LOW VOLTAGE ELECTRICAL CONNECTOR

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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This invention relates to low voltage "outside" lighting fixtures which are used for lighting some objects, such as buildings, signs, and various merchandise when it is on public exhibit. Lighting fixtures of the above type are also used now quite extensively for external artificial lighting of homes and gardens between sunset and bedtime for producing various lighting effects.

There are two types of lighting fixtures of the above type in use: high voltage fixtures using 110 volts, and low voltage fixtures which use voltage in the order of 12 volts, corresponding to the 12 volt system used in automobiles. In this manner automobile headlights, with minor modifications, can be used as light bulbs. Thus, this invention relates to the low voltage fixtures.

The invention is particularly concerned with the means for connecting such low voltage electric light bulbs to electric conductors bringing low voltage electric power to such light bulbs.

It is an object of this invention to provide a low voltage lighting fixture in which a low voltage cord is connectable to a lighting fixture and a light bulb by means of a cord locking clamp and connector having two projecting bars which penetrate the insulation of the two-wire cord and thus connect the electric bulb to the two multi-wire strands of the cord.

Referencing to the drawings:

FIGURE 1 is a perspective view of the low voltage lighting system;

FIGURE 2 is a rear perspective view of a lighting fixture connected to an electric cord;

FIGURE 3 is a side view, partly in section, of the lighting fixture illustrated in FIG. 2;

FIGURE 4 is a transverse section, taken along line 4-4, FIG. 3, of the base of the lighting fixture;

FIGURE 5 is an enlarged perspective view, partly in section, of the base and of strip terminals and a portion of a clamp connector;

FIGURE 6 is a perspective view of the upper portion of the base, of the cord and of the clamp connector;

FIGURE 7 is a perspective view of a strip terminal;

FIGURE 8 is a side view, partly in section, of an alternative form of connection between a light bulb and the base of the lighting fixture.

Referencing FIG. 1, it illustrates a perspective view of the low voltage lighting system. It includes a two conductor electric plug 10 connected to a two conductor cord 11 connected to a step-down transformer 12. The primary of this transformer is connected to the two conductors of cord 11 and the secondary of the transformer is connected to an outgoing low voltage two-conductor cord 14. Because of the low voltage, the cord and the 201, illustrated in FIG. 2. A plurality of lighting fixtures 16, 17 and 18 is connected to cord 14 in the manner which will be described more in detail below. Plug 10 and cord 11 is connected to an alternating voltage in the order of 110 to 125 volts. The step-down transformer 12 then steps down this voltage to a voltage in the order of 12 volts, and this low voltage is then impressed on cord 14. Because of the low voltage, the cords and the lighting fixtures offer less electrical hazard than the higher voltage lighting systems, and they also enable one to manufacture lighting fixtures and connectors which are simpler and cheaper to manufacture than the higher voltage fixtures and connectors. Because of the low voltage impressed on cord 14, it also becomes possible repeatedly to shift the position of lights 16, 17 and 18 along the length of the cord to change their location whenever this is necessary. Although a clamp connector used for connecting the fixtures to the cord is provided with two barbs 703 and 704, FIG. 5, for penetrating the insulation of cord 14, and even though such penetration of the insulation makes small, permanent open holes in the elastomeric insulation layer, such holes do not present any electrical hazard because only very low voltage is impressed on cord 14. For this reason cord 14 can be used for a considerable length of time, even though the lighting fixtures 16-18 are shifted from place to place along the length of cord 14, thus leaving a large number of tiny holes in the elastomeric insulation of this cord.

Referencing now to FIG. 2, it illustrates the overall perspective view of the lighting fixtures. The fixture is mounted on a stanchion 202 which is connected through a bolt or screw 205 to a clevis 204. Clevis 204 is an integral part of a housing 210 accommodating a light bulb 206, a lens 207, a ring 208 and a rubber washer 209 which, in turn, are bolted to the base 200 and lens 207. The light bulb 206 is provided with two outgoing L-shaped prongs 300 and 301, FIG. 3, which are welded to the conductors 302 and 303 supported by glass bosses 304 and 305 constituting an integral part of the hyperbolic glass reflector of the light bulb. The light bulb is also provided with conventional connections 306 and 307 for supporting a tungsten filament 309. Prongs 300 and 301 make an electrical connection with terminal strips 310 and 311 which furnish electrical power to the light bulb with the aid of a clamp connector 312, which is illustrated in FIGS. 2, 3 and 4. Terminal strips 310 and 311, one of which is shown more clearly in FIG. 7, are provided with locking dogs 700, an outwardly flaring, or bent, portion 701, a bent-over connector portion 702 and a barb 703 which makes contact with the multi-strand wire 200 or 201 of cord 14 in the manner which will be described below. The base 500, FIG. 5, is provided with a box-like member 501 which is used for rigidly mounting the terminal strips 310 and 311 in the base 500 in the manner illustrated in FIG. 5. The locking dogs 700 engage the cross bars 502 and 503 which constitute a part of the box member 501. The base 500 is provided with slots 504 and 505 through which the terminal strips 310 and 311 are introduced into the base 500. When the strips 310 and 311 are slid into the base 500, the locking dogs 700 snap into their outward position after the terminal strips 310 and 311 are inserted to that position at which the bent-over portion 702 engages the circular portion 506 of the base. The locking dogs then snap into their locking position after they pass beyond the edges of the cross-bars 502 and 503, and in this manner, the terminal strips are held in the locked position within the base.

An order to provide positive electrical connection between prongs 300 and 301 and the terminal strips 310 and 311, base 500 is also provided with rigid plates 507 and 508 which comprise the extensions of the walls 509 and 510 of box 501. To rigidly still further the plates 507 and 508, the base is also provided with two radially shaped struts 511 and 512. In this manner plates 507 and 508 offer very positive supports for prongs 300 and 301 and they guide prongs 300 and 301 into a positive, upper contact with the terminal strips 310 and 311. The upper portions of the rigid plates 507 and 508 are slightly curved outwardly so as to act as guiding means to the prongs 300 and 301 of the light bulb 206. In this manner a large
area, low resistance contact is established between prongs 300 and 301 and the terminal strips 310 and 311. The terminal strips 310 and 311, as illustrated in FIG. 7, are provided with the bent-over, flat shoulder portions 702, and these flat shoulder portions 702, as also illustrated in FIG. 7, are provided with barbs 703. The flat shoulder portions 702 rest on the circular portion 506 of base 500. As clearly illustrated in FIG. 5, the circular portion 506 of base 500 is provided with two connector walls 510 and 514 which constitute an integral part of the molded plastic base 500. The connector walls 513 and 514 are provided with four lugs 515 and 516 and 517 and 518. Lugs 515 and 516 are locking lugs and lugs 517 and 518 are pivot lugs. The locking lugs 515 and 516 are shorter than the pivot lugs 517 and 518 so as to enable one to insert and remove a locking clamp 600 which locks a cord 14 to base 500 in the manner which is described below. The locking clamp 600 is provided with two finger pads 601 and 602, a flat beam member 603 and a locking slide member 604 which is provided with slanting shoulders 605 and 606. The locking clamp 600 is also provided with four ledges 608, 609, 610 and 611. All of these four ledges 608-611 are dimensionally identical to each other and they act in pairs insofar as their function is concerned. If the 608-609 pair of ledges is used as pivot lugs, then the ledges 610-611 are used as the locking ledges and vice versa. This will become more apparent in the light of a more detailed description of FIG. 6. The operation of the locking side is illustrated in FIG. 6. Electrical cord 14 is placed on top of the circular portion 506 of base 500 and between connector walls 513 and 514, as illustrated in FIG. 6. It now only remains to clamp and then lock cord 14 to base 500. This is accomplished by exerting sufficient pressure on cord 14 and its elastomeric insulation jacket by rotating clamp 600 in order for the bars 703 and 704 to penetrate the insulation jacket and make positive contact with the multi-strand conductors 200 and 201. This is accomplished by engaging or placing the pivot lugs 608 and 609 under the pivot lugs 517 and 518 and then swinging or turning the locking clamp 600 downwardly in the clockwise direction, as viewed in FIG. 6, and as is also illustrated by an arrow 622, until the clamping and locking ledges 610 and 611 are depressed below the locking lugs 515 and 516. This is accomplished by exerting a pressure on the finger pad 602. When pressure is exerted on the finger pad 602, then the wedge-shaped slanting surface 605 of the locking slide 704 exerts pressure on insulation jacket 620 of cord 14 and events pressure to the insulating cord 14 against base 500. When the pressure is sufficient force so as to make the bars 703 and 704 penetrate the insulation 620 and make contact with multi-strand conductor 200 or 201 of cord 14. In order to place the locking clamp 600 into the permanently locked position, pressure is exerted on pad 602 in the direction of an arrow 622, with the result that clamp 600 slides in the direction of arrow 624 over the insulation 620 of the wire until the locking lugs 610 and 611 slide under the locking lugs 515 and 516, which completes the connection of the lighting fixture to cord 14.

FIGURE 8 illustrates an alternative form of connecting a low voltage light bulb 800 to a lighting fixture 801. The only difference that exists between the prior figures and FIG. 8 resides in the fact that the light bulb 800 now has the central portion of the base molded to the terminal strips 804 and 805. Strip 805 is connected to the threaded metallic socket insert 802 while terminal strip 804 is connected to a jumper 806 which includes a central button 807, making the connection with the central terminal, not illustrated, of the light bulb 800. All the remaining elements of the base and of the clamp connector 312 and the strip terminals 310 and 311 are identical to the similarly numbered elements of the base illustrated in FIGS. 1 through 7.

What I claim is:

1. A lighting fixture connectable to and along the length of an electric cord having an insulation sheath and two conductors, said fixture including a single piece molded hemispherically shaped housing having a hollow insulation base having a flat outer end, first and second connector walls projecting outwardly from said flat end, said first and second connector walls having a pair of pivot lugs and a pair of locking lugs at the other end of said walls, a pair of metallic bars projecting outwardly from said base and located in a channel defined by said walls, said cord fitting into said channel, and a cord locking clamp having a first pair of pivot latches engaging said pivot lugs and a second pair of locking latches engaging said locking latches, said pivot lugs being longer than said locking latches to permit sliding of said pivot latches through a portion of the lengths of said pivot lugs for obtaining a locking engagement between said locking latches and said locking latches by sliding said locking latches under said locking latches, said clamp also having means for clamping said electric cord against said bars and said base for electrically connecting said bars to said conductors, said bars penetrating through the insulation of said electric cord.

2. A lighting fixture as defined in claim 1 which also includes first and second terminal strips each having an inner portion connecting said strip to a prong of a light bulb, a slot in said base accommodating said strip, a flat shoulder portion inserting a bent over external portion of said terminal strip, said shoulder portion resting on top of the flat portion of said base and being located within said channel and between said walls, said bar constituting a bent over portion of said shoulder portion of said cord.

3. The lighting fixture as defined in claim 2 in which said base also includes means for guiding and supporting said prong in electrical engagement with said inner portion of said terminal strip.

4. A lighting fixture comprising a single piece molded housing for a reflector type light bulb, said fixture including a hemispherically shaped housing for accommodating said bulb, a base outwardly projecting from said housing, said base including two spaced from each other connector walls, said walls having a pair of pivot lugs at one end and a pair of locking lugs at the other end of said walls, a pair of metallic bars projecting outwardly from said base and located in the channel defined by said walls for connecting said fixture to an electric cord, and a cord locking clamp having first and second pairs of latches engaging, respectively, said locking and pivot latches, said clamp having means for clamping said cord to said base and to said bars.

5. A lighting fixture connectable to an electric two-conductor cord comprising a parabolically shaped housing for accommodating a light bulb with a parabolically shaped reflector, a hollow insulation base projecting outwardly from said housing, said base having a box-shaped member on the inner side of said base and having first, second, third and fourth walls, said first and third walls facing each other and having first and second upward rigid plates, respectively, extending and projecting inwardly into said base, said first and third walls including first and second sockets, respectively, first and second terminal strips mounted in said first and second slots, respectively, said terminals projecting outwardly through said base, said cord having a pair of conductors, said cord being connectable to said cord to said base and said bars in any desired position along the length of said cord.

6. A lighting fixture connectable along the length of a two-conductor electric cord by clamping said cord to said first and second plates, said cord including a housing for a light bulb having two prongs, a base constituting an integral rear part of said fixture, the front part of said fixture having a lens, first and second plates inwardly projecting from the central portion of said base, first and second
terminal strips mounted, respectively, along said first and second plates within said base, said terminal strips comprising two flat metallic springs pressing on adjacent flat surfaces of the respective plates, said prongs forming a sliding contact with said surfaces and said terminal strips for making electrical connection with said cord, said terminal strips projecting outwardly from said base as two barbs, and a clamp connector having two connector walls having two pairs of lugs and a locking clamp having two pairs of ledges for locking said clamp to said connector walls thereby clamping said cord to said base and connecting said two barbs to the respective two conductors of said cord.

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