March 8, 1938. H. A. DOUGLAS 2,110,137

ELECTRIC LAMP UNIT

Filed Feb. 26, 1935 2 Sheets-Sheet 1

Fig. 1

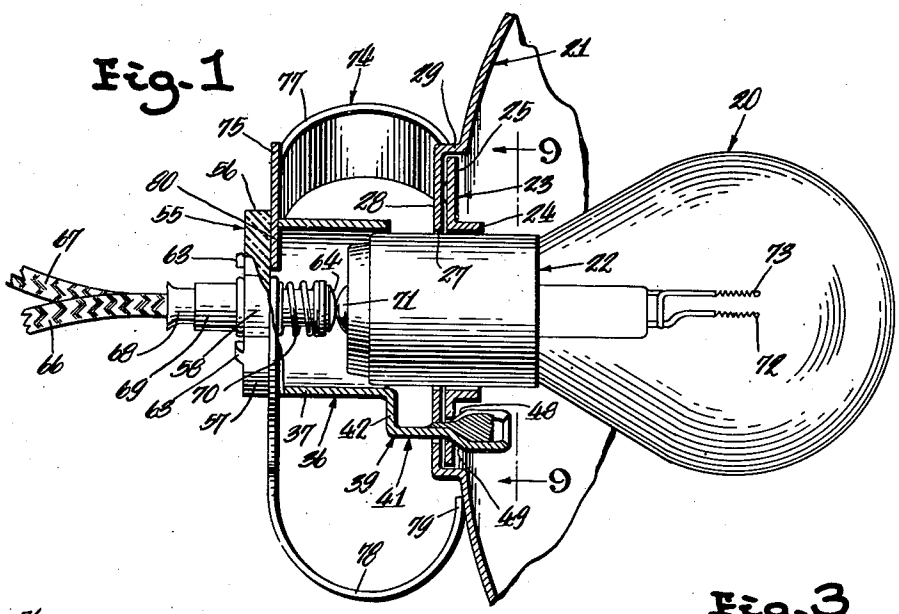


Fig. 2

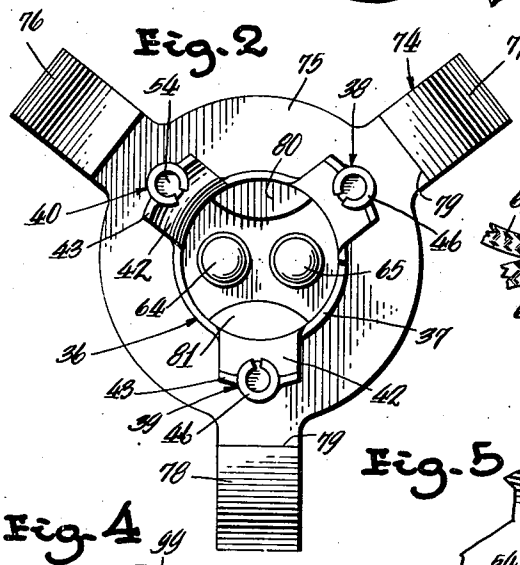


Fig. 3

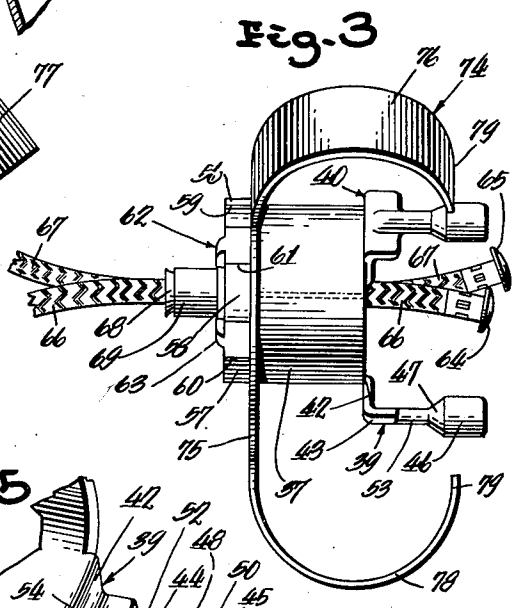


Fig. 4

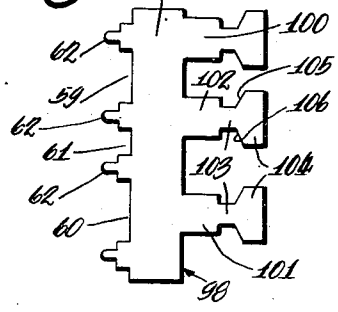
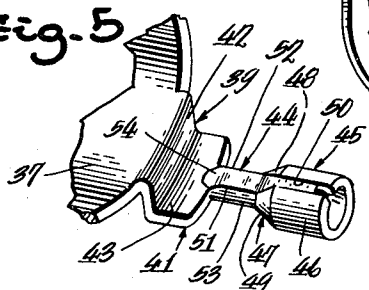


Fig. 5



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Fig. 6

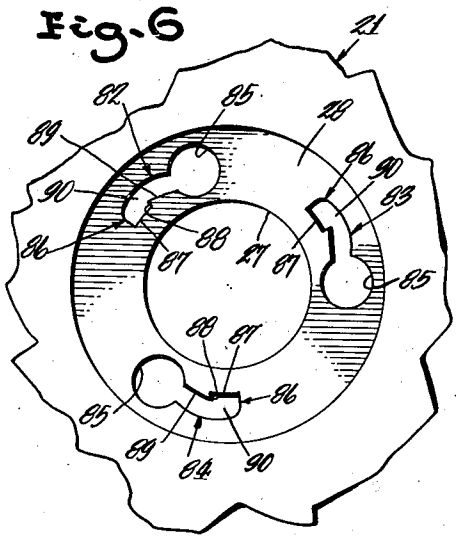


Fig. 7

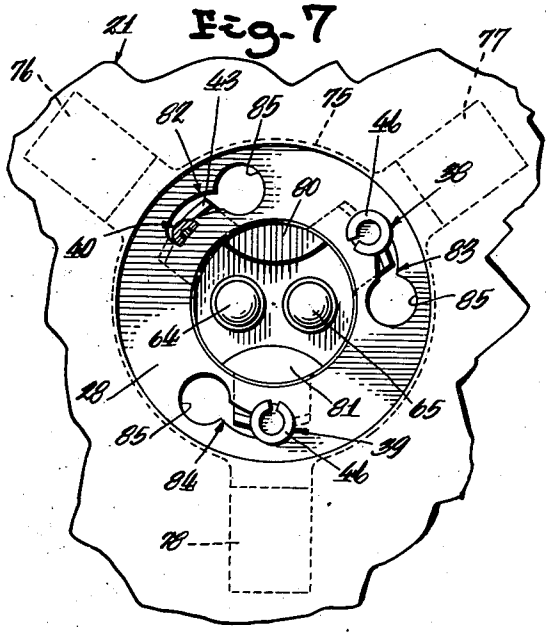


Fig. 8

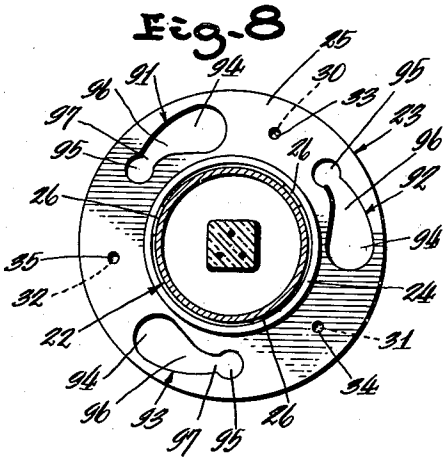


Fig. 9

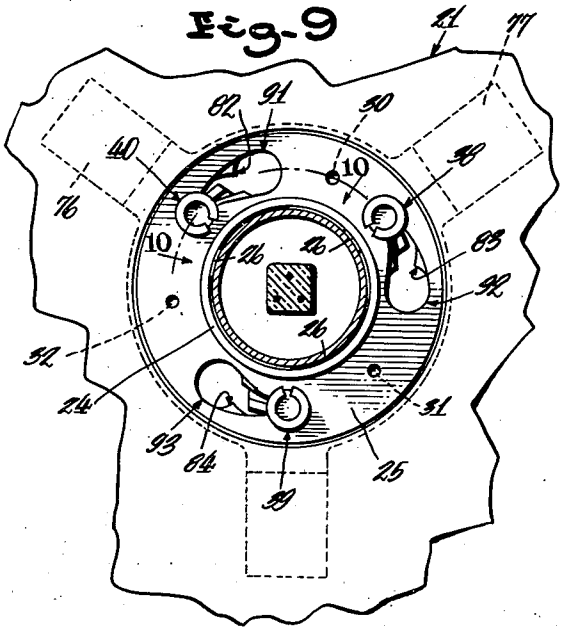
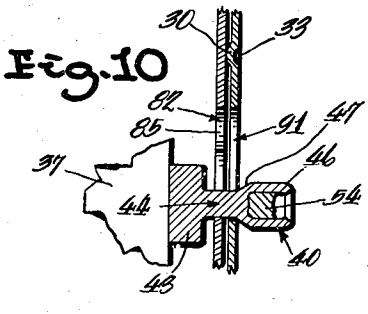


Fig. 10



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Patented Mar. 8, 1938

2,110,137

UNITED STATES PATENT OFFICE

2,110,137

ELECTRIC LAMP UNIT

Harry A. Douglas, Bronson, Mich., assignor to Kingston Products Corporation, a corporation of Indiana

Application February 26, 1935, Serial No. 8,313

11 Claims. (Cl. 240—41)

My invention relates to electric lamp units, and more particularly to electric lamp units comprising an incandescent lamp mounted in a reflector, as in an automobile headlight, and the principal object of my invention is to provide a new and improved unit of this type. In the drawings accompanying this application, I have shown, for purposes of illustration, one form which my invention may assume. In these drawings:

Figure 1 is a vertical longitudinal sectional view of one embodiment of my invention, showing the lamp in elevation, and certain parts fragmentarily,

Figure 2 is a front elevation of a socket unit forming part of the embodiment shown in Figure 1,

Figure 3 is a side elevation of the socket unit shown in Figure 2, the socket contacts being displaced in order to more clearly show them,

Figure 4 is a plan view of a metal blank, on a reduced scale, which may be used to form a portion of the socket unit,

Figure 5 is a detail of one of the connector portions of the socket unit,

Figure 6 is a fragmentary front elevation of the reflector shown in Figure 1,

Figure 7 is a front elevation of the reflector of Figure 6, with the socket unit assembled therewith, one of the connector portions of the socket being shown in section,

Figure 8 is a cross-section of the lamp only, taken on the line 9—9 of Figure 1, looking in the direction of the arrows,

Figure 9 is a section taken on the line 9—9 of Figure 1, looking in the direction of the arrows, and

Figure 10 is a sectional detailed view taken on the line 10—10 of Figure 9, looking in the direction of the arrows.

Referring to Figure 1 there is here shown an incandescent electric lamp **20**, connected to a reflector **21** fragmentarily shown. The lamp is provided with a base **22** having laterally extending positioning means **23**. The positioning means **23** comprises a collar **24** surrounding the lamp base, and a flange **25** extending radially from the collar **24**. The collar **24** may be fastened to the base **22** in any suitable manner, as by solder **26** (see Figure 8).

The reflector is provided with an aperture **27** adapted to receive the lamp base **22**, the aperture **27** being in this instance in a flange **28** extending radially inward from a tubular portion **29**, forming a rearward extension on the reflector **21**. The words front and rear will be used to designate respectively those portions of a part in question which are nearest to the light source of the lamp **20** and those that are farthest from it.

The flange **25** on the positioning means **23** is provided with a plurality of axially extending projections **30**, **31**, **32**, the projections being desirably three in number (see Figure 8). The projections **30**, **31**, **32** may be formed by indentations **33**, **34**, **35**, thereby striking out the metal, on the other side of the flange, as shown in Figure 10. The projections **30**, **31**, **32** are adapted to abut the front face of the reflector flange **28**, when the lamp is connected to the reflector.

A socket unit **36** is provided for cooperation with the lamp **20**, this socket unit comprising a tubular shell **37**, having a plurality of connector portions **38**, **39**, **40**, extending in a generally axial direction, integrally formed therewith. The connector portions **38**, **39**, **40** are identical and therefore but one of them, **39**, will be described in detail. The connector portion **39** has an axially extending portion **41**, off-set radially outwardly from the shell **37** and connected to the shell by a radial portion **42**.

Referring in particular to Figure 5, the axially extending portion **41** is formed in part by an axially extending portion **43**, which is here shown as of the same circumferential width as the radial portion **42**, and is of arcuate form concentric with the shell **37**. The axially extending portion **41** also includes a relatively narrow neck **44** connecting the wider arcuate portion **43** to an enlargement **45** forming the free end of the axially extending portion **41**. The enlargement **45** comprises a generally cylindrical hollow portion **46**, joined to the neck **44** by means of a portion tapering from the cylinder **46** to the neck **44** and forming a generally conical surface **47**. The conical portion **47** provides, particularly on its radially outer and inner surfaces, a pair of cam surfaces **48**, **49** (see Figure 1 also), adapted to cooperate with the positioning means **23**, as will appear.

The axially extending connectors **38**, **39**, **40**, as well as the socket shell **37**, are here shown as formed from sheet stock, and in the instance shown the edges **51** and **52** of the stock forming the enlargement **45** and the neck **44** do not quite abut, forming a slot **50**. The radially inner face of the neck **44** thus presents in effect a flat surface. The radially outer half **53** of the neck **44** is semi-circular in cross-section, and the surface of the outer half **53** forms with the flat radially inner portion of the neck **44** angular corners at the edges **51** and **52**. If desired, the otherwise hollow neck **44** and enlargement **45** may be partially or completely filled with solder **54**, but this is not essential.

The socket unit includes an insulating contact carrier **55** having an outside diameter the same as the inside diameter of the socket shell **37**, and provided with a plurality of radially extending projections, three of which, **56**, **57**, **58**, may be seen in Figures 1 and 3. The number of projections may be any desired number, but the pro-

jections are preferably so proportioned and arranged that the contact carrier is assemblable with the socket shell 37 in but one position about its axis with respect to the socket shell. The projections 56, 57, 58 are adapted to be received in recesses 59, 60, 61 in the rear end of the socket shell 37. The rear end of the socket shell is also provided with rearwardly axially extending fingers 62, which may be clinched, as at 63, radially inwardly over the rear end of the contact carrier 55 to fasten the carrier to the socket shell.

The contact carrier 55 carries a pair of contacts 64, 65, connected to conductors 66, 67. The contacts 64, 65 are each here shown as comprising a head with a shank which is swedged to the end of the respective conductor. The contacts 64, 65 and their mountings are identical so that only the contact 64, visible in Figure 1, will be described. The conductor 66, to which the contact 64 is swedged, is disposed through a sleeve 68, slidable in a bushing 69. The bushing 69 is fixedly mounted through the contact carrier 55 in any suitable manner, as by beading the bushing against the carrier. A helical spring 70 surrounds the sleeve 68 between the bushing 69 and a flange on the inner end of the sleeve 68 abutting the head of the contact 64. The contact 64 is thus adapted to be pressed against a contact 71 carried by the lamp base 22. In like manner the contact 65 is adapted to be pressed against another contact on the lamp base directly behind the contact 71 and therefore not visible in Figure 1. The lamp 20 is here shown as provided with two filaments 72, 73 and these filaments have their terminals connected to the shell of the lamp base and to the contacts 71 on the lamp base in a well known manner, so that by suitable switching means (not shown) interposed in the conductors 66, 67, the filament 72 may be lighted, to secure bright light, or the filament 73 may be lighted to secure dim or so-called tilted light, or if desired, both of the filaments may be lighted.

The socket unit 36 also includes biasing means 74, adapted to function as will hereinafter appear. The biasing means here shown includes a ring 75 of sheet metal, having a central aperture of the same diameter as the outside of the socket shell 37. The ring 75 may be provided with a plurality of radial extensions, the ends of which are bent radially inwardly to form the spring loops 76, 77, 78. The ends 79 of these spring loops are adapted to engage the rear surface of the reflector 21 when the socket unit is connected to the reflector. Projecting radially inwardly into the central aperture in the ring 75 are a pair of arcuate segments 80, 81, integral with the ring 75, the chords of which segments are desirably of the same length as the width of the recesses 59, 60 in the rear end of the socket shell 37, so that the projections 80, 81 lock the ring 75 against rotational movement. The ring 75 is fastened to the shell 37 by interposing it between the end of the shell and the insulating contact carrier 55. The two projections 80, 81, and likewise the two recesses 59, 60, preferably differ somewhat in circumferential extent, whereby the ring 75 can be assembled on the shell 37 in only one position.

Referring to Figure 6, the reflector 21 is provided with a plurality of apertures 82, 83, 84, disposed about the central aperture 27. These apertures are all identical, so that but one of them, 82, will be described in detail. The aperture 82 comprises a large portion 85 and a small portion 86 spaced from the large portion circumferentially. The smaller aperture 86 has a radially inner edge or seat defined by an arcuate line 87 concentric with the aperture 27, or the seat 87 may be defined by a straight line tangent to an arc concentric with the aperture 27. The larger aperture 85 is joined to the smaller aperture 86 by a connecting aperture 90, which inclines radially outwardly from the aperture 85 toward the aperture 86. The radially inner edge of the connecting aperture 90 is defined, as here shown, by a straight line forming a cam surface 89 inclined radially outwardly from the large aperture 85 to the small aperture 86 to a point radially beyond the radially inner edge or seat 87, thereby forming a shoulder 88, which is desirably defined by a radial line. The apertures 82, 83, 84, while otherwise identical, are desirably unequally spaced circumferentially about the aperture 27.

Referring to Figure 8, the flange 25 of the positioning means 23, provided on the base of the lamp 20, is here shown as provided with a plurality of apertures, desirably three in number, 91, 92, 93. These apertures, as a whole, are concentric with the flange 25, and since they are identical, but one of them, 91, will be described in detail. The aperture 91 comprises a larger portion 94 and a smaller portion 95, the small and large portions being connected by a tapering connecting aperture 96. The sides of the connecting aperture 96 are tangent to an arc defining the larger aperture 94, the connecting aperture narrowing as it approaches the smaller generally circular aperture 95, and merging with the small aperture 95 at a place of junction 97, which is narrower in a radial direction than the diameter of the small aperture 95.

When it is desired to connect the socket unit 36 to the reflector 21, the cylindrical enlargements 46 of the connector portions 38, 39, 40 are brought into registry, at the rear of the reflector 21, with the larger aperture portions 85 of the reflector apertures 82, 83, 84. The socket unit is then moved toward the reflector, against the bias of the spring loops 76, 77, 78, so that the necks 44 of the connector portions 38, 39, 40 will be in a position to engage the radially outwardly inclined cam surfaces 89 of the apertures 82, 83, 84. Upon clockwise rotation of the socket unit 36, as viewed from the rear of the reflector, the cam surfaces 89 act to move the necks 44 radially outwardly, the connectors 38, 39, 40 flexing sufficiently to permit such movement. Continued clockwise rotation of the socket unit causes the necks 44 to snap radially inwardly off of the shoulders 88 and onto the seats 87. The socket unit is thereby locked against unintentional counter-clockwise movement, since such movement causes the edges 51 of the necks to engage the respective shoulders 88. The action of the biasing means 74 pulls the enlargements 45 of the connectors 38, 39, 40, which overlie the front face of the reflector, against that face. The position of the parts, viewed from the front of the reflector, is then as shown in Figure 7, one of the enlargements 45 having been cut away to show the neck 44 in the seat 87.

If it is desired to connect the lamp 20 to the reflector, the large portions 94 of the apertures 91, 92, 93 of the flange 25, are brought into registry with the connector enlargements 46, the lamp being then moved toward the reflector, against the bias of the contacts 64, 65, until the projections 30, 31, 32 on the flange abut the re-

flector, specifically the front face of the flange 28. The lamp is then turned in a clockwise direction, as viewed from the front of the reflector, whereupon the tapering sides of the connecting apertures 96 engage radially outer and inner surfaces of the conical parts 47 of the connector enlargements 45. Continued clockwise rotation of the lamp causes the tapering aperture portions 96 to move the connector portions 38, 39, 40 farther through the reflector, against the bias of the biasing means 74, until the conical portions 47 snap off of the junctions 97 between the connecting aperture 96 and the smaller aperture 95, into the aperture 95 where they are then firmly seated. The position of the parts is then as shown in Figures 1, 9, and 10. The biasing means 74 of course then presses the base flange 25 toward the front face of the reflector, and hence presses the projections 30, 31, 32 into abutment with the front of the reflector flange 28. While the flange 25 may be gauged or located in its own plane by the conical portions 47 of the enlargements 45, it may also be gauged or located by having the flange 25 snugly fit the tubular portion 29.

The lamp may be assembled with the positioning means 23 by placing the positioning means on a standard with the lamp base within the collar 24 and then adjusting the lamp until the lighting center of the desired filament thereof is in a predetermined position, whereupon the collar 24 is soldered to the lamp base. The position of other filaments of the lamp may be likewise predetermined.

It will be evident from the foregoing that my invention provides a means whereby a lamp may be connected to a reflector with the lighting center of a filament thereof at a predetermined point with respect to the reflector, and also that the position of the lamp about its axis will be predetermined so that the proper contacts thereon will be brought into engagement with contacts on a socket unit which in turn has the position of its contacts about the axis of the socket predetermined with respect to the reflector.

When it is desired to disconnect the lamp 20 from the reflector the lamp is turned in a counter-clockwise direction, as viewed from the front of the reflector, whereby the edges of the smaller socket flange apertures 95 pull the connectors 38, 39, 40 frontwardly through the reflector, against the bias of the biasing means 74, thereby permitting disengagement of the lamp, as will be evident.

The socket unit may be disconnected from the reflector by moving the necks 44 of the connectors 38, 39, 40 radially outwardly thereby disengaging them from the seats 87, and thus permitting rotation and removal of the socket unit, as will be evident.

The socket shell 37 and the connector portions 38, 39, 40 are desirably formed from sheet stock and to this end a blank, such as shown in Figure 4, may be stamped from sheet metal. The blank 98 comprises a body 99 of generally rectangular form, which when rolled to form serves to provide the socket shell 37. The body 99 of the blank has three unequally spaced rectangular portions 100, 101, 102, extending laterally therefrom, and each one of these portions has a narrower extension 103 connecting it to a wider extension 104, of generally rectangular shape, but having transverse inclined edges 105, 106 converging toward the narrow portion 103. The blank 98 has its left hand edge, as viewed in Figure 4, provided with the recesses 59, 60, 61 and with the fingers 62, corresponding to the similarly numbered parts in the other views. It will be evident that the extensions 100, 101, 102 are adapted to be formed into the radial connecting portions 42 and the arcuate axially extending portions 43 of the connector portions 38, 39, 40, while the portions 103 and 104 are adapted to be formed into the necks 44 and the enlargements 45 of those connector portions.

In view of the foregoing it will be apparent to those skilled in the art that the herein disclosed embodiment of my invention provides a new and improved incandescent electric lamp unit, and accordingly accomplishes at least the principal object of my invention.

It will also be obvious to those skilled in the art that my invention may be embodied in other constructions wherein the reflector, or other mounting for the lamp, the socket unit, and the lamp and its base, may assume a variety of forms, variously changed and modified within the spirit of the invention.

In general it will be obvious to those skilled in the art that the features of my invention may be individually changed and modified, without departing from the spirit of my invention or sacrificing all of the advantages thereof, and accordingly that the disclosure herein is illustrative only, and that my invention is not limited thereto.

I claim:

1. In combination: a mounting having a plurality of apertures; an incandescent electric lamp having a base; a lateral extension on said base provided with a plurality of apertures; and a socket unit for said lamp, comprising a body having integral therewith portions, spaced from each other and from the axis of said unit, disposed through said mounting apertures and through said apertures in said lateral extension, said portions having hollow enlargements at the ends thereof, said enlargements overlying said lateral extension, and means for biasing said enlargements against said lateral extension.

2. In combination: a mounting having a plurality of apertures; an incandescent electric lamp having a base; a lateral extension on said base provided with a plurality of apertures; and a socket unit for said lamp, comprising a body having integral therewith portions, spaced from each other and from the axis of said unit, disposed through said mounting apertures and through said apertures in said lateral extension, said portions having enlargements at the ends thereof, said enlargements overlying said lateral extension and being generally circular in cross-section, and means for biasing said enlargements against said lateral extension.

3. In combination: a mounting having a plurality of apertures; an incandescent electric lamp having a base; a lateral extension on said base provided with a plurality of apertures; and a socket unit for said lamp, comprising a body having portions, spaced from each other and from the axis of said unit, disposed through said mounting apertures and through said apertures in said lateral extension, said portions having enlargements at the ends thereof, said enlargements overlying said lateral extension and being of greater radial extent, in a section plane transverse to said axis than axially adjacent parts of said portions, said body and said portions and said enlargements being formed integrally

with each other from sheet stock, and means for biasing said enlargements against said lateral extension.

4. In combination: a mounting having a plurality of apertures; a holding unit, including a body member having a plurality of portions, circumferentially spaced from each other, insertable through said apertures in said mounting; said portions extending longitudinally in the same general direction and having parts overlying said mounting; means for biasing said parts toward said mounting; an electric incandescent lamp having a base; said base having a lateral extension provided with apertures for receiving said portions; and said parts including means, comprising cam surfaces extending in a generally radial direction from said parts, so constructed and arranged that rotation of said lamp increases the bias of said biasing means; said body member, said portions, said parts and said cam surfaces being formed integrally with each other from sheet stock.

5. In combination: a mounting having a plurality of circumferentially extending apertures having radially inner and outer bounding margins; a holding unit, including a body member having a plurality of portions, circumferentially spaced from each other; said portions extending longitudinally in the same general direction and having enlargements at the ends thereof, constructed and arranged for insertion through said apertures in said mounting; and said portions, between said body and said enlargements, having flat surfaces, on the radially inner sides thereof, engageable with and slidable along said radially inner bounding margins.

6. Means for holding an incandescent electric lamp to a mounting, comprising a unitary article of manufacture cooperable with and separable as a unit from the mounting, said unitary article including: a body member having integral therewith a plurality of connector portions, circumferentially spaced from each other, said portions extending longitudinally in the same general direction; and said portions having enlargements at the ends thereof, material of each of said enlargements forming a loop with respect to a section transverse to said direction.

7. Means for holding an incandescent electric lamp to a mounting, comprising a unitary article of manufacture cooperable with and separable as a unit from the mounting, said unitary article including: a body member having integral therewith a plurality of connector portions, circumferentially spaced from each other, said portions extending longitudinally in the same general direction; said portions having enlargements at the ends thereof, material of each of said enlargements forming a substantially closed loop with respect to a section transverse to said direction; and said enlargements being connected to said portions by cam surfaces tapering from said enlargements to said portions.

8. In combination: a mounting, for an incandescent electric lamp, having a plurality of circumferentially extending apertures; a holding unit, for the lamp, including a body member having a plurality of connector portions, circumferentially spaced from each other, and extending longitudinally in the same general direction through said apertures; said portions having enlargements at the ends thereof constructed and arranged to abut said mounting; said enlargements being of greater radial extent from their radially inner to their radially outer limits, in a section plane transverse to said direction, than axially adjacent parts of said portions; and said body member said portions and said enlargements being formed integrally with each other from sheet stock.

9. In combination: a mounting, for an incandescent electric lamp, having a plurality of circumferentially extending apertures; a holding unit, for the lamp, including a body member having a plurality of connector portions, circumferentially spaced from each other, and extending longitudinally in the same general direction through said apertures; said portions having enlargements at the ends thereof constructed and arranged to abut said mounting; said enlargements being of greater radial extent from their radially inner to their radially outer limits, in a section plane transverse to said direction, than axially adjacent parts of said portions; said body member said portions and said enlargements being formed integrally with each other from sheet stock; and an incandescent electric lamp having a base; said base having a lateral extension provided with apertures for receiving said enlargements and being so constructed and arranged that upon connecting rotation of said lamp about its axis said portions hold said lateral extension to said mounting.

10. In combination: a mounting having a plurality of apertures; a holding unit, including a body member having integral therewith a plurality of connector portions, circumferentially spaced from each other and extending longitudinally in the same general directions; said portions having enlargements at the ends thereof, material of each of said enlargements forming a loop with respect to a section transverse to said direction, said enlargements being constructed and arranged for insertion through said apertures in said mounting; and an incandescent electric lamp having a base; and said base having a lateral extension provided with apertures for receiving said enlargements and being so constructed and arranged that upon connecting rotation of said lamp about its axis said enlargements hold said lateral extension to said mounting.

11. In combination: a mounting having a plurality of apertures; a holding unit, including a body member having a plurality of connector portions, circumferentially spaced from each other and extending longitudinally in the same general direction; said portions having enlargements at the ends thereof, material of each of said enlargements forming a loop with respect to a section transverse to said direction, said enlargements being constructed and arranged for insertion through said apertures in said mounting; said body member, said portions and said enlargements being formed integrally with each other from sheet stock; and an incandescent electric lamp having a base; and said base having a lateral extension provided with apertures for receiving said enlargements and being so constructed and arranged that upon connecting rotation of said lamp about its axis said enlargements hold said lateral extension to said mounting.

HARRY A. DOUGLAS.