Sept. 18, 1962 G. C. LENNOX 3,054,980

WIRING DEVICE

Filed March 20, 1958 2 Sheets-Sheet 1

Fig. 1.

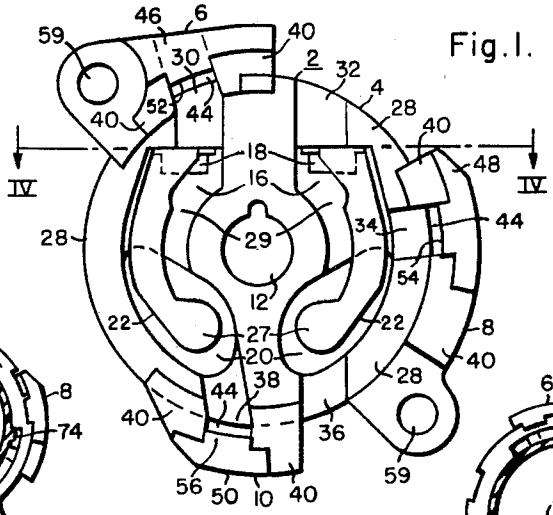


Fig. 2A.

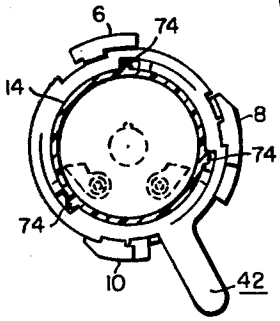


Fig. 2B.

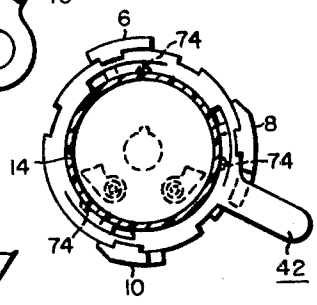


Fig. 3.

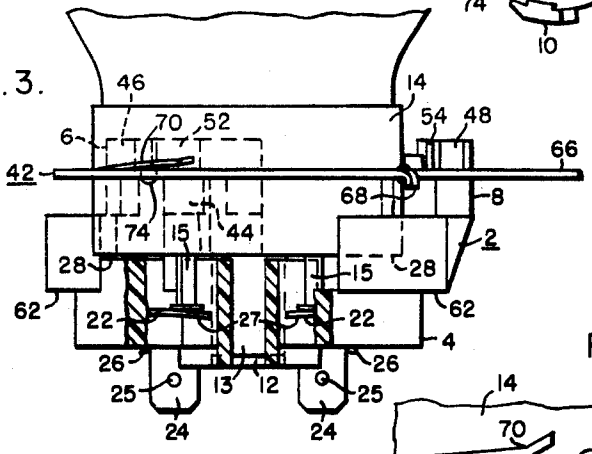


Fig. 4.

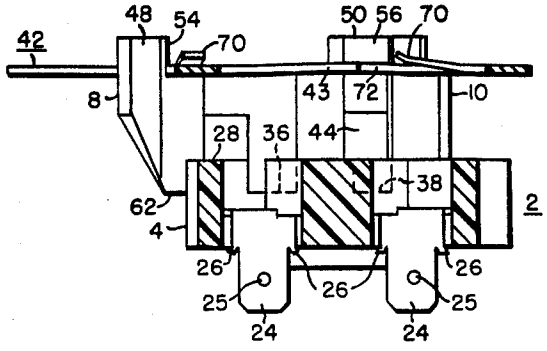
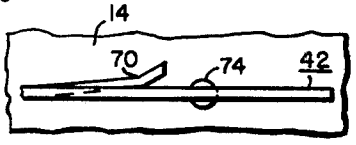


Fig. 5A.



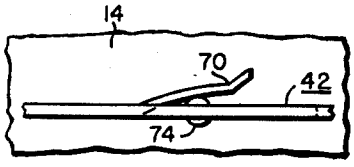


Fig. 5B.

WIRING DEVICE

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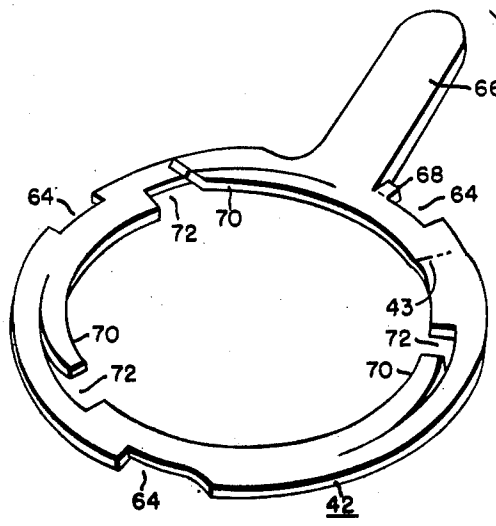


Fig.6.

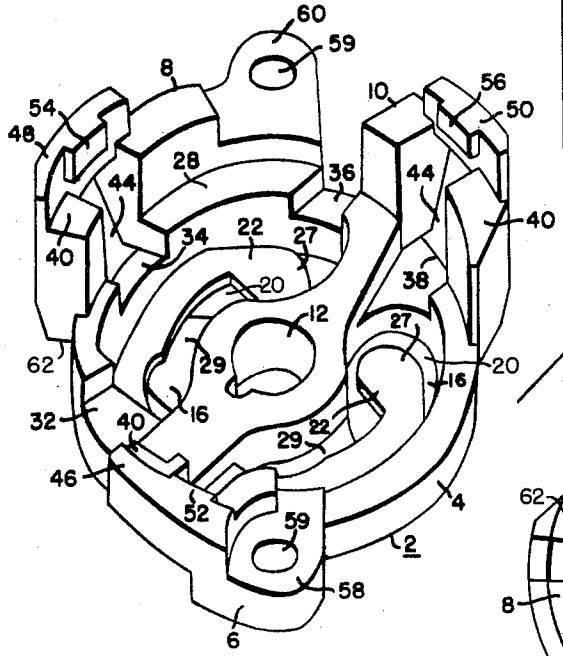
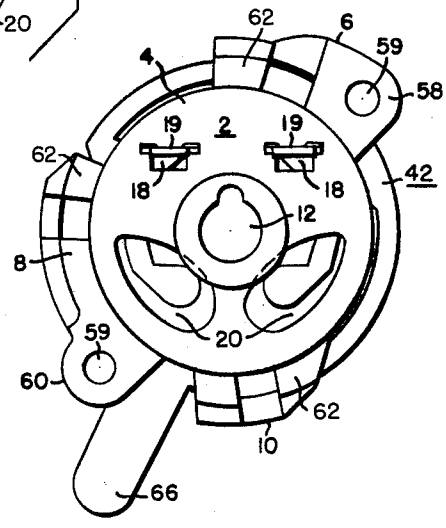


Fig.7.



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3,054,980

WIRING DEVICE

George C. Lennox, Southbury, Conn., assignor to The Bryant Electric Company, Bridgeport, Conn., a corporation of Connecticut

Filed Mar. 20, 1958, Ser. No. 722,703
6 Claims. (Cl. 339—90)

My invention relates to a wiring device and more particularly to a new and improved lampholder for positioning, mechanically supporting and electrically connecting a lamp.

In past constructions of lampholders, it has been a general practice to engage and disengage the lamp from the lampholder by rotating the lamp. For lamps used in certain applications, such for example as in motion picture or slide projectors, it is desirable to replace the lamp as quickly as possible so that the interval of interruption of the showing of the film is minimized. As is known, projector lamps become very hot during operation and it is desirable to minimize the handling time of the lamp during removal. Additionally, it is a necessity that a projection lamp be prefocused to be located in a predetermined position with respect to the focal axis of the optical system in order to provide maximum brightness for the system and uniform intensity of light across the screen. Lamps of this type also require adequate ventilation of their base portions, for the latter portions also become quite hot during operation.

My invention provides a structure which not only solves the aforementioned problems but also is inexpensive to manufacture and easily assembled.

As pointed out above, the conventional manner in which a lamp is removed from its lampholder is to rotate the lamp from either a screw base socket or a bayonet-type socket. My invention is particularly adapted for lamps provided with lugs which are engageable in bayonet-type sockets. However, unlocking of the lamp is accomplished not by rotating the lamp but by rotating a separate, relatively cool locking ring which engages the lugs on the lamp. The locking ring is easily assembled to the lamp-holder and is locked thereto by the provision of integral means on the locking ring. The lampholder is constructed in a novel manner to provide a generally open housing which allows adequate ventilation of the lamp base and also includes means for prefocusing the lamp in a predetermined position. Although somewhat complex in structure, the lampholder may be fabricated as a one-piece member from a molded insulating material using a direct compression molding press with force and cavity and requiring no side draws or wedges.

Accordingly, one object of my invention is to provide a new and improved lampholder for use with a lamp having a bayonet-type base.

Another object of my invention is to provide a new and improved lampholder having a separate movable locking ring, for use with a lamp having bayonet-type lugs.

Still another object of my invention is to provide a lampholder for use with a motion picture projector lamp having sufficient ventilation area for cooling the lamp.

Another object of my invention is to provide a new and improved lampholder having at least one contact mounted therein adapted to resiliently engage a contact on the lamp.

A more particular object of my invention is to provide a new and improved lampholder having a movable locking ring which can be assembled to the lampholder without the provision of additional securing means.

Another more particular object of my invention is to provide a new and improved lampholder having a terminal mounted therein and having integral means thereon

for mounting a rotatable annular locking ring having resilient arms thereon located to engage the lugs of a bayonet-type lamp base.

These and other objects of my invention will become more apparent upon consideration of the following detailed consideration of a preferred embodiment thereof when taken in conjunction with the attached drawings, in which:

FIGURE 1 is a front elevational view of a wiring device constructed in accordance with the principles of my invention having the locking ring removed;

FIG. 2*a* is a front plan view on a reduced scale of the wiring device shown in FIG. 1, showing a fragment of the lamp located therein and showing the locking ring in one operative position;

FIG. 2*b* is a front plan view similar to FIG. 2*a*, showing the locking ring in the other operative position;

FIG. 3 is a side elevation view of the wiring device shown in FIG. 1 having a lamp located therein and having portions thereof cut away;

FIG. 4 is a sectional view of the wiring device shown in FIG. 1, taken substantially along the lines IV—IV thereof and having the locking ring located thereon;

FIG. 5*a* is a fragmentary view of the lamp base and locking ring showing the lamp in an unlocked position;

FIG. 5*b* is another fragmentary view of the lamp base and locking ring showing the lamp in a locked position;

FIG. 6 is an exploded view of the wiring device shown in perspective and illustrating the locking ring and the interior of the housing; and

FIG. 7 is a bottom view of the wiring device.

Referring to the drawings, it will be noted that the wiring device constructed in accordance with the principles of my invention can comprise a housing **2** having a circular lower portion **4** and having three raised members **6**, **8** and **10** circumferentially spaced and extending upwardly and outwardly of the outer edge thereof. The housing **2** is constructed of an insulating material having sufficient structural strength, such for example, as a molded insulating material, and may be constructed as a single integral member. The lower portion **4** is provided with a centrally located non-circular keyway **12** extending axially therethrough and adapted for the insertion of a similarly shaped key **13** extending laterally outwardly from the under surface of a lamp base **14**. The lower portion **4** is also provided with recesses forming a pair of spaced contact chambers **16** located on opposite sides of the keyway **12**. One end of each of the contact chambers **16** (FIGS. 1 and 7) is provided with a securing passage **18** which extends laterally through the lower portion **4** to the exterior of the housing. Each of the contact chambers **16** at the other end thereof is provided with a generally oval passage **20** extending laterally therefrom to the underside of the lower portion **4**.

An elongated cantilever contact **22** is located in each of the contact chambers **16** and is provided with a terminal portion **24** extending laterally from one end thereof. It is to be noted that the securing passages **18** are generally T-shaped and the terminal portions **24** of contacts **22** extend downwardly through the cross-bar portion of the securing passages **18** to the underside of the lower portion **4**. Each of the terminal portions **24** is provided with a pair of spaced securing lugs **26** adjacent the underside of the lower portion **4**. The upper wall of cross-bar portion of the securing passages **18** is provided with a projection **19** (FIG. 7) extending into the passage and located to facilitate the securing of the terminal portion **24**. The terminals **24** may be secured to the housing by merely forcing them from the front through the cross-bar portion of the securing passages **18** with the securing lugs **26** resiliently biased inwardly towards the terminal.

When the securing lugs 26 reach the underside of the lower portion 4, they will spring out to permanently secure the contacts 23 to the housing 2.

The terminal portions 24 are provided with openings 25 therein to facilitate the securing of lead wires thereto in a conventional manner, such, for example, as by soldering. The other ends 27 of the contacts 22 are located over the oval passages 20 of the contact chambers 16, respectively, so that intermediate portions of the contacts engage the surfaces 29 of the contact chambers 16, respectively. By the provision of the oval passages 20, the contact ends 27 may be resiliently deflected downwardly when they are engaged by the lamp pins. The contacts 22 are preferably constructed of a material having good electrical conductivity and sufficient structural strength and resiliency, such, for example, as a copper alloy.

The contact chambers 16 in the circular lower portion 4 provide the housing with an annular ledge 28 extending about the periphery of the circular portion 4. The ledge 28 is provided with five cutaway portions 30, 32, 34, 36 and 38 spaced thereabout and extending radially across the ledge and downwardly towards the back of the lower portion 4 of the housing 2. The cutout portions 30, 32, 34, 36 and 38 cooperate with the oval passages 20 to provide additional ventilation of the lamp base 14.

Each of the raised members 6, 8 and 10 extend laterally forwardly from the annular ledge 28 and are provided with integral shoulders 40 thereon, respectively, which lie in a single plane and cooperate thereby to locate an annular locking ring 42, to be described later, in the plane described thereby.

Each of the raised members 6, 8 and 10 are provided with an elongated axial slot 44 therethrough extending from the shoulders 40 thereof, to the cutaway portions 30, 34 and 38, respectively, and extending outwardly to the exterior of the housing 2. The raised members 6, 8 and 10 are thus each provided with upper portions 46, 48 and 50, respectively, which extend laterally forwardly from the shoulders 40, respectively, and terminate in substantially the same plane. Lugs 52, 54 and 56 extend inwardly from the inner sides of the upper portions 46, 48 and 50, respectively, and are aligned with the slots 44 in the raised members 6, 8 and 10, respectively. The under surface of each of the lugs 52, 54 and 56 is equally spaced from the coplanar shoulders 40 on raised members 6, 8 and 10, respectively to provide passages therebetween for the locking ring 42. It is to be noted that the innermost surfaces of each of the raised members 6, 8 and 10 are spaced from the center of the housing and are curved to form segments of a common circle having its radius somewhat larger than the radius of the lamp base 14. The innermost sides of the upper portions 46, 48 and 50 are also located and curved to form segments of a single circle having a larger radius.

The raised members 6 and 8 are each provided at one end with securing members 58 and 60, respectively, integral therewith and with the lower portion 4 and are each provided with an opening 59 therein to facilitate the securing of the housing to a supporting member by suitable means, such for example, as by screws passing therethrough. The openings 59 are located to be at the ends of a diameter passing through the lower portion 4 of the housing 2. As pointed out earlier in the description, the raised members 6, 8 and 10 extend radially outwardly of the circular lower portion 4. They are each provided with a coplanar surface 62 to facilitate the flush mounting of the housing on its support.

The annular locking ring 42 is constructed of any suitable material having sufficient strength, resiliency and malleability, such for example as sheet steel, and may be stamped therefrom as a unitary member. The locking ring 42 is constructed to have a circular inner radius substantially equivalent in magnitude to the radius of the circle formed by the inner sides of raised members 6, 8 and 10. The outer radius of the locking ring is slightly less than the radius of the circle described by the inner axial sides of the upper portions 46, 48 and 50. The outer edge of the locking ring 42 is provided with three spaced outer slots 64 located to be aligned with lugs 52, 54 and 56 of raised members 6, 8 and 10, respectively, at only one rotative position of the locking ring, and are of sufficient length and depth to receive the lugs 52, 54 and 56 to allow the locking ring 42 to be moved past the lugs 52, 54 and 56, and engage the coplanar shoulders 40 on the raised members 6, 8 and 10. The locking ring 42 is constructed from material of a thickness less than the width of the passages created between the shoulders 40 and lugs 52, 54 and 56, so that the locking ring is rotatably mounted in the plane of the shoulders 40. The locking ring 42 is provided with a coplanar handle 66 extending radially outwardly from its outer edge to facilitate rotation of the locking ring. An integral fastening tab 68 extends outwardly from the outer edge of the locking ring 42 adjacent one side of the handle 66 and is adapted to bend downwardly towards the lower portion 4 of the housing 2 to prevent removal of the locking ring after it is assembled to the housing. Three spaced integral, circumferentially extending resilient cantilever arms 70 are struck out of the inner edge of the locking ring 42 and are curved to conform with the circumference of the circle described by the inner edge thereof. The cantilever arms 70 are inclined forwardly of the plane described by the front surface of the locking ring 42, with the outer ends extending angularly forwardly. The inner edge of the locking ring 42 is provided with inner slots 72 adjacent each of the free ends of the cantilever arms 70, respectively, which are of a width greater than the width of bayonet lugs 74 projecting outwardly from the lamp base 14.

To assemble the locking ring 42 to the housing 2, the locking ring is rotated to the position where the outer slots 64 are aligned with the lugs 52, 54 and 56 of raised portions 6, 8 and 10, respectively. The locking ring is then lowered into the housing until the under surface thereof engages the shoulders 40 on raised members 6, 8 and 10. The handle 66 is then rotated until portions of the locking ring are located in the passages created by the shoulders 40 and lugs 52, 54 and 56, respectively. The fastening tab 68 is then bent downwardly so that upon rotation of the locking ring 42 the tab will engage the opposed side walls of raised members 8 and 10, respectively, and prevent additional rotation of the locking ring 42. The fastening tab 68 is located on the locking ring to prevent realignment of the lugs 52, 54 and 56 of raised members 6, 8 and 10 with outer slots 64 of the locking ring 42. Thus, removal of the locking ring 42 from the housing is prevented unless the fastening tab 68 is bent back into the plane of the locking ring 42.

The locking ring may preferably be deformed laterally, such for example, as the slight bend at 43 thereon (FIG. 6) which is moved through the passage provided by lug 56 and shoulder 40 of raised portion 10 to provide friction between the locking ring 42 and the lamp holder when the locking ring is in its open position. It is to be noted that the lugs 54, 56 and 58 on the raised members 6, 8 and 10 are not spaced equally apart, but are located so that the locking ring 42 may be assembled to the housing only when the handle 66 is located between the raised members 8 and 10.

The receptacle is adapted to be used with a bayonet-type lamp such for example, as the lamp described in the copending application of Jacob F. Michael et al., entitled Electric Lamp and Socket, Serial No. 714,730, filed February 12, 1958, now Patent No. 2,972,699, having three bayonet lugs 74 spaced on the sides thereof to be aligned with the inner slots 72 of the locking ring. The lamp base 14 is provided with a lamp key 13 extending downwardly from the outer end thereof and a pair of spaced lamp terminals 15 which are aligned with the ends 27 of

the contacts 22 when the lamp key 13 is properly located in the keyway 12 of the housing 2. The lamp base 14 has a generally circular cross section of diameter slightly less than the diameter of the circle formed by the inner edge of the locking ring 42. The bayonet lugs 74 are located to be in the plane of the front surface of the locking ring 42 when the lamp is located in the lampholder and the locking ring 42 is in the position shown in FIGS. 2*a* and 5*a*. The bayonet lugs 74 are then located in the inner slots 72 of the locking ring 42 and have a portion thereof extending slightly above the plane of the upper surface of the locking ring 42 (FIG. 5*a*). The free ends of the cantilever arm 70 are located above the uppermost portion of the bayonet lugs 74. However, an intermediate portion of the cantilever arms 70 will engage the uppermost surface of the bayonet lugs 74 when the locking ring is rotated to the position shown in FIGS. 2*b* and 5*b* to exert a downward camming action on the lamp base, to force the base terminals 15 into engagement with contacts 22 of the lampholder and deflect the latter downwardly until the lamp base engages a rigid surface on the lampholder. Further movement of the locking ring then further stresses and deflects the arms 70. With the locking ring in the latter position, the cantilever arms 70 act to bias the bayonet lugs 74 towards the end of the lamp base to properly position the lamp base. The biasing action of the locking ring 42 also acts to insure good contact between the lamp terminals 15 and the resilient contacts 22 of the lampholder.

As can be seen, the lamp is removed from the lampholder by merely rotating the locking ring 42 back to the position shown in FIG. 2*a* and then merely lifting the lamp out of the lampholder.

As hereinbefore pointed out, the housing 2 may be fabricated as a single member at a relatively low cost. The unit cost of forming the housing 2 is appreciably lessened by the utilization of a direct compression molding press having merely force and cavity dies rather than utilizing molding dies requiring side draws or wedges. It is to be noted that the lugs 52, 54 and 56 must be located along the inner side walls of the upper portions 46, 48 and 50, respectively. The lugs 52, 54 and 56 must also be spaced from the coplanar shoulders 40 on each of the raised members 6, 8 and 10. Ordinarily, the provision of the lugs 52, 54 and 56 could not be accomplished without utilizing side draws or wedges on a male molding die. By the provision of the slots 44, aligned with the lugs 52, 54 and 56, respectively, the lugs may be fabricated without the requirement of side draws or wedges on the male molding die. The lugs may be fabricated by merely providing inwardly extending projections on the female molding die which create an outer side portion of the slots 44. These projections then would have inner portions which extend upwardly beyond the lower surface of the raised portions 46, 48 and 50 so that the upper inner surface thereof forms the lower surface of the lugs 52, 54 and 56, respectively. It is to be noted that the inner sides of the lugs 52, 54 and 56 are spaced outwardly from the circumference of the lower portion 4 of the housing and that the projections on the female die extend not beyond the inner side of the lugs 52, 54 and 56. The width of the female die projections is equal to the width of the slots 44. The shoulders 40 and the remaining surfaces of the projections 52, 54 and 56 are formed by cavities and ledges on the male molding die. By utilizing this method of forming the projections 52, 54 and 56, the side slots 44 may be formed, for the sides of the projections on the female molding die will frictionally engage the sides of the male molding die so that no molding material will be located therebetween and so that the slots 44 will be provided to provide additional ventilation for the lampholder. By constructing the lugs 52, 54 and 56 in this manner, a passage is formed between the lugs and the shoulders 40 to enable the locking ring to be rotatably received therein.

An additional feature of my invention is that the lampholder is constructed of merely four members, a single piece skeletal housing, two contacts and a movable locking ring. The contacts may be assembled to the housing by merely force fitting them into the securing passages provided in the housing, and the locking ring may be secured to the housing by merely aligning the outer slots 64 with the lugs 52, 54 and 56 and slipping the ring past the lugs into engagement with the shoulders 40. It can therefore be appreciated that the lampholder can be assembled at a minimum of cost in a simplified manner.

It can also be appreciated that removal and installation of the lamp is accomplished very rapidly in which the handling time of the lamp is minimized. Good contact is provided between the lamp terminals 15 and the contacts 22 by the biasing action of the cantilever arms 70 on the bayonet lugs 74 of the lamp base 14. It can also be seen that the locking ring 42 and the contacts 22 are assembled to the housing 2 with a minimum of effort and at relatively low cost. By the provision of a separate locking ring, replacement of the lamp is accomplished with a minimum of effort and with a minimum of handling of a hot lamp. The housing 2 is formed of an intricate shape and provides a maximum of ventilation for the lamp andt thereby increases the life thereof. It is formed by being molded from a suitable insulating material whereby the intricate form can be quickly and readily obtained at a small unit cost by using a direct compression molding press with force and cavity dies and requiring no side draws.

Although I have shown and described one particular form of lampholder which incorporates various features of my invention in accordance with the Patent Statutes, I am aware that other modifications may be made without departing from the broad spirit and scope of my invention. Accordingly, it is desired that the invention be not limited to the particular form of lampholder and locking device or the use thereof specifically illustrated and described herein, but that the invention should be given a broad scope and that the foregoing be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. A wiring device comprising, a housing having substantially opposed side walls formed from a molded insulating material, a pair of spaced shoulders located on one side wall and facing an open end of said housing, a projection extending into said housing from said one side wall and located between said spaced shoulders and between said shoulders and said open end, an opening in said one wall aligned with said projection and located between said projection and the other end of said housing, said opening also extending inwardly of the housing a distance at least equal to the length of said projection, whereby said shoulders and said projection may be formed with molding dies requiring no side draws or wedges, and contact means mounted in said housing.

2. A wiring device comprising, a housing formed from a molded insulating material having a base and a plurality of spaced projections extending angularly from said base to form the side walls of said housing, at least one shoulder located on each of said side walls and facing an open end of said housing, at least one projection extending into said housing from each of said side walls and located between said shoulders and said open end, respectively, an opening in each of said side walls aligned with said projections and located between said projections and said base, respectively, said openings also extending inwardly of said housing a distance at least equal to the length of said projections whereby said shoulders and said projections may be formed with molding dies requiring no side draws or wedges, and contact means mounted in said housing.

3. A wiring device comprising, a housing having substantially opposed side walls formed from a molded insulating material, at least one shoulder located on one side wall and facing an open end of said housing, a projection extending into said housing from said one side wall and located between said shoulder and said open end, an open-

ing in said one wall aligned with said projection and located between said projection and the other end of said housing, said opening also extending inwardly of the housing a distance at least equal to the length of said projection, whereby said shoulder and said projection may be formed with molding dies requiring no side draws or wedges, and contact means mounted in said housing.

4. A wiring device comprising a generally cup-shaped housing of insulating material, shoulder means located in said housing on a side wall thereof, at least one integral inwardly extending lug located on a portion of said side wall and spaced outwardly from said shoulder means to form a passage therewith, a ring being generally sized to be supported within said housing and being of a thickness to be received in said passage and having at least one slot in its outer edge of a size to receive said lug when aligned therewith so that said ring can be moved inwardly into engagement with said shoulder means and be rotatable in said passage, means on said ring for engaging a device insertable in said housing to lock the latter therein, and an integral deformable tab on said ring, said tab being engageable with spaced housing portions when said ring is rotated a given amount relative to said passage so as to limit rotative movement of said ring and to prevent the realignment of said slot with said lug and thereby to preclude removal of said ring from said passage.

5. A wiring device comprising an open-sided insulating member for supporting load apparatus, wall means substantially transverse to said open side, at least one passage being extended laterally through said wall means to provide cross-cooling for said load apparatus when inserted in said insulating member, first contact means engaging said insulating member for resilient connection to contact means of said load apparatus, means for securing a locking member relative to said wall means so as to hold said locking member against movement toward said open side of said insulating member yet so as to free said locking member for limited rotative movement about said insulating member, said securing means including a shoulder on said wall means for supporting said locking member and a portion of said wall means extending over said locking member

for holding the latter inwardly, and said securing means including a tab on said locking member being engageable with other spaced portions of said wall means so as to limit the rotative movement of said locking member as described, and means on said locking member for cooperatively engaging a portion of said load apparatus in at least one rotative position of said locking member.

6. A wiring device comprising an open sided housing of insulating material, shoulder means located in said housing on a side wall thereof, a region of said housing spaced outwardly from said shoulder means extending over said shoulder means to form a passage therewith, a ring being generally sized to be supported within said housing and being of a thickness to be received in said passage, means forming a part of said ring and said housing region for enabling said ring to be located in said passage for rotative movement therein, means on said ring for engaging a device insertable in said housing to lock the latter therein, and an integral deformable tab on said ring, said tab being engageable with spaced housing portions when said ring is rotated a given amount relative to said passage so as to limit rotative movement of said ring and to preclude removal of said ring from said passage.

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