

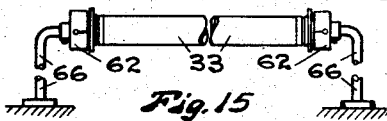
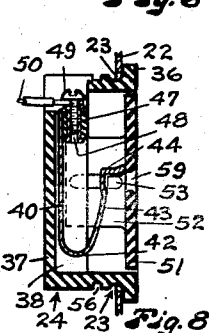
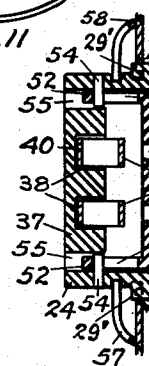
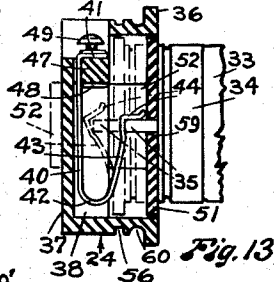
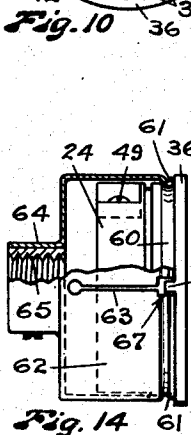
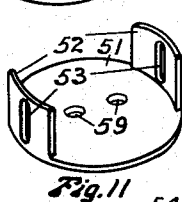
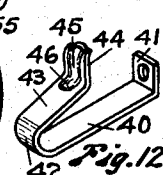
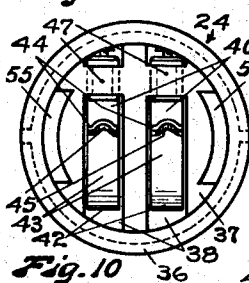
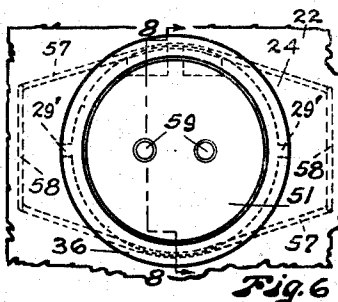
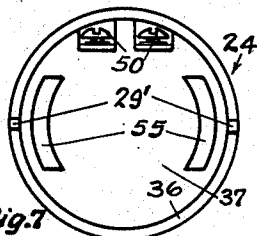
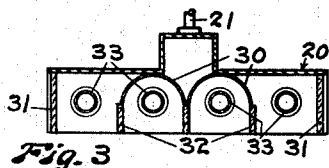
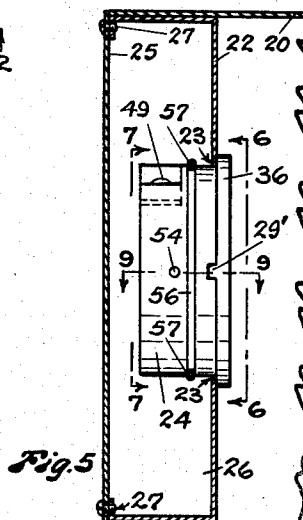
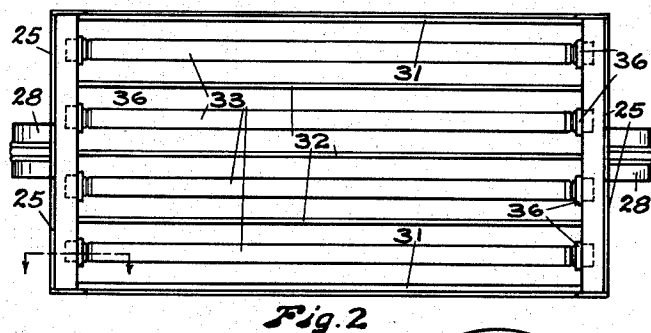
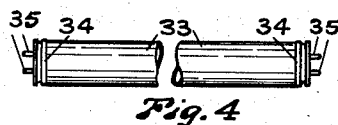
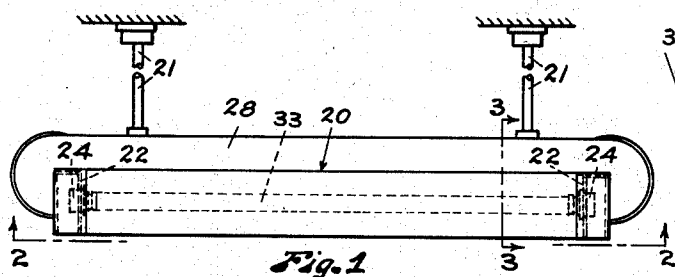
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O. H. SPARLING

2,285,175

LAMP SOCKET

Filed July 24, 1940



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UNITED STATES PATENT OFFICE

2,285,175

LAMP SOCKET

Oliver H. Sparling, Seattle, Wash., assignor of one-third to W. Paul Heath and one-third to Bertram T. Heinz, both of Seattle, Wash.

Application July 24, 1940, Serial No. 347,252

3 Claims. (Cl. 173-328)

My invention relates to lamp sockets and more particularly to a socket for electric lamps of the double-ended discharge type.

At the present time fluorescent tubes or discharge type lamps are being increasingly used as a source of illumination. In such discharge tubes filament-electrodes are positioned at the respective ends of the tube and electrical energy is dissipated between the electrodes by way of the gaseous medium within the tube. As the filament at each end of the tube is illuminated, there will be sufficient glow within the gaseous medium to facilitate the discharge through the gaseous medium and the said filaments therefore function as a starting device. By various means well known in the art, after discharge through the gaseous medium is started, the illumination of the filaments at the respective ends of the tube is automatically stopped.

The construction of discharge tubes as now commonly made, thus comprises filaments and electrodes positioned at the respective ends of the discharge tube and two contact prongs at the respective ends of the discharge tube, permitting the discharge of energy from one electrode at one end to a second electrode at the other end by way of the gaseous conductor. It is necessary that two contact prongs or pins be provided at each end of the discharge tube.

A number of sockets are available on the market for mounting such discharge lamps and which are provided with prong or pin receiving clips. However, such sockets have many shortcomings. One of the difficulties encountered in the art is the limitations of the types of fixtures which may be constructed employing present day sockets. Generally speaking, present day sockets are provided with a slot or slots and, to operatively connect a tube with a socket, the tube is moved transversely so that the two pins or prongs on each end of the discharge tube are inserted into a slot. In one type, now on the market, thereafter the tube is angularly moved approximately ninety degrees and the tube thus secured in position.

To provide sufficient room for the pins or prongs in the socket, very substantial depth is required of the socket, which depth in itself provides a serious shortcoming in the appearance of the completed fixture. Also as the pins or prongs of the tube are moved transversely into position, the socket must be adjacent an edge of the fixture so as to provide an unobstructed slot for reception of the pins or prongs of the tube. Still other problems which exist in the art by

reason of present day sockets, reside in the necessary open construction leaving exposed contact in the sockets and serving as a gathering place for dirt, dust, insects and the like. It is an object of the present invention to provide a socket which will overcome the various shortcomings in the art above mentioned, and to provide a socket which is completely enclosed and characterized by the absence of exposed contacts. It is a further object to provide a socket so that the contacts are protected against the various elements of dust, insects, etc., and which eliminates contact troubles resulting from air-borne materials or insects. Whenever the contacts are exposed to material which may be borne in the air as dust, grease, insects, salt and many others, corrosion of the pins and receiving clips will result providing non-conductor materials thereon and inoperative periods will result. These various difficulties are well known in the art and are generally termed contact troubles.

It is another object of the invention to provide a socket which will receive a tube by longitudinal movement thereof so that the socket may be of any desired shape. One desired shape of the socket is a circular shape as the framework of a fixtures may be readily punched to provide the same. It is another object of the invention to provide a socket which is so designed as to provide for a minimum depth, thus permitting streamlining of fixtures and the minimizing of non-illuminated portions. It is a further object of the invention to provide a socket construction whereby visible indication may be had that the tube lamp is locked securely in place. In present day sockets the only manner of determining whether the tube lamp has been properly positioned and is locked in place is by twisting or turning the tube lamp, and because of the absence of any visible means indicating whether a lamp has been properly secured in place many lamps have been dropped and broken and the losses by reason of this shortcoming is a substantial one.

It is another object of the invention to provide a socket which will insure positive and firm contact between the receiving clips in the socket and the pins or prongs of the tube lamp.

It is another object of the invention to provide a socket which will eliminate any necessity for twisting or turning the tube lamp. In present day sockets, in the event of displacement of members in the socket, damage to lamps and sockets has resulted because of twisting the pins against relatively fixed members. Also the pins

or prongs at the end of the lamp become somewhat loosened in the normal twisting required. It is an object of my invention to provide a socket where the pins are inserted longitudinally into the socket and all twisting of the lamp is eliminated.

Another type of socket commonly used on the market is provided with spring clips so that the lamp is inserted in a transverse direction. In case the spring clip are misaligned, pressure in this transverse direction will tend to loosen the pins or prongs of the lamp and further damage the socket.

The above mentioned general objects of my invention, together with others inherent in the same are attained by the mechanisms illustrated in the following drawing, the same being preferred exemplary forms of embodiment of my invention, throughout which drawing like reference numerals indicate like parts:

Figure 1 is a side elevation of a tube lamp fixture provided with sockets constructed in accordance with this invention, the outlines of a tube lamp and the sockets therefor being shown by dotted lines;

Fig. 2 is a bottom plan view of the apparatus shown in Figure 1;

Fig. 3 is a sectional view taken substantially on broken line 3—3 of Figure 1;

Fig. 4 is a detached elevation, with parts broken away, of a tube lamp used in connection with this invention;

Fig. 5 is a fragmentary sectional view, on a larger scale than Fig. 2, taken substantially on broken line 5—5 of Fig. 2, and showing one of my lamp sockets in side elevation;

Fig. 6 is an elevation, with parts broken away, and looking in the direction of broken line 6—6 of Fig. 5, parts being shown by dotted lines;

Fig. 7 is a detached rear elevation of my socket looking in the direction indicated by broken lines 7—7 of Fig. 5;

Fig. 8 is a sectional view taken substantially on broken line 8—8 of Fig. 6 and showing parts in elevation;

Fig. 9 is a sectional view taken substantially on broken line 9—9 of Fig. 5, parts being shown in elevation;

Fig. 10 is a plan view looking into the socket with the face plate thereof removed;

Fig. 11 is a detached perspective view of the face plate of my lamp socket;

Fig. 12 is a detached perspective view of a resilient contact clip member embodied in my lamp socket;

Fig. 13 is a fragmentary view, partly in section and partly in elevation, illustrating the operation of resilient electrical contact clip means used in my lamp socket, and showing by dotted and dash lines, positions that parts may assume when a lamp is being inserted in this lamp socket;

Fig. 14 is a view partly in elevation and partly in section showing mounting means for my socket that differs from the mounting means shown in the preceding figures; and

Fig. 15 is an elevation, with parts broken away, illustrating a tube lamp in the mounting means shown in Fig. 14 and a bracket means which may be used for supporting the same.

As illustrative of one mounting for my socket, Figs. 1, 2, 3, 5 and 6 show one type of lamp fixture means with which said socket may be used. These figures show a rectangular lamp housing comprising a flat top plate 20 hung from overhead supports 21. End plates 22 are secured to the

top plate 20 and extend downwardly therefrom, as best shown in Fig. 5, and circular openings 23 are provided in the end plates 22 for the reception of the cylindrical housing portions 24 of my socket. Preferably outer end plates 25 are positioned in outwardly spaced relation from the end plates 22 to provide chambers 26 for the socket member housings 24. The outer end plates 25 are preferably removably connected with the fixture housings by screws 27 to provide easy access to the chambers 26.

An auxiliary housing portion 28 of inverted trough shape is secured to the main fixture housing to provide an ornamental design and to provide a housing for the usual auxiliary or starting apparatus employed in tube lighting.

The circular socket receiving openings 23 in the end plates 22 are preferably provided with notches 29 at one or more points to receive lugs 29' on the socket housing 24 and compel the correct positioning of the socket housings 24. In the drawing, see Figs. 5, 6 and 9, I have shown notches 29 and lugs 29' provided at two diametrically opposite locations but the position and number of these lugs obviously may be varied.

Fig. 3 shows reflectors 30, light reflective side walls 31, and light reflective partitions 32 all extending longitudinally and cooperating with a plurality of longitudinally extending tube lamps 33 to reflect light in a desired direction. Obviously any desired reflectors, housing members and the like may be used in place of those shown in the drawing.

The lamp socket shown in Figs. 5 to 15 comprises the cup shaped cylindrical housing 24 that is adapted to fit into one of the cylindrical openings 23 in the end plates 22 and is provided adjacent one end with external flange means 36 adapted to rest against the end plate 22 and form a stop. Obviously the external shape of the housing 24 and flange 36 may be varied.

The housing 24 is provided with a bottom portion 37 that has two internal trough shaped parallel grooves 38 extending crosswise thereof on opposite sides of the center for the reception of two spring contact clip members each formed of flat resilient metal.

Each spring contact clip member comprises a flat base portion 40 having an upturned perforated portion 41 at one end and a reversely bent or U shaped portion 42 at the other end. The U shaped portion 42 is connected with an outer spring portion 43 that terminates in an outwardly bent contact member 44. The contact member 44 has a concave groove 45 extending longitudinally thereof and a depression 46 is preferably formed in the spring portion 43 at the base of the groove 45. The groove 45 and depression 46 are adapted to receive and make electrical contact with the side portion and end portion respectively of one of the pins or prongs 35 on the end of a tube lamp 33 as best shown in Fig. 13.

When the spring contact clip members are properly positioned and secured in the housing 24, the base portion of each contact member extends under an integral bridge portion 47 of the housing and the perforated lug 41 of the spring contact member is secured to the bridge portion 47 by a tubular rivet member 48, Figs. 8 and 13. The interior of each tubular rivet 48 is threaded for the reception of a screw 49 by which suitable circuit wires 50, Fig. 8, are connected with the spring contact clip members.

An end plate or disc 51 of a suitable size to fit

telescopically within the socket housing 24 is provided at two diametrically opposite locations with two marginally positioned perpendicular side flanges 52 that extend into the socket housing 24 and serve as guide means for the end plate 51.

The side flanges 52 have slots 53 therein for the reception of pins 54 that extend through the sides of the socket housing 24 and through the slots 53, as shown in Fig. 9. The pins 54 limit the outward movement of the end plate 51 to a position substantially flush with the front of the housing 24.

To arcuate holes 55 in the bottom portion 37 of the housing 24 provide clearance for movement of the side flanges 52 when the end plate 51 is pushed into said housing 24 into a position as shown by dot and dash lines in Fig. 13. This occurs when a tube lamp 33 is being inserted.

Two holes 59 are provided in the end plate 51 for the reception of the two pins 35 on the end portion of a tube lamp 33.

The socket housing 24 is externally provided with an annular groove 56 for the reception of a spring clip 57 (Fig. 6) that snaps into said groove 56 and has two end portions 58 that engage with the end plate 22 to hold the socket housing in assembled relation with the plate 22.

To facilitate connection of my socket members with various types of brackets adapted to be used independently of fixtures of the type shown in Figs. 1, 2, 3 and 5, I provide in the socket housing 24 adjacent the flange 36, a groove 60 (Fig. 13) within which an inwardly deformed end portion 61 of a cup shaped metal shell 62, Figs. 14 and 15, may engage. The shell 62 has a split 63 in the side thereof to provide for enough expansion so that the socket housing 24 may be inserted therein and removed therefrom. The shell 62 has a tubular boss 64 on the outer end thereof and preferably an internally threaded bushing 65 is fixedly secured within the boss 64 to receive externally threaded end portions of combined support and circuit wire conduit members 66. The members 66 may be attached to any fixed support, such as a ceiling or a wall or a desk, from which a tube lamp is to be supported.

The inner end portion of each cup shaped shell 62 has suitable notches 67 therein to fit over the lugs 29 of the socket housings 24. One of these notches 67 is shown in Fig. 14.

In the use of this device two of these sockets are supported in alignment with each other and spaced apart just far enough to allow a tube lamp of a predetermined standard length, measured from end to end exclusive of the pins or prongs 35, to be positioned therebetween. To engage the tube lamp 33 with the sockets the pins 35 on one end of the tube lamp are first inserted in the holes 59 in the resiliently supported end plate 51 of one socket and said end plate 51 is pushed inwardly to substantially the position shown by dot and dash lines in Fig. 13. This allows the pins 35 on the other end of the tube lamp 33 to just clear the face of the other socket and they are properly positioned to enter the holes 59 in the end plate 51 of said other socket. The pins 35 may be urged into the holes 59 in the end plate 51 of said other socket or the tube lamp may be released. When the tube lamp is thus released the reaction of the deflected spring clips in the socket 24 at the first inserted end of the tube lamp will move said tube lamp toward the other socket until the two ends of the tube lamp are substantially flush with the face portions of the respective sockets and the tube

lamp is in its normal operating position. In this position of the lamp both pins at both ends of the lamp will be in side and end contact with their respective contact slip springs substantially as shown by full lines in Fig. 13.

Obviously the end plate of one socket of each pair can be fixed and non-movable and the lamp can be inserted by pressing one end portion of a lamp tube into the socket having the movable end plate a distance at least equal to the length of the pins 35 at one end and then letting the lamp tube move back toward the socket with the non-movable end plate after the pins 35 on that end are properly aligned with the holes. It is thus seen that at least one of the sockets of each pair is to be provided with resilient means to allow an end portion of the lamp tube to be inserted therein in applying the tube to or removing it from the receptacles.

When the contact springs or clips are pressed inwardly in inserting a lamp 33, they will assume a position substantially as shown by dot and dash lines in Fig. 13 and will only engage with the end portions of the pins 35. When the tube lamp 33 moves to its correct operating position the contact springs or clips will move outwardly into the full line position shown in Fig. 13 and will make electrical contact with both the side portions and the end portions of the pins 35. Also when the contact springs are in full engagement with the pins 35, the tip portions of said contact springs will engage with the end plates 51 and prevent lost motion or play of said end plates.

As the pins 35 are moved into engagement with or are withdrawn from engagement with the contact springs, said pins 35 will have a wiping action on the portions 45 of the contact springs or clips and this will tend to keep the contacting parts clear of corrosion and insure good electrical contact.

The end plate 51 substantially closes the socket housing 24 in which the contact springs or clips are disposed and helps to exclude dust, moisture, insects and the like, thereby minimizing the danger of contact trouble due to corrosion and foreign material. The spring contact members always tend to maintain good electrical contact with the pins 35. This is of great advantage in a tube lamp of this type which operates on low amperage, as it helps to minimize contact troubles.

The socket member of my invention is of shallow depth and is compact and takes up little space, thus minimizing the restrictions imposed by said sockets in the design of lighting fixtures, especially as respects streamlining of the fixture and the housing portions.

The tube lamp is inserted in the socket by endwise movement rather than by sidewise or side-wise and twisting movement. This avoids danger of injury to the lamp and socket inherent from sidewise or twisting movement and also provides visible indication as to whether or not the lamp is properly inserted, thus avoiding the danger of leaving the lamp in such a condition that it will drop out of the fixture, a thing that frequently occurred with the prior art devices.

Obviously, changes may be made in the forms, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. In a lamp socket for tube lamps having projecting contact pins at each end, a tubular recep-

tacle having a substantially closed end portion; an end plate telescopically movable within said receptacle in spaced relation to said substantially closed end portion, said end plate having holes therein through which tube lamp contact pins may extend into said receptacle; slotted guide members rigid with said end plate and cooperating with said receptacle to guide said end plate, the closed end portion of said receptacle having slots within which said guide members operate; stop means operable in the slots of said guide members to limit the outward movement of said end plate; and contact springs within said receptacle yieldingly supporting said end plate and positioned for electric contact with contact pins that extend through said holes in said end plate.

2. In a lamp socket for tube lamps having projecting contact pins at each end, a tubular receptacle having a substantially closed end portion; an end plate telescopically movable within said tubular receptacle in spaced relation from said closed end portion, said movable end plate having two spaced apart holes therein to provide for the passage therethrough of two tube light contact pins; means limiting the outward movement of said movable end plate; and two substantially U shaped contact springs of flat resilient metal secured within the receptacle, each contact

spring having a contact portion extending toward said movable end plate and normally engaging and resiliently supporting said movable end plate and positioned to make both end contact and side contact with tube lamp contact pins that are inserted through the two holes in said movable end plate.

3. In a lamp socket for tube lamps having projecting contact pins at each end, a tubular receptacle having a substantially closed end portion; an end plate telescopically movable within said tubular receptacle in spaced relation from said closed end portion, said movable end plate having two spaced apart holes therein to provide for the passage therethrough of two tube light contact pins; stop means limiting the outward movement of said movable end plate; and two flat resilient contact springs secured within said receptacle resiliently supporting and urging said end plate normally against its said stop means and depressible with said plate means a minimum distance equal to the length of the tube light projecting contact pins, said contact springs being further mounted in alignment with the holes in the said end plate for electrical engagement with the projecting pins of a tube lamp.

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