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3,247,368

FLUORESCENT LIGHTING FIXTURE

Filed July 16, 1963

2 Sheets-Sheet 1

FIG. 1

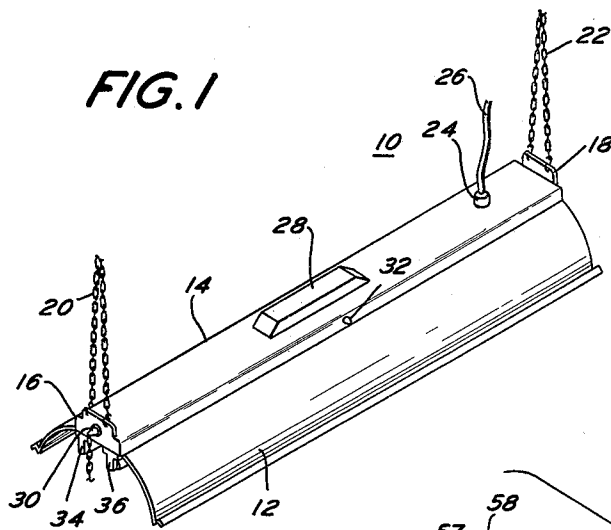


FIG. 2

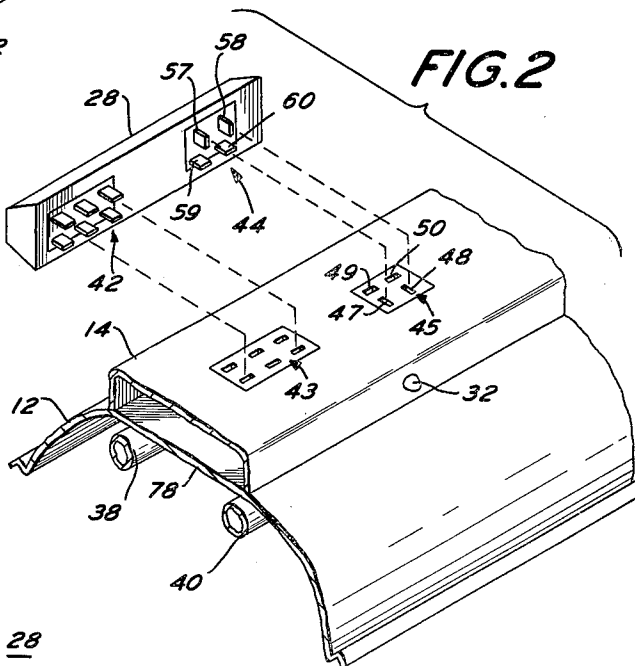
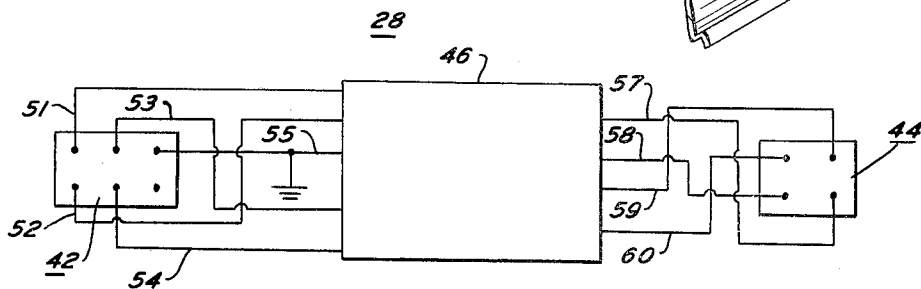


FIG. 3



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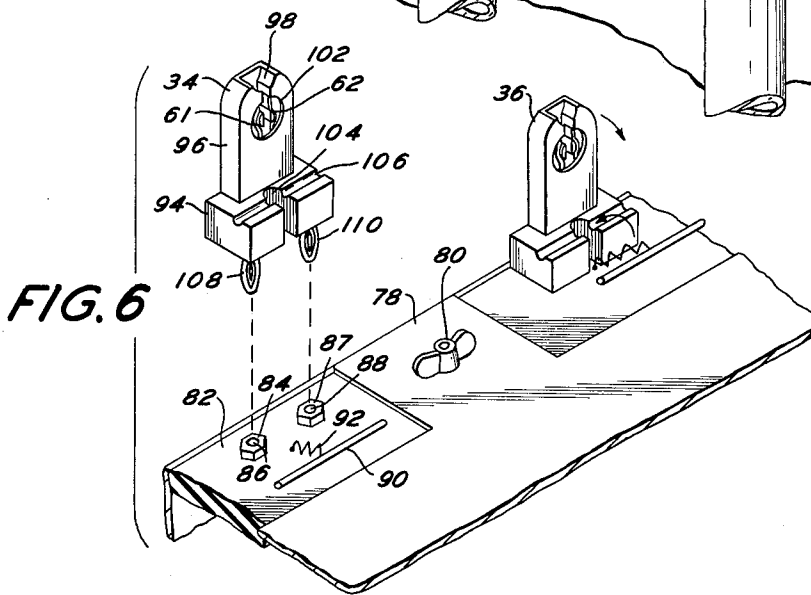
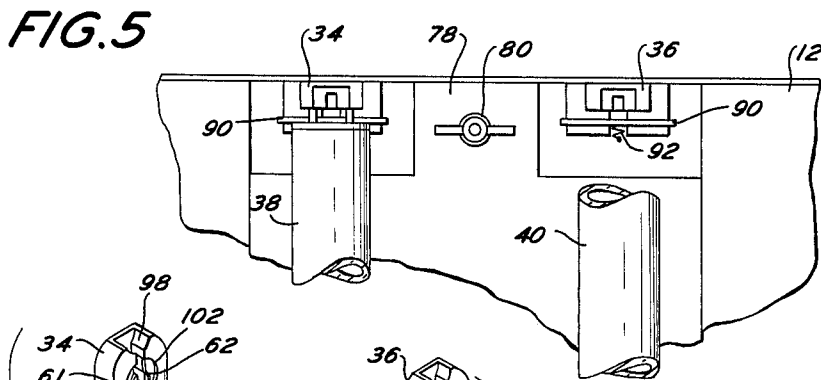
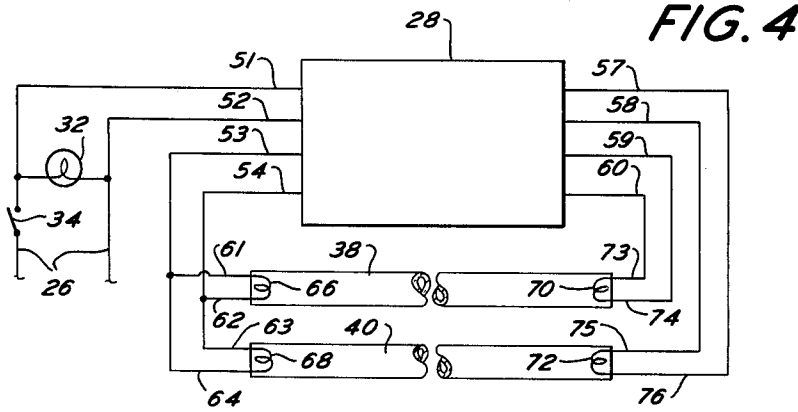
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FLUORESCENT LIGHTING FIXTURE

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6 Claims. (Cl. 240—51.11)

In general, this invention relates to a new and improved fluorescent lighting fixture and more particularly to a fluorescent lighting fixture which can be easily serviced.

In the past, when a fluorescent lighting fixture needed repair, it was necessary for the serviceman to spend a considerable amount of time determining the exact trouble and even more time repairing the fixture. Thus, in many instances the cost of the serviceman's labor exceeds the actual worth of the lighting fixture.

Thus, it is the general object of this invention to avoid and overcome the foregoing and other difficulties of prior art practices by the provision of a new and better fluorescent lighting fixture.

Another object is the provision of a new and more simple electric lighting fixture which can be easily repaired.

Still another object of this invention is the provision of a new and better electric lighting fixture in which individual parts can be replaced in a simple and easy manner.

A further object of this invention is the provision of a new and better design for a fluorescent lighting fixture in which the ballast is a plug in unit.

A still further object of this invention is the provision of a new and better fluorescent lighting fixture in which the fluorescent lighting sockets are plugged into the fixture for easy removal therefrom and are continuously canted toward each other by a biasing arrangement.

Other objects will appear hereinafter.

The objects of the present invention are achieved by providing a standard ballast circuit having a special casing with male or female plugs thereon adapted to cooperate with a receptacle on the fluorescent fixture. The ballast plugs are polarized so that the ballast unit will always be placed in the correct electrical circuit relation. Further, the ballast unit is grounded to the fixture so that there is a common ground connection for the entire fixture.

A neon bulb is provided to show that power is being supplied to the ballast and to inform the service personnel that the error is in the ballast circuit rather than in the power supply.

Still further, the fluorescent light sockets are of the plug in type. These sockets have male connectors thereon adapted to be placed within a female receptacle on the lighting fixture electrically insulated from the remainder of the lighting fixture. The female receptacle is raised from the surface of the fixture and the socket is held in place by a spring arrangement which cants the sockets toward each other so as to insure good electrical contact with the fluorescent lamp.

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is a perspective view of a fluorescent lighting fixture built in accordance with the principles of the present invention.

FIGURE 2 is an enlarged exploded view of the center portion of the fixture of FIGURE 1.

FIGURE 3 is a wiring diagram of the ballast unit 28 shown in FIGURES 1 and 2.

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FIGURE 4 is a wiring diagram of the entire circuit of the fluorescent fixture of the present invention.

FIGURE 5 is an enlarged bottom plan view of one end of the lighting fixture of the present invention.

FIGURE 6 is an exploded perspective view of the portion shown in FIGURE 5 with the fluorescent bulbs removed.

In FIGURE 1, the fluorescent lighting fixture of the present invention is generally designated by the numeral 10. The fixture 10 includes a reflector 12 having an electrical housing 14 mounted on the top thereof. At the ends of the housing 14 there are provided suitable end plates 16 and 18 to which are secured chains 20 and 22 respectively for supporting the fixture 10 from a ceiling or the like.

The fixture 10 is supplied electrical current through a plug in connector 24 attached to a suitable power lead 26. The plug in connector 24 fits into a suitable socket (not shown) on the housing 14 so that the fluorescent fixture can be completely separated from its power supply leads in a simple and easy manner. It should also be noted that the chains 20 and 22 can be easily unhooked from the end walls 16 and 18.

At the center of the housing 14 and on top thereof there is provided a suitable ballast unit housing 28. This unit will be discussed below.

The end wall 16 supports a suitable switch 30 for turning the electric light on and off. Suitable sockets 34 and 36 are provided on the end walls of a pair of fluorescent tubes 38 and 40 for connecting the electric power from the fluorescent lighting fixture 10 to the bulbs 38 and 40. The sockets 34 and 36 are exactly alike and have counter parts on the end of the fluorescent lighting unit 10 now shown.

The ballast unit 28 consists of a housing from one face of which extends two sets of male prongs 42 and 44 respectively electrically insulated from the housing of the ballast unit 28. The prongs 42 are three parallel spaced pairs of connectors adapted to cooperate with three similarly spaced female connectors 43 supported by and insulated from a face of the housing 14. The prongs 44 are two pairs of oppositely polarized contact members 57, 58 and 59, 60 adapted to be placed within female connectors 45 formed on housing 14. The female connector 45 also comprised two pair of oppositely polarized female openings 47, 48 and 49, 50 respectively insulated from housing 14. Thus, the ballast unit 28 will always be correctly inserted in the circuit of the fluorescent lighting unit 10 by reason of the polarized connectors on the face of ballast unit 28.

The ballast unit 28 includes a standard ballast circuit 46. This ballast circuit may be any of a number of standard circuits available on the market. For example, the rapid start ballast manufactured by the Universal Manufacturing Corporation, 29-51 East 6th Street, Paterson 4, New Jersey for 2 lamps/430 ma. high power factor operation Catalog Number 446 might be utilized.

The circuit within the ballast unit 28 is shown in FIGURE 3. In FIGURE 3, wires 51 and 52 are connected between prongs 42 and ballast 46 for later connection to the line 26. A second pair of wires 53 and 54 are connected between prongs 42 and ballast 46 for a later connection to one pair of end sockets of fluorescent bulbs 38 and 40. A fifth wire 55 is connected between prongs 42 and ballast 46. This wire 55 is connected to the housing of the ballast 46 and the housing of ballast unit 28 so as to provide a common ground connection between the ballast unit 28 and its associated ballast 46 and the housing 14 and reflector 12. Thus, there will be a single ground connection for the entire fluorescent lighting apparatus 10. The single ground connection will pre-

vent high voltage from being present on the ballast unit 28 with respect to the reflector 12 which might cause injury to a person servicing the fluorescent lighting unit.

The prongs 44 are connected through wires 57 and 58 to the ballast 46 for supplying one end of lamp 40 and the leads 59 and 60 connect the ballast 46 through prongs 44 to the other lamp 38.

As shown in FIGURE 4, with the ballast unit 28 in place, closing of switch 34 will supply electrical energy to the fluorescent lighting unit 10 and the fluorescent bulbs 38 and 40 will go on.

The switch 34 when closed will energize the neon bulb 32 showing the serviceman that power is being supplied to the fluorescent lighting unit. Wires 26 are in series with the switch 34 and the connectors 51 and 52. The connectors 53 and 54 of prongs 42 are connected to two parallel prongs 61, 62 and 63, 64 of sockets 34 and 36 respectively. The prongs 61, 62 and 63, 64 insure the supply of voltage to electrodes 66 and 68 of lamps 38 and 40 respectively. The lamps 38 and 40 have a second pair of electrodes 70 and 72 respectively which are connected to prongs 73, 74 and 75, 76 respectively of the opposite sockets (not shown) of the fluorescent lighting unit 10. Prongs 73, 74 are connected through female plugs 49 and 50 to male plugs 59 and 60 of the ballast unit 28. Prongs 75 and 76 are connected through female plugs 47 and 48 to male prongs 57 and 58 of ballast unit 28. Thus, the fluorescent lighting fixture circuit is connected in a standard manner utilizing the principles of the present invention.

That is, the ballast unit 28 can be easily removed by merely lifting it and separating the male prongs 42 and 44 from their respective female receptacles 43 and 45.

The reflector 12 includes a flat portion 78 at the top center thereof which is secured to the electrical housing 14 by wing nuts 80. The wing nuts 80 secure a suitable insulating support 82 on which are placed the sockets 34 and 36.

The insulating support 82 has placed thereon a pair of female sockets 86 and 88 including raised conducting nuts 84 and 87 for reasons which will be discussed below. Additionally, a T bar 90 is resiliently secured to the insulating support 82 through a spring 92.

The socket 34 includes a substantially rectangular base portion 94 and upstanding portion 96 having an opening 98 at the top thereof for receiving the prongs of the fluorescent lamp 38. The base 94 and upstanding portion 96 are formed of an electrically insulating material. The slot 98 leads to a cylindrical opening 102 within which are placed the prongs 61 and 62.

The base portion 94 includes a vertical slot 104 at the center thereof in front of upstanding portion 96 and a horizontal groove 106 formed on the top surface thereof. The prongs 61 and 62 are connected through suitable banana plugs 108 and 110 for connection with the female receptacles 86 and 88.

To insert the socket 34, it is only necessary to place the banana plugs 108 and 110 into the female receptacles 86 and 88. By utilizing banana plugs, the springlike action of these plugs will hold the socket in place preventing them from falling out when the fixture 10 is in its normal position. However, in order to insure that the socket 34 will remain in place the T bar 90 is placed into the groove 106 by stretching spring 92 and placing it through slot 104 as shown with respect to the socket 36 in FIGURE 6.

The T bar 90 performs 2 functions. That is, it holds the socket 34 in place and insures that it will not fall out due to gravity. Further, since the T bar 90 applies force to the groove 106 at a point in front of the upright support 96, the socket 34 will cant forward around raised nuts 84 and 87 forcing the prongs 61 and 62 into better contact with the end prongs of the fluorescent bulb 38.

Since, over a long period of time, any fluorescent fixture tends to bow outwardly with the sockets pulling

away from the ends of the fluorescent light, this spring action of T bar 90 will insure that the contacts 61 and 62 will always be held in good electrical contact with the end of the fluorescent bulb 38.

Further, whereas in prior fluorescent lighting fixtures it was necessary to unscrew the socket 34 by entering the housing 14, and unsoldering or unscrewing connectors to the sockets, it is now possible in one simple movement by the service personnel to lift T bar 90 and remove the socket 34 from its position. Thus, there is easy servicing of all of the sockets in a short period of time in a simple and easy manner. Further, the canting of the sockets 34 and 36 toward the center of the fixture is an additional advantage provided by this unique arrangement.

Thus, the present invention has achieved a simplicity in servicing not possible in prior fluorescent lighting fixtures. That is, one need only remove a ballast unit 28 from the fluorescent lighting fixture 10 and replace it with a good ballast unit to correct trouble in the ballast circuit. There is little lost time in such an operation. To remove the sockets where such has been the cause of a breakdown of the fluorescent lighting fixture, the T bar 90 is merely lifted out of place and the socket removed. There can be no mistake in the operation by the serviceman as the ballast unit is polarized by the polarized prongs 57, 58 and 59, 60. Still further, if the trouble does not lie in the electric lighting fixture, but rather in the power supply, the neon bulb 32 will indicate this to the serviceman.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. A fluorescent lighting fixture comprising a light reflective housing, pin receiving sockets secured to said housing for supporting a fluorescent bulb within said housing, a ballast unit, said ballast unit including a ballast circuit mounted within a rigid casing, said ballast unit having rigid electrical connectors electrically insulated from and mounted on said casing, said housing having rigid electrical connectors electrically insulated from and mounted thereon, said ballast unit and housing connectors providing mating contact, said ballast unit and housing connectors completing a circuit between said ballast circuit and said sockets, said sockets including an insulating base portion, male prongs mounted on said insulating base portion, said housing including female receptacles insulated from said housing, said socket male prongs fitting into said female receptacles, said female receptacles including upstanding members spaced from said housing for spacing said insulating base from said housing, said sockets being arranged in pairs with each pair of sockets facing each other, and means resiliently biasing each socket in a direction toward the other socket of its pair, said insulating base canting about said upstanding member.

2. The fluorescent lighting fixture of claim 1 wherein said housing includes an insulating support, said female receptacles being mounted on said insulating support, said insulating base having a horizontal groove on an uppermost face thereof, said resilient biasing means including a bar resiliently connected between said insulating support and said groove for holding said socket in place.

3. A fluorescent lighting fixture comprising a light reflective housing, pin receiving sockets secured to said housing for supporting a fluorescent bulb within said housing, a ballast unit, said ballast unit including a ballast circuit mounted within a rigid casing, said ballast unit being electrically connected to and completing a circuit between said ballast circuit and said sockets, said sockets including an insulating base portion, male prongs mounted on said insulating base portion, said housing including fe-

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male receptacles insulated from said housing, said male prongs fitting within said female receptacles, said female receptacles including upstanding members spaced from said housing for spacing an insulating base from said housing, said sockets being arranged in pairs with each pair of sockets facing each other, and means resiliently biasing each socket in a direction toward the other socket of its pair, said insulating base canting about said upstanding member.

4. The fluorescent lighting fixture of claim 3 wherein said housing includes an insulating support, said female receptacle being mounted on said insulating support, said insulating base having a horizontal groove on an uppermost surface thereof, said resilient biasing means including a bar resiliently connected between said housing and said groove for holding said socket in place.

5. A fluorescent lighting fixture comprising a light reflective housing, pin receiving sockets secured to said housing for supporting a fluorescent bulb within said housing, a ballast unit, said ballast unit including a ballast circuit mounted within a rigid casing, said ballast unit having rigid electrical connectors electrically insulated from and mounted on said casing, said housing having rigid electrical connectors electrically insulated from and mounted thereon, said ballast unit and said housing connectors providing mating contact, said ballast unit and housing connectors completing a circuit between said ballast circuit and said sockets, said ballast casing being formed of an electrically conducting material, said light reflective housing being electrically conductive, said ballast and said connectors including one pair of mating ground contacts, said mating ground contacts electrically connecting said ballast casing to said light reflective housing, said ballast and housing connective being polarized to align said ballast unit in correct electrical circuit relation with respective said housing, said ballast unit connectors being male prongs, said housing connectors being female receptacles, said ballast unit male prongs being

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aligned to matingly engage with said housing female receptacles, said housing including a second electrical connecting means spaced from said first mentioned electrical connectors, and a power supply means, said power supply means including a selectively releasable electrical connector adapted to matingly engage said second electrical connecting means to supply electric power to said ballast circuit and sockets, a signal light, said signal light being connected between said ballast circuit and said second mentioned electrical connection, said signal light providing an indication of power supplied to said ballast circuit, said signal light being mounted on said housing.

6. A pin receiving socket for supporting a fluorescent bulb comprising a base, a projection outstanding from said base, an opening in said projection for receiving the prongs of a fluorescent lamp, a slot communicating said opening with an edge of said projection, electrical connectors within said opening for connecting the prongs of a fluorescent lamp to an electrical conductor, said base portion having a top surface, a horizontal groove on said top surface and a vertical groove communicating said top surface to a bottom surface of said base, and male connectors extending from said bottom surface, said horizontal groove being adapted to receive a resiliently biased bar extending through said vertical groove.

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