March 22, 1949. W. M. JOHNSON 2,465,100

BASE AND HOLDER FOR ELECTRIC LAMPS

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Fig. 1

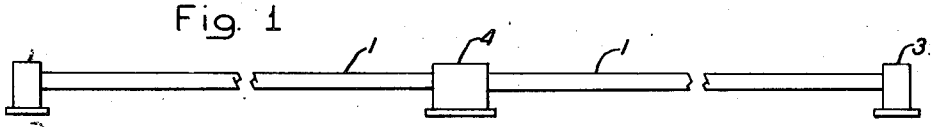


Fig. 2

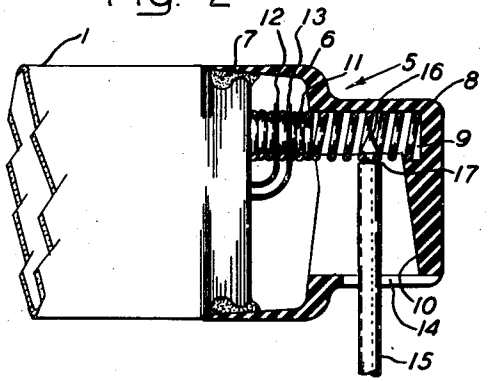


Fig. 3

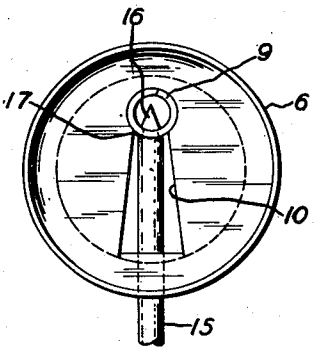
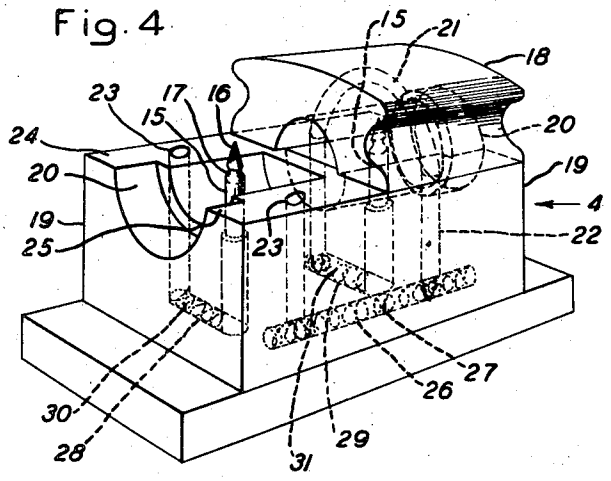


Fig. 4



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BASE AND HOLDER FOR ELECTRIC LAMPS

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13 Claims. (Cl. 176—32)

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My invention relates to bases and holders for electric lamps and is of particular interest in connection with double ended, elongated tubular lamps having a single terminal at each end, such as fluorescent lamps. It is especially useful in connection with tubular lamps requiring a relatively high open-circuit voltage, such as 500 volts and higher, though its usefulness is not limited to such lamps.

An object of the invention is to provide an electrical connector of particular utility for lamp bases and holders. Another object of the invention is to provide a base in which the lamp terminal is well insulated and guarded electrically for purposes of safety but is readily accessible to and easily engageable with a holder contact. Another object of the invention is to provide such a base and a holder therefor which permits relatively large tolerances in the length of the lamps and the spacing of the lamp holders. Further objects and advantages of the invention will appear from the following description of species thereof and from the drawing.

In the drawing Fig. 1 is a side elevation of a pair of lamps mounted in three spaced holders; Fig. 2 is a similar view on an enlarged scale of an end portion of a lamp showing the lamp base partly in section; Fig. 3 is a front end view of the lamp base; and Fig. 4 is a perspective view on a smaller scale of a double holder for accommodating two lamp bases and connecting the lamps in series.

Referring to Fig. 1 of the drawing the fluorescent lamps 1 are supported in a line by two single holders 2 and 3 and a double holder 4 for accommodating and making electrical connections with the lamp bases. The single holders 2 and 3 at the ends of the row of lamps may be provided with conductors for connection with terminals of a suitable electric power source and the double holder 4 connects the lamps 1 in series.

The lamps 1 have a base at each end thereof one of which is shown in detail in Figs. 2 and 3. As shown, the base 5 comprises a shell of electrically insulating material having a skirted portion 6 for attachment to the end of the tubular glass envelope of the lamp 1 by basing cement 7. The portion 8 of the base 5 has therein an elongated cavity of keyhole shape. The keyhole shaped cavity has a cylindrical part 9 extending parallel to and offset from the longitudinal axis of the base 5 and a slot shaped part 10 (Fig. 3) extending across the said axis and opening at the side of the base portion 8. A coiled

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metal spring 11 is disposed in the cylindrical part 9 of the cavity and extends into the space defined by the skirt 6 of the base and the end of the lamp 1. The spring 11 is of such length relative to the length of the base 5 that it bears against and is compressed between the end of the lamp envelope and the end wall of the cavity part 9 when the base 5 is mounted on the lamp envelope. The current inlead wires 12 and 13 for the electrode (not shown) at the end of the envelope are inserted between the turns of the coiled spring 11 so as to make a good mechanical and electrical connection therewith. Obviously, the inleads 12 and 13 may be soldered or welded to the spring 11 and the latter need not be compressed between the envelope and the base but may loosely fit between these members. The spring constitutes one terminal of the lamp the other terminal of which is constituted by a similar spring in a similar base mounted at the opposite end of the lamp envelope.

Access to the spring 11 for connecting the lamp electrode to a terminal of a suitable source of electric power for the lamp is afforded by the aforesaid slot shaped part 10 of the cavity 9. The sides of cavity part 10 diverge outwardly from cavity part 9 to provide an outer opening 14 of convenient size for the insertion of a holder contact into the base and to guide such contact into engagement with the spring 11. For safety purposes, the size of the outer opening 14 is preferably less than that which would permit the insertion therein of a person's finger. This, together with the remote location of the spring 11 with respect to the opening 14 at the side of the base, gives the lamp 1 a high safety factor which is of particular importance with lamps requiring a relatively high open circuit voltage, such as 500 volts and higher.

As shown in Fig. 2 the opening 14 in the side of the base and the opening between the cavity parts 9 and 10 extend an appreciable distance longitudinally of the base. This allows for variations in lamp length and in spacing of the lamp holders. Increasing the tolerances on lamp length reduces the number of lamps rejected for being too long or too short and so reduces the cost of manufacture of such lamps. Exact spacing of lamp holders in a fixture, or on a wall or ceiling is a difficult and time consuming task. Thus, a base which allows for variations in holder spacing facilitates mounting of the holders and reduces the cost of installing them.

The lamp holders 2, 3 and 4 for accommodating the lamp bases and supplying electrical energy

to the lamp 1 comprise an elongated contact pin 15 (Figs. 2, 3 and 4) of sufficient length for insertion through the opening 14 in the side of the base 5 and into engagement with the coiled spring 11. A suitable contact pin 15 is shown mounted on one suitable type of double holder 4 in Fig. 4. The pin 15 illustrated has a pointed, cone shaped end 16 for facilitating its passage between the turns of the spring 11 when the lamp 1 is placed in the holder 4 and an annular groove 17 adjoining the end 16. The base of the cone shaped end 16 and the grooved part 17 are larger in diameter than the distance between the turns of the compressed spring 11 so that the turns of the spring 11 are first spread apart as the end 16 of the pin 15 passes therebetween and then spring back into the annular groove 17 to grip the pin 15 after the base of the cone shaped end 16 has passed. The spring 11 exerts sufficient force to make a good electrical contact with pin 15 and to hold the lamp 1 against the force of gravity tending to separate the lamp from its holders when the latter are mounted on a ceiling, for example. The lamp is, however, easily removable from the holder 4 by a pull in a direction transverse to the lamp axis. The lamp 1 thus may be mounted on and removed from its holders by a push or a pull in a direction transverse to its longitudinal axis and without rotating the lamp about its axis.

The double holder 4 of Fig. 4 has two such pins 15 for engaging the bases on the lamps 1 extending therefrom and is so constructed and arranged that the circuit to each pin 15 is completed by a conducting element incorporated in an electrically insulating cover 18 which must be removed from the holder 4 before a lamp base can be inserted into or removed therefrom. As shown in Fig. 4 the holder 4 comprises a main body portion 19 of electrically insulating material and defining with the two covers 18 (only one of which is shown) a pair of sockets 20 for accommodating a base on each of two lamps. The two contact pins 15 are partially embedded in the body 19 of the holder and project into the socket spaces 20 a sufficient distance to engage the springs 11 in the bases 5 when the latter are placed in the sockets. The covers 18 also consist of electrically insulating material and have the curved portion 21 of a U-shaped electrically conducting member embedded therein. The parallel legs 22 of the U-shaped member project from the cover for insertion into passages 23 provided therefor in the side walls 24 and 25 of the base 4. The two passages 23 in the side walls 25 are connected by another passage 26 which accommodates coiled spring 27 similar to the spring 11 in the base 5 and the two passages 23 in the wall 24 are connected to the embedded ends of the contact pins 15 by two passages 28 and 29 which likewise accommodate springs 30 and 31 of the same type. The springs 30 and 31 are connected to the pins 15. The ends of the U-shaped conductors 21, 22 are the same in structure as the free ends of the contact pins 15 and engage the springs 27, 30 and 31 in the same way to hold the covers 18 and the lamp bases 5 on the holders 4.

When either or both of the covers 18 are removed for inserting or removing a lamp base 5 the series electrical connection between the contact pins 15 and including the two conductors 21, 22 and the three springs 27, 30 and 31, is broken; the break taking place deep within the holder 4 for safety purposes. The single holders

2 and 3 at the end of the row of lamps may be similar in structure to one and half of the double holder 4 shown in Fig. 4.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An electric lamp base comprising a shell containing a coiled spring contact for receiving and gripping between its turns a contact of a holder for the base.

2. An electric lamp base comprising a shell containing a helical spring contact for receiving and gripping between its turns a contact of a holder for the base.

3. An electric lamp base comprising a shell having an opening in its side for receiving a contact of a holder for the base and containing a helical spring contact disposed across the opening for engaging the holder contact.

4. An electric lamp base comprising a shell having an opening in its side for receiving a contact of a holder for the base, and contact means in said shell so disposed with respect to the said opening as to engage the holder contact.

5. An electric lamp base comprising an electrically insulating shell having an opening in its side for receiving a contact of a holder for the base and having also an elongated cavity parallel to its longitudinal axis and joining said opening, and a helical spring contact in said cavity for engaging the holder contact.

6. An electric lamp base comprising an electrically insulating shell having a cylindrical cavity parallel to and offset from its longitudinal axis and having also an opening extending from its side, across its said axis and into said cavity for receiving a contact of a holder for the lamp base and a helical spring contact in and extending along said cavity and across the inner end of said opening for receiving and gripping the holder contact between its turns.

7. An electric lamp base comprising an electrically insulating shell provided with a skirt for attachment to the lamp and a contact enclosing portion having a cylindrical cavity parallel to and offset from its longitudinal axis and having also an opening extending from its side, across its said axis and into said cavity for receiving a contact of a holder for the lamp base and a helical spring contact disposed in said cavity across the inner end of said opening for receiving and gripping the holder contact.

8. An electric lamp base comprising a shell of electrically insulating material having a skirt for attachment to a lamp envelope and having a keyhole shaped cavity opening at its side and extending parallel to its longitudinal axis for accommodating contact means for the lamp and for receiving a contact of a lamp base holder.

9. In combination, a lamp base holder having a contact pin extending transversely into its base receiving portion and a lamp base having a keyhole shaped cavity opening at its side for receiving the contact pin and extending longitudinally of the base for accommodating contact means for engaging the holder contact.

10. In combination, a lamp base holder having a pointed contact pin provided with an annular groove adjacent its pointed end and extending transversely into the base receiving portion of the holder and a lamp base having a cavity in which is mounted a helical spring contact for receiving and gripping the pointed and recessed end portion of the holder contact between its adjacent turns, said cavity having a transversely

extending portion opening at the side of the base for receiving the holder pin.

11. A lamp holder comprising an insulating housing providing a lamp socket having an electric contact, and a coiled spring conductor for the contact disposed in and supported by the walls of a cavity in the housing and exposed through a transverse opening in the housing wall for connection to a power source.

12. An electric lamp comprising a tubular envelope having a current leading-in wire extending from an end thereof and a base attached thereto and enclosing said wire, said base having a shell containing a coiled spring exposed through an opening in the side of the base and engaging said leading-in wire to constitute a terminal of the lamp.

13. A lamp holder comprising an insulating housing having a removable cover and providing a lamp socket having an electrical contact for

engaging a lamp terminal and separable electrical connector means in the housing for making and breaking a circuit including said contact, said connector means comprising a pin-like contact projecting from said cover into a wall of the housing and a coiled metal spring disposed in and supported by the walls of a cavity in the housing wall and being transverse to and gripping the pin-like contact between its turns.

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