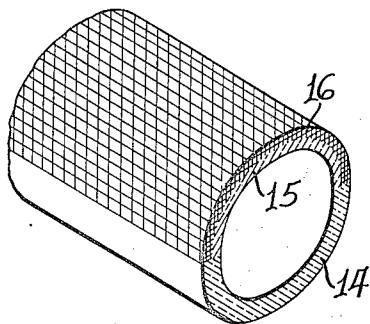


FIG. 3



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NEON TUBE AND METHOD OF MAKING
THE SAME

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6 Claims. (Cl. 176—122)

This invention relates to an improvement in neon light tubes and methods of making the same, and has for its object to produce a light of this character where the light rays will be efficiently directed in the desired direction by means that will not deteriorate rapidly in use.

In advertising signs or the like, it is customary to use tubes containing neon, argon krypton or the like rendered luminescent by high tension current. The glass tubes employed for this purpose are bent into the shape of various letters, figures and designs and lend themselves very readily to such shaping.

The light emitted from the tube escapes in all directions but ordinarily the sign is viewed from only one side. If the tube is mounted in front of a board or backing as is generally the case, the light emitted in the direction of the board is partly absorbed and partly reflected by the backing board, and in neither case does it have any beneficial effect from the standpoint of rendering the sign visible. This invention has for its object the reflection of a large part of the light rays from the back of the tube so that they may be directed to the side from which the sign will be seen, and also contemplates the absorption of any rays which are not reflected so that they will not illuminate the background. Accordingly, the lighted tubes stand out more distinctly both because of the reflected light and because of the relatively dark background. Details and further features of the invention will appear as the description proceeds.

In the accompanying drawing forming a part of this specification, Figure 1 is a section through a tube showing one form of the invention and also showing a portion of a backing behind the tube. Figure 2 is a view similar to Figure 1, but showing an alternative form of construction. Figure 3 is an isometric view of a section of a tube such as disclosed in Figure 2.

In the form shown in Figure 1 there is a glass tube 10, such as is commonly used for this purpose, and it is shown located in front of a backing board 11, which may be of any desired construction. On the rear of the tube there is shown a reflecting layer 12 and an absorbing layer 13. The reflecting layer is generally white, although it may be colored or tinted in any desired manner to accord with the tint of light which is desired, where such tinting of the reflector is found helpful. The layer 13 is ordinarily black, although good absorptive material of another color might be employed.

The preferable construction of these layers is

to make them of a coating material which may be baked in place on the surface of the glass, and will withstand the radiations and emanations from the tube. One suitable coating material comprises resins, commonly referred to as glyptal or alkyd, with fatty acid dissolved in coal tar hydrocarbons or other suitable solvents, such as hydrogenated naphtha, petroleum naphtha, and various combinations of them. The resins are condensation products formed by the combining of polyhydric alcohol with dibasic acid. For the white layer, titanium oxide has been found particularly suitable, although other suitable pigments may be employed for coloring the reflecting layer, and any suitable pigment, preferably black, may be employed in the absorptive layer.

A convenient way of making the tube is to paint the coatings thereon and thereafter bake them on during the customary bombardment of the tube, at which time sufficient heat is generated to produce the necessary baking of the coating. This has the advantage of producing the coated tube merely by coating it with the proper materials at the proper time without requiring any separate baking operation.

A coating of the material suggested has been found suitably resistant and durable under the normal conditions of use of such a tube, although it will be understood that the broader scope of the invention is not dependent upon the particular coating material employed.

In the construction shown in Figures 2 and 3 the front half 14 of the tube is of clear glass similar to that employed in tube 10, but the rear portion of the tube is formed of two layers of glass, an inner white layer 15 and an outer black layer 16. While the colors white and black are preferred for the reflecting layer 15 and absorptive layer 16, respectively, it will be understood that other colors are permissible as indicated in connection with the description of layers 12 and 13. A backing board 11a, similar to backing board 11, is indicated on the drawing.

In making a tube such as shown in Figures 2 and 3, it is possible to assemble the glass in a comparatively short thick tube and weld the various layers of glass together while in the softened condition, and thereafter while still plastic the tube may be drawn in the usual manner to the desired diameter. Of course, the tube may be made in any other manner which is found desirable and practicable.

While a tube such as indicated in Figures 2 and 3 may operate very satisfactorily, it will obviously

involve more expense in its manufacture than will the simple coating of the tube during the bombardment step, as discussed in connection with Figure 1, and while other suitable resistant materials may be employed in place of those suggested for use in coatings 12 and 13, it must be understood that ordinary paints and varnishes are affected by the radiations and emanations from the tube to such an extent that their useful life is brief. Accordingly, if materials are used in place of those suggested, care must be taken to select those which will withstand the conditions to which they are subjected in use on such a tube. The use of the reflective and absorptive coats, as described above, has a number of important advantages. Of course, it is readily understood that by reflection of the light towards the front, the waste of the light, which would otherwise occur, is avoided. It may not so readily appear that the apparent breadth of the tube is approximately doubled, but this will be understood if it is taken into consideration that the light directly transmitted results in an apparent column of light which is smaller than the actual column of gas, while the use of the reflector results in light being so directed that the entire tube to the outer diameter thereof constitutes an apparent light giving source, the result being that substantially twice as broad a strip is illuminated as would otherwise be the case. Further, since the lighting up of the back board is avoided, the sign stands out against the relatively dark background and is additionally distinct because of this reason. As a consequence tubes become much more clearly and readily visible and at the same time the form, into which the tubes are bent so as to make the desired characters or designs, is much more clear cut and distinct. A small tube thus coated is as clearly visible as one about three times the capacity without the coating.

Having set forth the principles of this inven-

tion and disclosed two specific forms thereof, it will be understood that the specific disclosures are by way of illustration and the appended claims are not limited thereby, except so far as stated in the claims. It will be further understood that whereas for the sake of brevity reference is made in the claims to a neon tube, this expression is intended to cover a tube of this type regardless of the particular gas employed whether neon, argon, krypton, or other gases or vapours that may be used in a like manner, or a mixture of such gases, reference being made to the type of light rather than to the particular gas employed.

What I claim is:

1. A neon tube having a reflecting coat around its rear half, said coat having incorporated therein titanium oxide.

2. A neon tube coated on its rear side with a composition comprising a resinous condensation product formed from polyhydric alcohol and dibasic acid and dissolved in a suitable solvent, baked in place upon the tube, and containing a suitable pigment.

3. A tube in accordance with claim 2 and in which the pigment comprises titanium oxide.

4. A tube in accordance with claim 2, and the coat containing white pigment next to the glass and black pigment in its outer portion.

5. The method of making a coated neon tube which comprises coating a portion of the tube with a suitable reflective enamel composition and baking the enamel onto the tube during the bombardment of the tube in the process of making the same.

6. A method in accordance with claim 5 and in which the enamel composition comprises a condensation product formed by the combination of polyhydric alcohol and dibasic acid, dissolved in a suitable solvent and containing titanium oxide as a pigment.

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