Jan. 17, 1950 E. R. KULKA 2,495,196

HOLDER FOR GASEOUS DISCHARGE LAMPS

Filed Dec. 18, 1948 2 Sheets-Sheet 1

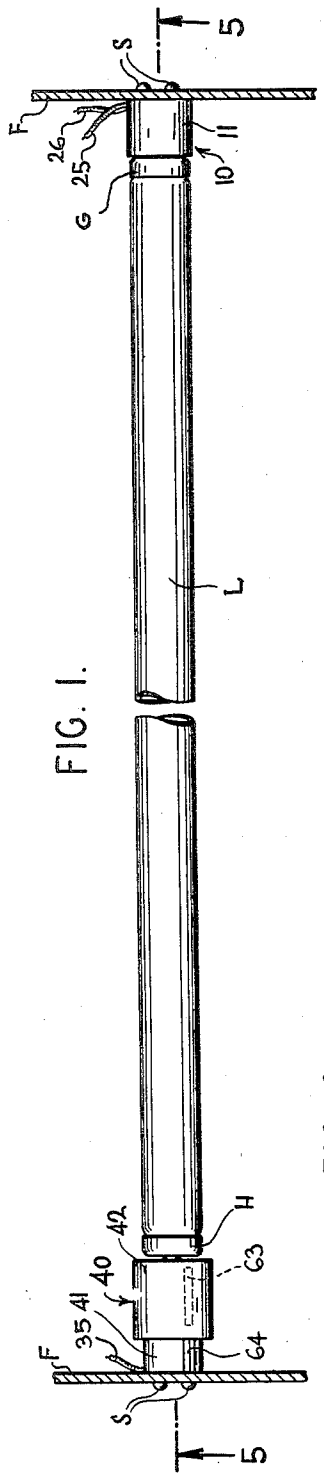


FIG. 1.

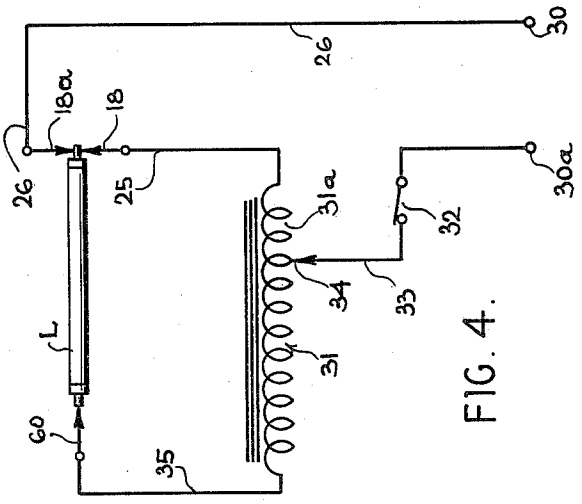


FIG. 4.

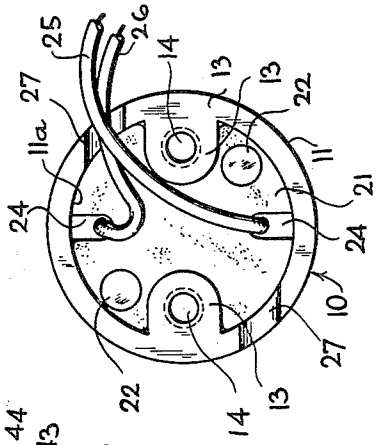


FIG. 3.

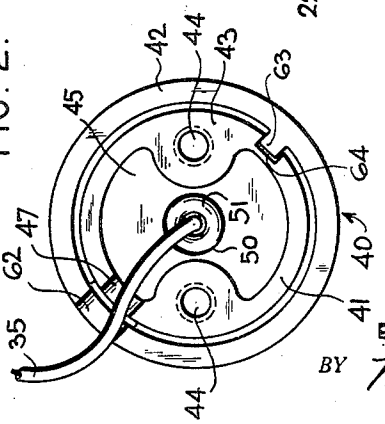


FIG. 2.

INVENTOR.
EUGENE R. KULKA.
BY Mock & Blum
ATTORNEYS.

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HOLDER FOR GASEOUS DISCHARGE LAMPS

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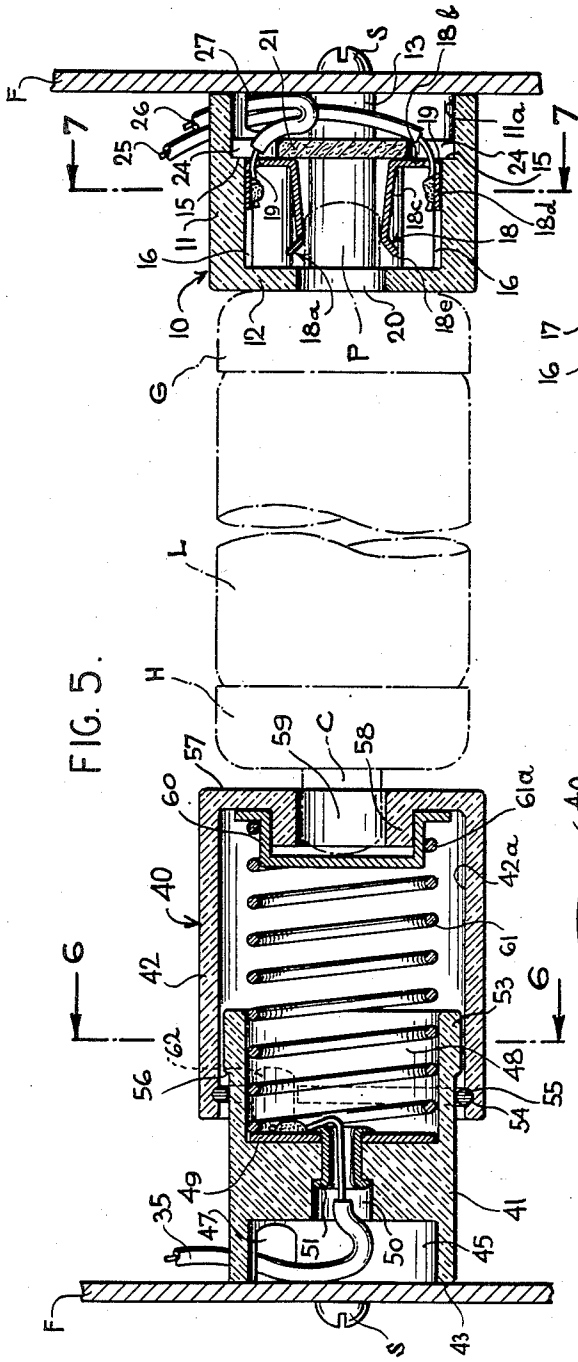


FIG. 5.

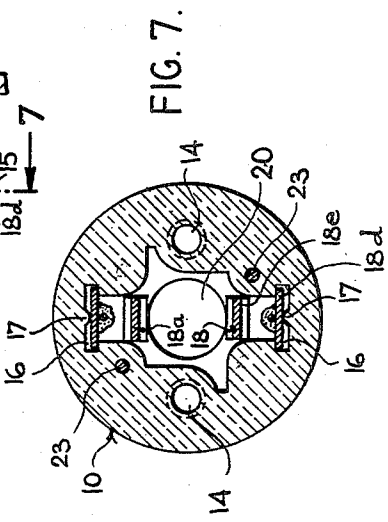


FIG. 7.

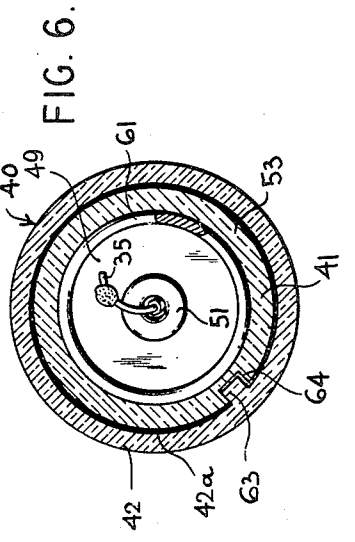


FIG. 6.

INVENTOR.
EUGENE R. KULKA.
BY Mock & Blum
ATTORNEYS.

Patented Jan. 17, 1950 2,495,196

UNITED STATES PATENT OFFICE

2,495,196

HOLDER FOR GASEOUS DISCHARGE LAMPS

Eugene R. Kulka, Mount Vernon, N. Y.

Application December 18, 1948, Serial No. 66,065

8 Claims. (Cl. 173—328)

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My invention relates to improvements in lampholder means for holding "fluorescent" lamps and other lamps of the gaseous discharge type, and is a continuation-in-part of my co-pending application, Serial No. 586,647, filed April 5, 1945, which has matured into U. S. Patent No. 2,464,643, issued March 15, 1949.

The invention relates particularly to lampholder means for a gaseous discharge lamp which is operated at a high voltage, such as 600 volts–1000 volts or more. The accidental touching of such a high-voltage contact results in serious injury or death.

A lamp of this type has a single external metal contact head or prong, at each end thereof, such contact head being commonly referred to as a "mono pin." Such lamps do not require starters. I provide a primary lampholder and a secondary lampholder for each lamp. The high and dangerous voltage is applied to the terminal of the secondary lampholder. This high voltage is secured, for example, from the secondary section of a step-up auto-transformer. The high-voltage secondary circuit remains open, until a lamp is inserted into the two lampholders, whereby the secondary circuit is closed through the lamp itself. When the lamp is inserted, it covers and obstructs the high-voltage contact, thus preventing accidents.

Gaseous discharge lamps having a single external contact head are manufactured in several lengths, and of several diameters. Such lamps are now made with diameters of 1½ inches, one inch, and ¾ inch, and, according to present indications, lamps having greater diameters will eventually appear upon the market. The diameters of the hollow heads which connect the contact heads to the envelope of the lamps vary correspondingly with the diameters of the lamp envelopes.

The conventional lampholders for lamps of this type are commonly provided with a peripheral flange in the front wall thereof into which the hollow heads of the lamps are adapted to fit snugly, in order for the contact heads or prongs to make contact with the internal circuits of the holders. Since the diameters of these hollow heads increase as the diameter of the lamp increases, it has heretofore been necessary to change the lampholders in the fixture every time the diameter of the lamp was changed. In addition, this requirement has caused serious inconvenience to dealers and manufacturers who must carry a complete line of lampholders for each size of lamp.

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In lamps of this sort, the contact heads or prongs are made of a uniform size and diameter regardless of the size and diameter of the hollow heads or the envelopes.

I provide a pair of lampholders which may be effectively used to hold a lamp of the aforementioned type, no matter what its size or diameter and in which lamps of various diameters may be used interchangeably.

Numerous additional objects and advantages of my invention will be stated in the annexed description and drawings, which illustrate one embodiment thereof.

Fig. 1 is a side elevation of a lamp shown held operatively in a secondary holder and a primary holder of my invention. In this view, the holders are shown attached to the walls of a fixture.

Fig. 2 is a bottom plan view of the secondary holder.

Fig. 3 is a bottom plan view of the primary holder.

Fig. 4 is a diagrammatic view of the circuit which I employ for both holders.

Fig. 5 is a side sectional view of the primary holder and the secondary holder shown attached to the walls of a fixture. The lamp L inserted in each holder is shown in phantom and is broken away at the center for convenience of illustration.

Fig. 6 is a section of the secondary holder taken on line 6—6 of Fig. 5.

Fig. 7 is a section of the primary holder taken along line 7—7 of Fig. 6.

The primary holder 10 and the secondary holder 40 have casings which are made of suitable insulating material. Said holders 10 and 40 may be fixed to the walls of a fixture F with the front walls of said holder casings proximate to each other and longitudinally alined.

The primary holder 10 comprises a cylindrical outer casing 11 which has a front wall 12. A central hole 20 in said front wall 12 provides an insert opening for the contact head of a lamp. The inner wall 11*a* of the outer casing 11 has a pair of diametrically-opposed, longitudinal projections or posts 13 which are provided with tapped holes 14. The posts 13 are integral with the inner wall 11*a*, and extend from the front wall 12 to the open edge of the casing 11.

The projections 13 have extension-shoulders 15 which extend transversely around the inner wall 11*a* between the posts 13. The shoulders 15 are integral with the inner face of the front wall 12, but the end surfaces of said shoulders are spaced from the open end of the casing 11. Each shoulder 15 has a T-shaped slot or groove 16 which

extends longitudinally therein. A longitudinal projection or rib 17 extends into the center of each slot 16.

All of the aforementioned parts of the casing 11 are preferably integral therewith, and may be formed in a single molding operation, thus greatly lowering the cost of manufacture.

The slots 16 are adapted to receive and retain a pair of contact springs 18, 18a. These contact springs are preferably made of Phosphor bronze or other resilient and conductive material. Each contact spring 18, 18a is bent to form a base 18b and two respective upright arms 18c and 18d. The arm 18c is longer than the arm 18d, and the free end of said arm 18c may be bent as shown at 18e in Fig. 5 in order to facilitate freer sliding contact thereof with the contact head of an inserted lamp. Each contact spring 18, 18a is provided with a hole or recess 19 at the juncture of base 18b and arm 18d.

The arm 18d is of a size and shape to fit within the T-shaped slot 16 of casing 11. When so inserted, the bent end 18e of arm 18c is normally held adajacent the inner surface of the hole 20 in front wall 12, and partially overlapping said hole, so that it will engage the contact head of an inserted lamp. The longitudinal bead or rib 17 in the slot 16 is provided to put tension on the arm 18d and thus afford a pressure-fit for the respective contact spring 18, 18a.

The contact springs 18 and 18a are shown and described by way of a preferred example, it being understood that said springs may be of any desired shape and located within the primary casing in any suitable manner so as to contact an inserted contact head or prong of the lamp. Said contact springs 18 and 18a have been described as being preferably made of a resilient material, but said springs may be made of a solid or non-resilient, conductive material if desired. I prefer, however, a resilient material for better efficiency in operation.

The rear open end of the primary holder socket 10 is provided with a cover 21 which is made of insulating material. Cover 21 is shaped to fit within the open end of casing 11, and to abut the upper edge of the shoulders 15. Said cover 21 is fixed to the shoulders 15 by rivets or other fasteners 22 (Fig. 3), which are located in bores or recesses 23 of said shoulders 15 (Fig. 7).

Cover 21 has a pair of wire inlets or grooves 24, through which respective lead wires 25 and 26 extend. The terminal edge of casing 11 has a pair of openings or recesses 27, through which the wires 25 and 26 may be passed when the socket 10 is secured to a fixture F. Both wires may be passed through a single recess 27 as shown in Fig. 3, or each wire may be passed through a separate recess, according to the installation requirements.

The bare end of each of the wires 25 and 26 extends through the hole or recess 19 in the base of one of the contact springs 18, 18a, and the wire is secured to the inner wall of the arm 18d by soldering or in any other way. Thus a large area of contact is afforded each wire. The respective bare end of wire 25 is conductively fixed to contact spring 18, while the respective bare end of wire 26 is fixed to contact spring 18a. These wires are insulated from each other, inwardly of primary holder 10 and also externally thereto, save where wire 26 is fixed to power terminal 30, and where wire 25 is fixed to an end of the auto-transformer coil 31, which has a primary section 31a. This auto-transformer 30 functions to step up the ordinary house voltage of 110–115 volts, to 600–1,000 volts or more.

Power terminal 30a of the source of primary current can be connected through switch 32 to wire 33, which is adjustably connected at 34 to the coil 31, intermediate the ends of the coil 31, in order to regulate the ratio between primary voltage and secondary voltage.

One end of the coil 31 is connected by wire 35 to the contact washer 49 of the secondary holder 40. This contact washer 49 is a secondary terminal.

The secondary holder 40 comprises a cylindrical base 41, and a hollow cylinder or shell 42 which is slidable on said base 41. The end wall 43 of base 41 has a plurality of longitudinal tapped bores 44 into which screws S may be inserted for attachment of said base 41 to the wall of a fixture F. The end wall 43 is also provided with a recess 45 intermediate the tapped bores 44, as shown in Figs. 2 and 5. The casing wall of the base 41 adjacent the recess 45 is provided with a wire inlet 47 through which the wire 35 may extend.

The opposite unattached end of the base 41 is provided with an enlarged bore or well 48, at the bottom of which is the contact washer 49. A longitudinal bore 50 connects the recess 45 with the well 48. The contact washer 49 is clamped to the bottom wall of the well 48 by a hollow rivet or eyelet 51, which extends through the center of said contact washer 48 and partially through the bore 50. This eyelet 51 is made of a conductive material, as is the contact washer 49. The bare end of the wire 35 extends through the eyelet 51 into the well 48, and is conductively secured to the contact washer 49 by solder or similar means.

The forward outer wall of the base 41 is provided with a peripheral flange 53 which slidably abuts the inner wall 42a of the cylinder 42. The rear end of the cylinder 42 has an inner peripheral groove 54 which houses a flexible wire or band 55. The wire or band 55 protrudes beyond the surface of the inner wall 42a of the cylinder 42, and said wire or band 55 is positioned to abut the shoulder 56 formed by the flange 53 of base 41. The wire or band 55 thus acts as a stop to limit the forward movement of the cylinder 42, and prevents said cylinder 42 from sliding out of engagement with the base 41.

The slidable cylinder 42 has a front wall 57, the inner face of which is provided with a circular boss 58. The front wall has a centrally disposed recess or bore 59 which extends through the boss 58 and into the hollow center portion of said cylinder 52. A conductive metal cup 60 is fixed to the inner end of the boss 58, as by a drive fit or in any other manner. Said cup 60 has a plate portion which crosses and also closes the central opening or bore 59.

A metal biasing spring 61 is seated in the well 48. The unseated end of said spring 61 biases the cup 60 away from the base 41, so that the shoulder 56 of said base 41 normally engages the wire or band 55. The spring 61 has one or more turns 61a which firmly grip the cup 60. Said spring 61 is made of a conductive, resilient material.

As shown in Figs. 3 and 5, the terminal end of cylinder 42 is provided with an opening or recess 62 which registers with the wire inlet 47 of base 41. The cylinder 42 may thus be slid against the tension of biasing spring 61 until the edge of said cylinder 42 abuts the fixture F, without the lead

wire 35 interfering with its movement. In order to maintain the recess 62 in position to register with the wire inlet 47, a key 63 is provided on the inner wall 42a of the cylinder 42, and a corresponding groove 64 is provided in the outer wall of base 41. This key 63 and groove 64 function to prevent the cylinder 42 from rotating relative to the base 41.

The wire or band 55 of the cylinder 42 terminates adjacent each end of the recess 62 as shown in broken lines in Fig. 5.

The lamp L has the usual envelope which is made of glass or other insulating material. Said lamp L has the usual hollow heads H and G which are made of insulating material. The usual metal contact heads or contact prongs C and P are connected in the usual manner to the internal electrodes of the lamp. Said heads C and P are longitudinally alined.

In order to connect the lamp to the secondary current circuit, it is necessary first to insert the contact head C into the secondary holder 40 through its open insert end 59 and to push the cylinder 42 laterally toward the fixture F and against the biasing force of spring 61. This is done by the pressure of contact head or prong C against the respective wall or portion of metal cup 60 which crosses the bore of boss 58, as well as the pressure of the hollow head H against the outer face of front wall 57. The cylinder 42 must be pushed inwardly of the position shown in Figs. 1 and 5, in order that the lamp L can be horizontally located with its head P located externally to primary holder 10. The head P is then inserted into the primary holder 10 through its open insert end, so that said head P projects through the hole 20 of the front wall 12, which front wall 12 then abuts the head P to act as a stop. The bent ends 18e of the contact springs 18 and 18a then make contact with said head P.

It will be noted that when the contact head or prong C is inserted fully within its respective insert recess 59 so that said contact head C makes contact with the metal cup 60, the hollow head H of the lamp L abuts the outer face of front wall 57 of secondary holder 40. Similarly, the contact head or prong P may be inserted into its respective recess 20 until the respective hollow head G abuts the front wall 12 of primary holder 10.

Since, as has been previously stated, the contact heads or prongs C and P have a uniform size and diameter, no matter what may be the size and diameter of the lamp and its hollow heads G and H, it is obvious that any "mono pin" lamp of whatever size or diameter may be effectively and operatively held by the holder sockets of my invention.

The primary holder 10 and the secondary holder 40 are fixed to the wall of a fixture F, by the screws S which pass through bores of said fixture wall or walls. Said screws S are screwed into the tapped bores 14 of the primary holder 10 as well as the tapped bores 44 of the secondary holder 40. When so fixed, the open inlet or insert ends of the casings of the holders 10 and 40 are longitudinally alined, and said inlet ends face each other.

When switch 32 is closed, the lead 30a of the alternating primary current, which may be ordinary house current of 100-115 volts and 60 cycles, is connected through wire 33 to the inner end of the primary section 31a of the auto-transformer coil 31. Said auto-transformer coil 31 also functions as a ballast for the lamp. The free end of the primary section 31a is connected by

wire 25 to contact spring 18. The lead 30 of the alternating primary current is connected by wire 26 to the contact spring 18a. The primary circuit is thus closed through the primary section 31a and the contact head P.

One end of the coil 31 is connected through wire 35, contact washer 49, biasing spring 61, and metal cap 60, to the contact head C. The high secondary voltage discharges through the lamp L to head P, and through spring 18 and wire 25 to the respective end of the auto-transformer 31.

The high voltage secondary circuit therefore remains open, until the lamp L is in operative position, when it obstructs the exposed high voltage terminal 60 of the secondary holder 40. If the exposed wall of metal cup 60 is touched, even when switch 32 is closed, there can be no shock.

I have disclosed a preferred embodiment of my invention, but numerous changes and omissions and additions can be made without departing from its scope.

For example, the invention is not limited to the use of an auto-transformer. The ends of the secondary coil of any type of transformer can be connected respectively to the terminals 49 and 18, so that the secondary circuit will be closed through the metal contact heads C and P and the interior space of the lamp. In such case, the ends of the primary coil are connected respectively to the terminals 18 and 18a. In Fig. 5, the entire coil 31 is the secondary coil, and the section 31a is the primary coil.

The invention applies to any type of lamp, including discharge lamps in which the space current results from electronic flow, as distinguished from an ionization discharge, and also including non-discharge lamps.

In effect, the contact springs 18 and 18a constitute a switch device or switch means, whereby the primary circuit is automatically closed when the lamp is inserted into the holder 10, and said primary circuit is automatically opened when the lamp is removed from holder 10. This switch device is operated and controlled by head P. In this aspect of my invention, it is not limited to the preferred structure illustrated herein, in which all the internal parts of the holder 10 are fixed, save for the bending of springs 18 and 18a when the head P is inserted.

For convenience, the terminal or contact washer 49 may also be designated as a first terminal, and the terminals 18 and 18a may be designated as second terminals. The members 61—60 then constitute a first contact for the first terminal 49, and the ends 18e of the members 18 and 18a constitute second contacts. These contacts are located so that when the lamp is in operative position, the first contact 61—60 abuts one contact head of the lamp, and the second contacts 18e abut the other contact head of the lamp. The lamp may be of a type which has more than two contact heads. Hence, when I specify a lamp which has a pair of contact heads, the invention is not limited in this respect, as it includes a lamp which has more than two contact heads.

I claim:

1. For use in holding one end of a lamp which has respective external and parallel and longitudinally-alined and conductive contact heads, a casing made of insulating material and comprising a base, a hollow member which is telescopically slidable over said base, and an internal conductive spring which biases said hollow member away from said base, said hollow member having

at least one longitudinal inlet-opening, and a contact member which is fixed over said inlet opening in a position to contact with a respective inserted contact head of the lamp, said base having a conductive terminal, said spring touching the conductive terminal at one end and the contact member at the other end.

2. For use in holding one end of a lamp which has an envelope, respective external and parallel and longitudinally-alined and conductive contact heads, and respective hollow end members which house the inner ends of said contact heads, a casing made of insulating material and comprising a fixed, stationary base having a conductive terminal, and a hollow cup which houses the outer end of said base and is longitudinally slidable thereon, said hollow cup having a front wall, and a longitudinal axis which passes through an inlet opening in said front wall, said inlet opening being shaped to receive a respective inserted contact head of the lamp, said front wall being adapted to abut the respective hollow end of the lamp when one of the contact heads is inserted into said inlet opening, said hollow cup also having a contact which is fixed to said front wall and which is located to contact with said respective inserted contact head, the said casing having an internal conductive spring which biases said hollow cup away from the fixed end of said base, one end of the spring being connected to the terminal in the base, the other end of said spring touching the contact member in said hollow cup.

3. A casing according to claim 2, in which the side wall of the base adjacent the fixed end thereof contains a wire inlet opening, and the open end of the hollow cup contains a second wire inlet opening which is positioned to register with the wire inlet opening of the base when said hollow cup is pushed toward the fixed end of said base, the inner wall of said hollow cup having a longitudinally-extending, projecting key, the outer wall of said base having a longitudinally-extending groove which is shaped to receive said key, said key and groove being positioned to retain the said wire inlet openings in registering position.

4. For use in holding one end of a lamp which has respective external and parallel and longitudinally-alined and conductive contact heads, a casing made of insulating material and comprising a base, one end of which is fixed to a stationary support, a hollow member which is telescopically slidable over said base, and an internal conductive spring which biases said hollow member away from the fixed end of said base, said hollow member having at least one longitudinal inlet opening in the front wall thereof, and a contact member which is fixed over said inlet opening in position to contact with a respective inserted contact head of the lamp, said base having an internal conductive terminal, said spring touching the conductive terminal at one end and the contact member at the other end, the side wall of said base containing a wire inlet opening, the hollow member containing a second wire inlet opening which is positioned to register with the wire inlet opening of the base, the inner wall of the hollow member and the outer wall of the base bearing a respective longitudinally-extending and interfitting key and groove which are positioned to retain said wire inlet opening in position to register with each other.

5. A casing according to claim 4 in which the free end of the base has an outwardly projecting peripheral flange, and the inner wall of the hollow member contains a peripheral groove which houses a resilient ring member, said ring member projecting beyond the surface of said inner wall, said ring member being positioned to contact the peripheral flange of the base when the hollow member is biased away from the fixed end of the base, said peripheral flange and ring member cooperating as stop means to prevent said hollow member from being biased out of engagement with said base.

6. For use in holding one end of a lamp which has respective external and parallel and longitudinally-alined and conductive contact heads, a casing made of insulating material and comprising a base, a hollow member which is telescopically slidable over said base, and an internal conductive spring which biases said hollow member away from said base, said hollow member having at least one longitudinal inlet-opening, and a contact member which is fixed over said inlet opening in a position to contact with a respective inserted contact head of the lamp, said base having a conductive terminal, said spring touching the conductive terminal at one end and the contact member at the other end, said base having an externally projecting peripheral flange, said hollow member having an internal peripheral resilient ring, said ring being positioned to abut said flange when said hollow member is biased away from said base and to prevent said hollow member from leaving said base.

7. For use in holding one end of a lamp which has an envelope, respective external and parallel and longitudinally alined and conductive contact heads, and respective hollow end members which house the inner ends of said contact heads, a casing made of insulating material and comprising a fixed, stationary hollow base having a conductive terminal and a hollow cup which is axially alined with said base and telescopes with said base, the internal recess of said hollow cup communicating with the internal recess of said base, said hollow cup having a front wall, and at least one longitudinal inlet opening in said front wall, said inlet opening being shaped to receive a respective inserted contact head of the lamp, the outer surface of said front wall being positioned to abut the respective hollow end of the lamp when one of the contact heads is inserted into said inlet opening, said hollow cup also having a contact member which abuts the inner surface of said front wall adjacent said inlet opening and is located to contact with said respective inserted contact head, said casing having an internal conductive spring one end of which is seated in the internal recess of the base and the other end of which is seated in the internal recess of the hollow cup, said spring biasing the front wall of said hollow cup away from said base, one end of said spring making electrical contact with the terminal in said base, the other end of said spring making electrical contact with the contact member in said hollow cup.

8. For use in holding one end of a lamp which has an envelope, respective external and parallel and longitudinally alined and conductive contact heads, and respective hollow end members which house the inner ends of said contact heads, a casing made of insulating material and comprising a fixed, stationary base having a longitudinal recess in the front end thereof and a conductive terminal within said recess, and a hollow cup which is axially alined with said base and is

longitudinally and telescopically slidable relative to said base, the internal recess of said hollow cup communicating with the internal recess of said base, said hollow cup having a front wall and at least one longitudinal inlet opening in said front wall, said inlet opening being shaped to receive a respective inserted contact head of the lamp, said hollow cup also having a contact member which abuts the inner surface of said front wall adjacent said inlet opening and is positioned to contact with said respective inserted contact head, said casing having an internal conductive spring one end of which is seated in the internal recess of the base and the other end of which is seated in the internal recess of the hollow cup, said spring biasing the front wall of said hollow cup to an extended position in which said front wall is located forwardly of said base with the outer surface of said front wall

positioned to abut the respective hollow end of the lamp when one of the contact heads is inserted into said inlet opening, one end of said spring making electrical contact with the terminal of said base, the other end of said spring abutting the contact member of said hollow cup and pressing said contact member against the inner surface of said front wall.

EUGENE R. KULKA.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,401,555	De Reamer	June 4, 1946