This invention relates to power supply circuits for electrical utilization devices, and more particularly to wiring systems for electrical lighting fixtures.

While not limited thereto, the present invention is particularly adapted for use in wiring fluorescent lighting fixtures in the field. When fluorescent lighting fixtures are hung in continuous rows as in factories, retail stores and the like, the individual fixtures must first be disassembled, then hung and bolted together in parallel rows. After the fixtures are in place, they are then wired and reassembled. In the usual case, it takes as long or longer to wire the fixture as it does to hang them. That is, the main power supply leads must first be pulled through each fixture and spliced to the ballast unit in each fixture such that when current flows through the main power supply leads, each fixture will be energized. In order to provide circuits for night lights, emergency lights, outlets and the like, it is necessary to pull extra wires through each fixture in succession to establish auxiliary circuits apart from the aforesaid main power circuit which energizes all of the lighting fixtures. Thus, a lighting arrangement may require that a night light circuit be provided whereby every eighth fixture will be energized. This necessitates at least one extra wire being pulled through each fixture and connected to the ballast unit of every eighth fixture.

Needless to say, the conventional method of wiring lighting fixtures described above is an expensive and time-consuming procedure. Accordingly, as an overall object, the present invention seeks to provide lighting fixtures incorporating built-in wiring and which are assembled prior to installation in the field, whereby they may be connected together simply and quickly without requiring lengths of wire to be pulled through successive fixtures as was previously the practice.

Another object of the invention is to provide a self-contained lighting fixture for installation in buildings and the like which does not require wiring other than connection of the input leads of the lighting fixture to selected electrical terminals.

Still another object of the invention is to provide a new and improved power supply system for electrical utilization devices, particularly lighting fixtures.

In accordance with the invention, lighting fixtures are provided having a multi-wire electrical cable extending therethrough. At opposite ends of the cable for each fixture are male and female connecting plugs such that the cables extending through successive fixtures may be connected by insertion of the plug of one fixture into the cooperating plug of the next successive fixture.

The multi-wire electrical cable in each lighting fixture incorporates a plurality of electrical conductors each of which is insulated from the others. Each conductor, in turn, is connected to a terminal on a terminal block carried within the fixture itself such that the lamp socket or sockets of the fixtures may be connected directly, or through a ballast unit in the case of a fluorescent fixture, to selected pairs of the terminals on the terminal block. In order to energize all lighting fixtures connected in this manner, the lamp sockets of each fixture are simply connected to a first pair of terminals which are, in turn, connected through the terminal block to a first pair of conductors within the multi-wire electrical cables. When this first pair of conductors is energized, all lamps will be energized.

In order to provide night lights, emergency lights, electrical outlets and the like, the lamp sockets of selected ones of the lighting fixtures may be connected to a second set of terminals on their associated terminal block. The second set of terminals, in turn, is connected to a second pair of conductors within the cables such that when this second set of conductors is energized, only selected ones of the lighting fixtures will be energized to provide night lights. It will be appreciated that by connecting the lamp sockets of the fixtures to selected ones of the terminals on the terminal block, any combination of lighting arrangements may be provided simply and efficiently without the necessity for drawing wires through the lighting fixtures.

The above and other objects and features of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings which form a part of this specification, and in which:

FIGURE 1 is a perspective view of a lighting fixture in accordance with the present invention;

FIG. 2 is an enlarged view of the terminal block for the lighting fixture of FIG. 1;

FIG. 3 illustrates the manner in which the fixtures of FIG. 1 are hung from the ceiling of a building in rows;

FIG. 4 illustrates the arrangement of the male connecting plug of the lighting fixture of the invention; and

FIG. 5 illustrates the manner in which successive ones of the fixtures shown in FIG. 3 are connected together.

Referring now to the drawings, and particularly to FIG. 1, the fluorescent lighting fixture shown includes a multi-wire electrical cable 20 which encloses a ballast unit 12. At opposite ends of the housing 10 are downwardly-dependent sockets 14 for fluorescent lamps, not shown. The sockets 14, in turn, are connected through suitable wiring, also not shown, to the ballast unit 12 in accordance with usual practice.

Beneath the housing 10 is a removable shade 16 which, when the fixture is assembled, is screwed or otherwise securely fastened to the underside of the housing 10. With the fixture fully assembled, the bottom of the housing 10 will be closed by the shade 16; and the fluorescent lamps will be supported by the sockets 14, as will be understood. At opposite ends of the housing 10 are tabs 18 having openings therein through which bolts or the like may be passed in order to secure successive lighting fixtures together in rows in a manner hereinafter described.

In accordance with the present invention, a multi-wire cable 20 extends through openings 22 and 24 in the housing 10 and has male and female electrical sockets 26 and 28, respectively, at opposite ends thereof. The multi-wire cable 20 has a plurality of electrical conductors extending therethrough, each of which is insulated from the others. Each electrical conductor in the cable 20 is, in turn, connected to an associated one of the terminals on a terminal block 30 carried within the housing 10.

The terminal block 30 is shown in detail in FIG. 2 and comprises a member 32 formed from electrical insulating material such as plastic and having openings at its opposite ends for the reception of screws 34 which serve to hold it within the interior of the housing 10 extending across the top of the insulating member 32 are a plurality of copper strips 36 each of which has a screw or electrical terminal threadedly received therein and identified by the letters A, B, C, D and E. Each of the copper strips 36 is electrically insulated from the others and is connected to an associated one of the electrical conductors within the cable 20. For the case illustrated, it will be assumed that there are five conductors within...
cable 20, each of which is connected to an associated one of the strips 36. Referring, again, to FIG. 1, the terminals A and B may, for example, be connected through leads 38 and 40 to input terminals 42 and 44 of the ballast unit 12. Thus, when the conductors within cable 20 to which the terminals A and B are connected are energized, the lamps within the sockets 14 will also be energized. As shown in FIG. 1, it is also possible to connect the input terminal 44 of the ballast unit 12 through a lead 46 to the terminal C on terminal block 30 such that the lamps within sockets 14 will be energized when the conductors within cable 20 connected to terminals A and C are energized. In this manner, it will be appreciated that two different lighting circuits are provided for the fixture. Similarly, different combinations of terminals on terminal block 30 may be connected to the terminals 42 and 44 on the ballast unit 12 to provide different lighting arrangements. Of course, if the ballast unit 12 is provided with built-in connecting leads rather than the terminals 42 and 44 shown herein, connections to various sets of terminals on block 30 may be made by jumper leads.

With reference, now, to FIGS. 3 and 5, a plurality of lighting fixtures 48, 50 and 52 such as that shown in detail in FIG. 1 are connected in end-to-end relationship with the male plug of fixture 48 being inserted into the female plug of fixture 50, and so on. It will be noted that the housing 10 has grooves 49 stamped into its sides. These grooves, in turn, receive U-shaped stampings 51 having downwardly-depending legs 53 and 55 which snap into the grooves. The parts are held assembled by means of bolts 57 which pass through the stampings 51 and hold legs 53 and 55 within grooves 49. The fixtures are then hung from the ceiling by, for example, downwardly-depending rods 59 which pass through openings in the stampings and are secured thereto as by the nuts shown.

The male plug on each lighting fixture is shown in FIG. 4 and includes five prongs identified as A1, B1, C1, D1 and E1. The prong A1 on the plug 26 for each fixture is connected to terminal A on terminal block 30; prong B1 is connected to terminal B; prong C1 is connected to terminal C; and so on. Furthermore, spacing is provided between the prongs A1 and E1 on the plug 26, and matching sockets are provided on the female plug 25 in a manner similar to the prongs on a vacuum tube such that the male and female plugs 26 and 25 may be inserted, one into the other, in one way only. Furthermore, since each prong A1—E1 is connected to its corresponding terminal on the fixture, it is known that when the ballast unit 12 is connected to terminal A in lighting fixture 48 of FIG. 3, for example, it will be connected to the same electrical conductor in cable 20 as is terminal A in lighting fixtures 50 and 52. In order to secure the male and female prongs together, a flanged nut 60 is provided on the male plug 26 and is adapted to be threaded onto its associated female plug.

Thus, if it is desired to energize all of the lamps in all lighting fixtures simultaneously, the ballast terminals 42 and 44 of each fixture may be connected to terminals A and B on their associated terminal blocks 30. The conductors in the cables 20 associated with terminals A and B are then connected through a male and female plug assembly 26-28, a drop cord 54 (FIG. 3) and a terminal box 56 to two power leads. These power leads, in turn, will be energized through a main switch. If it is desired to provide a night light circuit wherein every eighth lighting fixture is energized, then the terminal C of every eighth lighting fixture is energized, and the terminal B may be connected to terminal 44 as shown in FIG. 1. Therefore, when the conductors to which terminals A and C are energized by closure of an appropriate switch, every eighth lighting fixture will be energized only. Of course, in this case, every eighth fixture will be connected only to terminals A, C and if it is desired to energize all lamps simultaneously, one switch will have to be closed to energize all but every eighth fixture and another switch closed to energize every eighth one. Similarly, the remaining terminals D and E may be utilized to provide auxiliary circuits.

In FIG. 5, the manner in which successive ones of the lighting fixtures 48, 50 and 52 are connected together is shown. A bolt 58 is passed through abutting tabs 18 on adjacent lighting fixtures and held in place by means of a nut 60. This, of course, illustrates only one manner in which the lighting fixtures may be secured together, depending upon their specific design.

Although the invention has been shown in connection with a certain specific embodiment, it will be readily apparent to those skilled in the art that various changes in form and arrangement of parts may be made to suit requirements without departing from the spirit and scope of the invention.

I claim as my invention:

1. In a power supply circuitry for a plurality of lighting fixtures wherein means are provided to energize all fixtures and means are provided to energize selected ones of the fixtures only; the combination of an electrical cable for each of said fixtures having male and female connecting plugs at opposite ends thereof, a plurality of conductors in each of said cables which are electrically insulated from each other, means connecting the cables in series whereby the male plug of one fixture is inserted into the female plug of the succeeding fixture and vice versa, a terminal block carried on each of said lighting fixtures, means connecting a first pair of said conductors in each cable to a first set of the terminals on the terminal block associated with that cable, means connecting said first set of terminals on certain of said terminal blocks to their associated lighting fixtures such that said associated lighting fixtures will be energized when the cables are interconnected and said first set of conductors are energized, means connecting a second pair of the conductors in each cable to a second set of the terminals on the terminal block associated with that cable, and means connecting said second set of the terminals on said selected ones of the terminal blocks to their associated lighting fixtures whereby said latter-mentioned associated lighting fixtures will be energized when said second set of conductors are energized.

2. The combination of claim 1 wherein one conductor in said first and second pairs of conductors is common to both pairs.

3. The combination of claim 1 including means connecting a second pair of the conductors in each cable to a third set of the terminals on the terminal block associated with that cable, and means connecting said third set of the terminals on said selected ones of the terminal blocks to associated electrical utilization devices whereby said latter-mentioned associated lighting fixtures are energized when said third set of conductors are energized.

4. The combination of claim 1 wherein the terminal block and cable for each lighting fixture are permanently connected to said fixture.

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