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HANDLING PROTECTOR FOR U-TUBES

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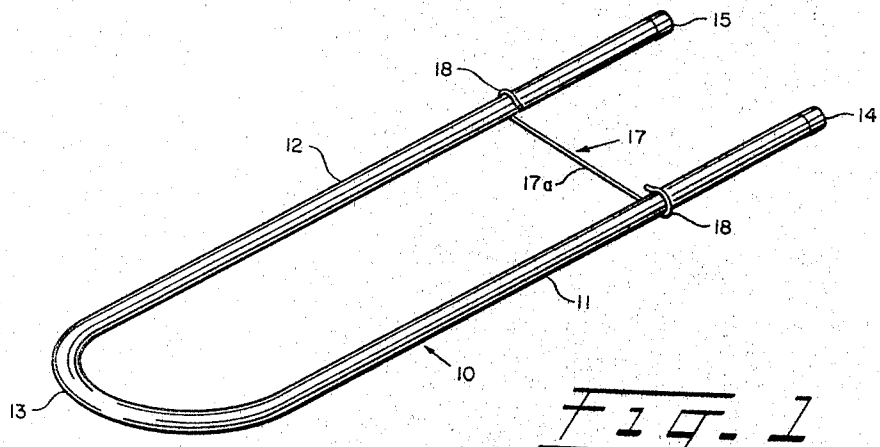


Fig. 1

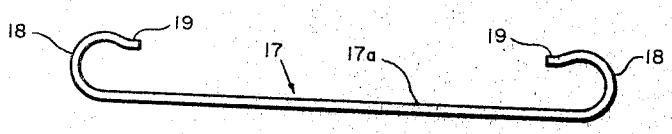


Fig. 2

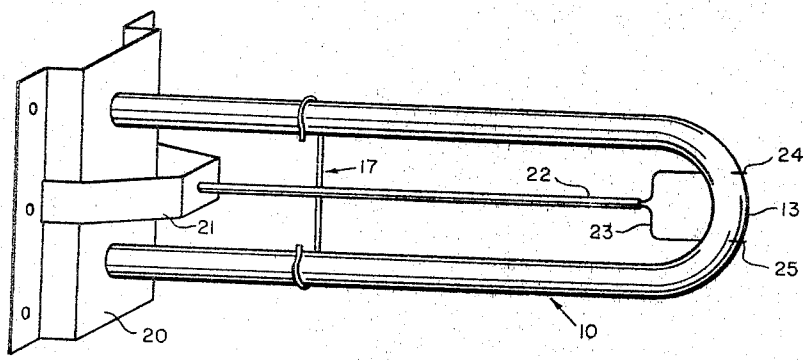


Fig. 3

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HANDLING PROTECTOR FOR U-TUBES

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ABSTRACT OF THE DISCLOSURE

A brace which extends around but which is readily removable, from the inner ends of a U-shaped fluorescent lamp and which serves to prevent the lamp ends from being pressed together or spread apart sufficiently to break the lamp during handling or installation.

This invention relates to a handling protector for fluorescent lighting tubes, and more particularly for U-tubes; i.e., tubes bent in the shape of a U, and having bases for electrical contacts at each end of the U.

In the shipping and handling of such tubes, and more particularly in the manual handling necessary to unpack the tubes and install them in fixtures, breakage of the tubes has been found to be undesirably high. An examination of the causes of such breakage indicates that it results primarily from pressures applied to the open ends of the U in a direction to spread the ends apart or press them together, and not from impact. The force required to break a tube by such pressure has been found to be relatively low, in some cases as low as two pounds, and such a force can be exerted very easily by one handling the tube, almost without realizing it.

In accordance with this invention, I provide an extremely simple and inexpensive protector which can be applied to the tube at the factory after the tubes are completed and before they are packed, which will prevent the tube ends from being accidentally or unwittingly pressed together or spread apart sufficiently to break the tube, during shipping, handling, and installation in the fixture. The protector is so designed and constructed that it may be left on the tube after installation, without loss of appreciable light from the tube, and without interference with the fixture. Additionally, the weight of the protector is so small that it does not add any significant amount of weight to the tube in shipping or when installed in the fixture.

Previous braces for spacing the ends of U-tubes have been fastened permanently to the bases at the ends of the lamp; they have been relatively costly and heavy, compared to the present wire brace. More important, all previous braces for this purpose have crossed through the central axis of the U, whereas the protector of my invention is offset to one side of the axis and does not interfere with the metal support rod which is desirably and frequently used along the central axis of the U-tube.

From the foregoing, it will be understood that among the objects of this invention are:

To provide a simple, inexpensive, but effective protector for fluorescent U-tubes, to prevent breakage due to pressure applied in a direction to spread or close the open ends of the U;

To provide such a protector which may be of wire, simply manufactured on an automatic machine;

To provide such a protector having sufficient resiliency to grip the tube snugly without breaking the glass, and hold sufficiently tightly to resist accidental displacement from its installed position;

To provide such a resilient protector which is of very light weight, adding no significant weight to the tube in shipment or in the fixture, and which may be left on the

tube in use, without noticeably reducing the light radiated, and without interference with the tube mount.

Still other objects and advantages of my invention will be apparent from the specification.

The features of novelty which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its fundamental principles and as to its particular embodiments, will best be understood by reference to the specification and accompanying drawing, in which

FIG. 1 is a perspective view of a U-tube with the protector in position,

FIG. 2 is a plan view of the protector, and

FIG. 3 is a perspective view of a U-tube with the protector in position, in a fixture.

Referring now more particularly to FIG. 1, arrow **10** designates a fluorescent U-tube having the straight portions **11** and **12**, and connecting curved portion **13**. The ends of the portions **11** and **12** are provided with suitable bases **14** and **15**, of any desired type, usually carrying pins (not shown), which engage contacts in sockets in the fixture and supply power to the tube.

The protector as a whole is designated by arrow **17**, and is formed of relatively heavy and stiff wire of circular cross section, yet having some elasticity, and has a straight body portion **17***a*, and arcuate portions **18**, forming somewhat more than semi-circles, and relatively short end portions **19** extending inwardly, to keep the possibly burred ends of the wire from engaging the glass of the tube. The radius of curvature of the arcuate portions **18** is preferably made slightly less than that of the tube to which it is to be fitted, enabling the protector to grip the tube snugly enough to prevent accidental displacement, yet to permit the protector to be slid onto the tube and moved to the desired position.

The protector is preferably and most economically formed from steel wire (plated if desired with a corrosion resisting metal) of the order of ⅛ inch diameter, and may be easily formed and cut from stock on an automatic wire-forming machine of any type well known in the art. It may, however, be made of plastic if desired.

The protector is designed to protect against spreading of the ends of the tube, by offering resistance, considerably more than that of the tube, against spreading forces sufficient to break the tube, and thus itself takes and resists the spreading force. The tube is similarly protected against forces pressing the tube ends together by the inner ends of the arcuate portions, which protect the tube against inwardly acting forces. Thus the protector prevents any ordinary spreading or squeezing pressures acting on the tube, and so eliminates the greatest cause of breakage of such tubes.

It will be noted that in the form shown, the body portion is offset from the center line of the tube, and so does not interfere with the center post with which some fixtures are equipped. This is shown in FIG. 3 in which **20** designates a plate adapted to be secured to a wall or other supporting surface, provided with sockets (not shown) to receive and supply power to the tube **10**. The fixture may include a substantially V-shaped plate **21**, at the apex of which is mounted center post **22**, carrying at its outer end a cross bracket **23**, in turn carrying spring arms **24** and **25** which embrace the curved portion **13** of the tube to brace it in position. The offset of the main body **17***a* of the protector **17** eliminates possible interference with center post **22**, and fabrication of the protector from wire provides minimum absorption of light radiated, which could occur to a significant degree were the protector formed from flat stock.

In the foregoing, I have described the preferred embodiment of my invention, and the best mode presently known to me for practicing the same, but it should be

understood that modifications and changes may be made without departing from the spirit and scope of my invention, as will be clear to those skilled in the art.

I claim:

1. The combination with a fluorescent U-tube of a protector slidable onto said tube, having opposite portions resiliently embracing the U-branches of said tube respectively, and resisting deflection of said U ends either inwardly or outwardly.

2. The combination claimed in claim 1 in which said protector is formed of relatively heavy cross-section wire.

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