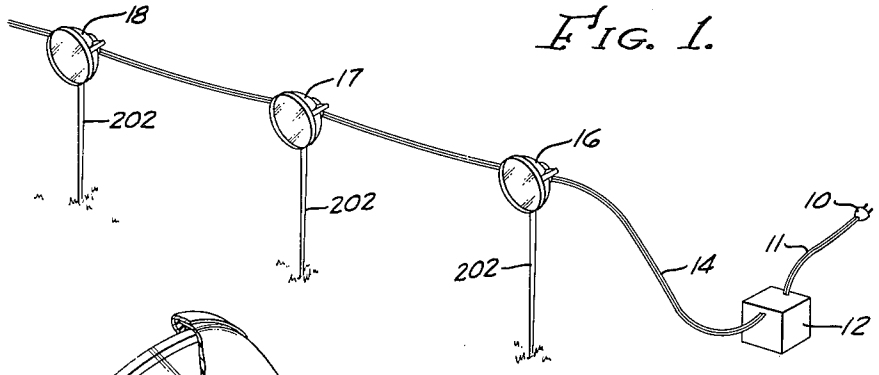
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LOW VOLTAGE ELECTRICAL CONNECTOR

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FIG. 1.



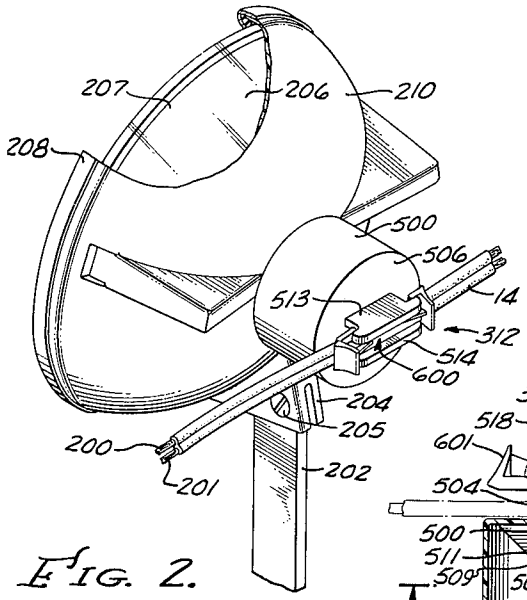


FIG. 2.

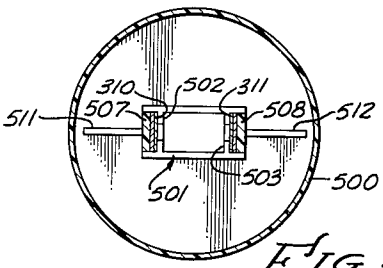


FIG. 4.

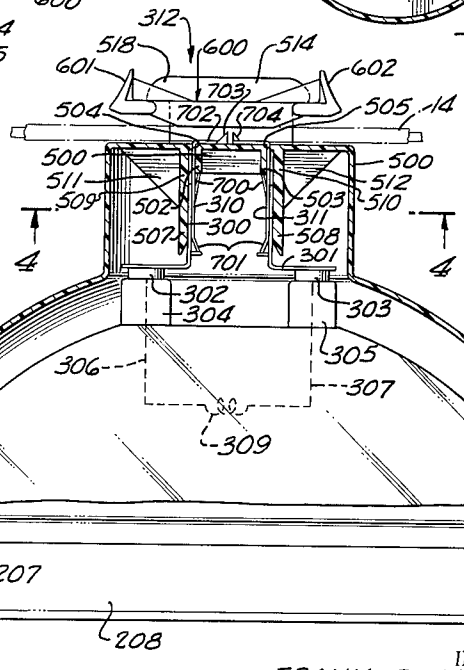


FIG. 3.

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FIG. 5.

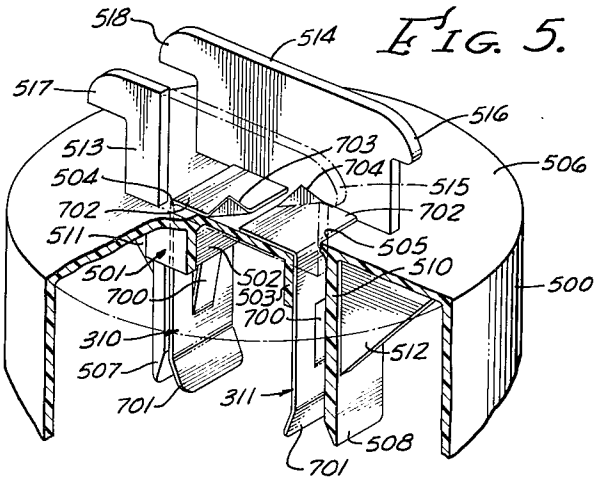


FIG. 7.

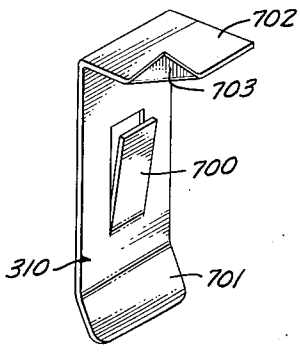


FIG. 6.

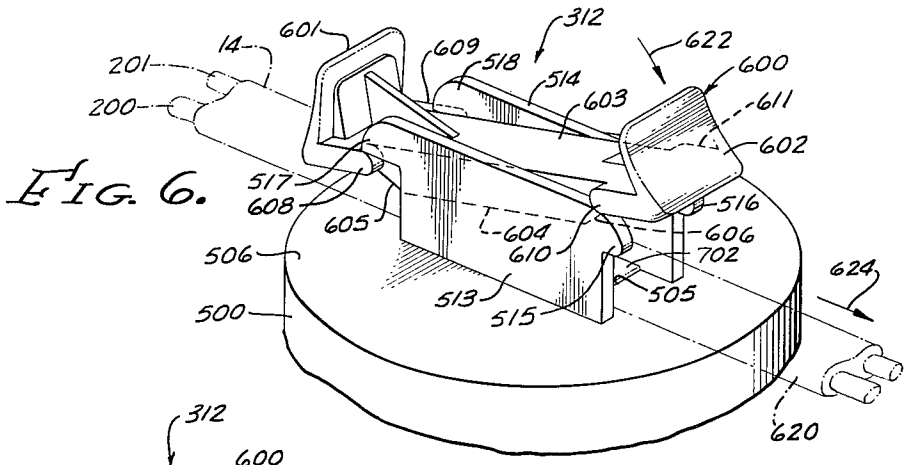
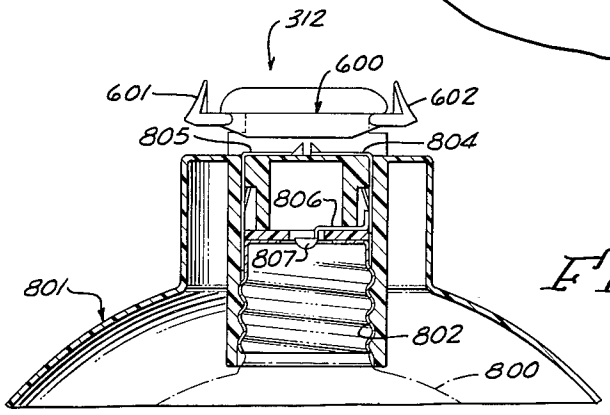


FIG. 8.



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United States Patent Office 3,231,731 Patented Jan. 25, 1966

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LOW VOLTAGE ELECTRICAL CONNECTOR

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Filed Aug. 30, 1963, Ser. No. 305,753
6 Claims. (Cl. 240—3)

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 now 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 barbs which penetrate the insulation of the two-wire cord and thus connect the electric bulb to the two multi-strand wires of the cord.

Referring 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.

Referring to 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.

Referring 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 provides a water-tight seal between housing **210** 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 rods **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 6. 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.

In 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 rigidize still further the plates **507** and **508**, the base is also provided with triangularly-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 **513** 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 ledges, 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 slide 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**, in the manner 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 barbs **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 ledges **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 eventually presses the insulation of cord **14** against the barbs **703** and **704**, with sufficient force so as to make the barbs **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 ledges **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 well known screw-type base **802** which is connected 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 merging into 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 at one end and a pair of locking lugs at the other end of said walls, a pair of metallic barbs 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 ledges engaging said pivot lugs and a second pair of locking ledges engaging said locking lugs, said pivot lugs being longer than said locking lugs to permit sliding of said pivot ledges through a portion of the lengths of said pivot lugs for obtaining a locking engagement between said locking ledges and said locking lugs by sliding said locking ledges under said locking lugs, said clamp also having means for clamping said electric cord against said barbs and said base for electrically connecting said barbs to said conductors, said barbs penetrating through the insulation sheath of said 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 constituting 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 barb constituting a bent over portion of said shoulder portion of said terminal strip.

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 barbs 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 ledges engaging, respectively, said locking and pivot lugs, said clamp having means for clamping said cord to said base and to said barbs.

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 upright rigid plates, respectively, extending and projecting inwardly into said base, said first and third walls including first and second slots, respectively, first and second terminal strips mounted in said first and second slots, respectively, said terminals projecting outwardly through said base as first and second barbs, and means for clamping said cord to said base and said barbs 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 fixture, said fixture 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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