Dec. 28, 1948. S. LEVENSON 2,457,780

SOCKET FOR GASEOUS DISCHARGE LAMPS

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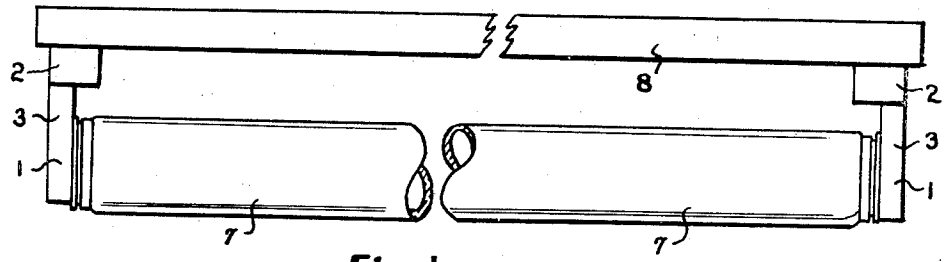


Fig. 1

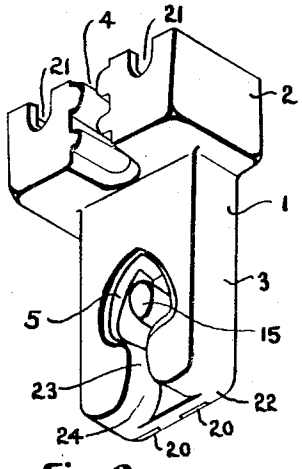


Fig. 2

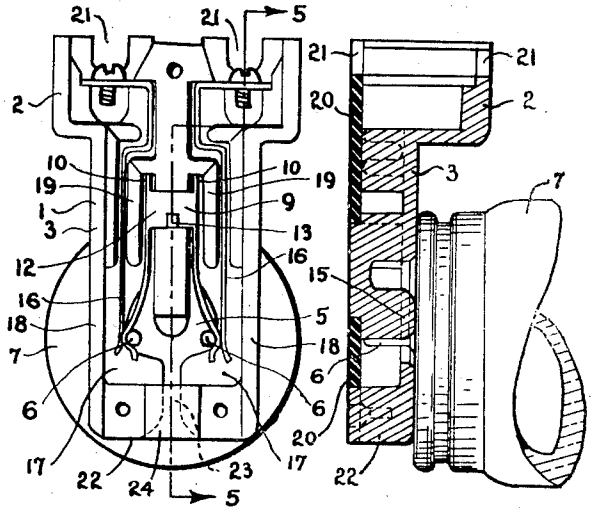


Fig. 3

Fig. 4

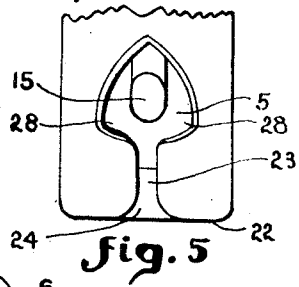


Fig. 5

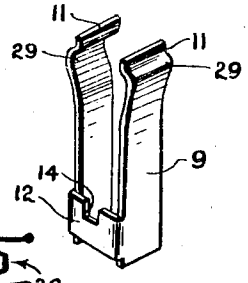


Fig. 6

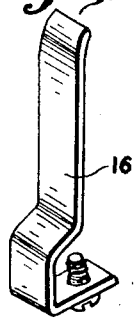


Fig. 7

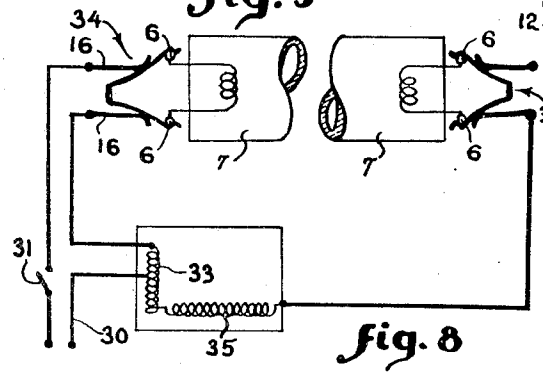


Fig. 8

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SOCKET FOR GASEOUS DISCHARGE LAMPS

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This invention relates to sockets for instant starting gaseous discharge lamps and particularly to such sockets embodying rigid holding and safety features.

The principles of the invention may be applied to sockets for holding gaseous discharge lamps to function in various types of operating circuits, and it is a general object of the invention to provide a highly efficient, adaptable and rugged socket having a firm and positive means for engaging, holding and energizing the lamp through its pin connectors.

It has been found highly desirable in many instances where gaseous discharge illumination is used, to provide means for employing a standard hot cathode type of lamp in a supply circuit designed for instantaneously starting the lamp.

It is a further object of the present invention therefore to provide a highly efficient socket for rigidly holding and electrically interconnecting the pins on the lamp.

A further object of the invention is to provide a socket in which all possible bodily contact with the live conductors is prevented.

A further object of the invention is to provide a socket in which the insertion of a lamp is simplified and rendered positive in action.

A further object of the invention is to provide a socket in which the recess for the pins is so shaped that the pins become locked in a sharply defined junction of the walls thereof and thus prevent loosening or detachment of the lamp from the socket.

Other objects and features will more fully appear from the following description taken in connection with the accompanying drawings.

A socket embodying the invention includes a frame or body member of insulating material within which suitable metallic conductors are received for supplying electric current to the lamp. A recess of special conformation is provided in the frame within which the contact pins on the end of the lamp are received. The recess is so formed that the lamp is smoothly guided into operating position in the socket and automatically becomes firmly anchored therein when its operating position is reached. The conductors which engage the pins project into the recess when no lamp is in the socket and are at this time insulated from the lamp energizing circuit. At least one other conductor is received in the frame and entirely enclosed thereby so that no bodily contact therewith is possible. A portion of this latter conductor extends into the path of at least one of the first named conductors as they are forced outward by insertion of a lamp in the socket. It is to the protected conductor that the energizing current is connected thereby preventing contact of the body with any live members in the sockets.

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To present a better understanding of the invention a particular embodiment thereof will be described and illustrated in the acompanying drawing in which:

Figure 1 is a side elevation of typical application of sockets embodying the invention;

Figure 2 is a perspective view of the socket;

Figure 3 is an elevation of the rear face of the socket with its back plate removed;

Figure 4 is a cross section on line 5—5, Figure 4;

Figure 5 is a detail view illustrating the conformation of the recess for receiving the lamp pins;

Figure 6 is a perspective view of the lamp pin engaging conductor; and

Figure 7 is a perspective view of one of the conductors which are connected to the electric supply circuit.

Figure 8 is a diagrammatic view illustrating circuit connections embodying the invention.

Desirably the frame or body portion 1 is moulded in one piece of durable insulating material and has an attaching base portion 2 and a column portion 3. The base portion is provided with a suitable slot 4 within which an attaching bolt may be received. The column portion has a recess 5 formed therein within which the pins 6 of a fluorescent lamp 7 are received. Two such sockets are required one for each end of the lamp. The sockets are mounted upon a suitable flat surface or fixture 8 and spaced apart the length of the lamp.

The socket herein described may readily be adapted for use in lighting systems wherein a gaseous discharge type of lamp designed for hot cathode operation is operated in a circuit having means for instantly starting the discharge. The socket embodying the invention is interchangeable with and may be substituted for a standard type of socket wherein preliminary heating of the cathode is employed to start the discharge. The socket illustrated is provided with elements necessary for instantly starting the lamp.

A conductor 9 is situated centrally within the socket frame 1 and is anchored at one end in chambers 10 formed therein. The conductor is provided with a pair of spaced spring contact members 11 which project into the recess 5 in position to be engaged by and sprung outward when a lamp is inserted in the socket. The conductor 9 is made of sheet metal, and desirably but not necessarily is of one piece construction. Its an-

chored end has an interconnecting bridge section 12 which both mechanically and electrically connects the members 11. To provide additional anchorage for the conductor a key 13 is moulded in the frame and interlocks with a notch 14 in the bridge piece 12 when the conductor is assembled in the socket. A pin guiding boss 15 is integrally moulded as part of the socket frame and projects into a central position in the recess 5. If the socket is to be used in a circuit in which the filament is preheated before discharge takes place then the member 9 may be constructed with its two members 11 insulated from each other.

Another one or more conductors 16 are situated in the socket frame 1. Either one or two of these conductors may be used depending upon the circuit connections employed. As shown herein two flexible conductors 16 are employed which are wholly enclosed within the walls of the frame. One end of the conductors are provided with terminals for connection to a source of electrical supply and are located in the base 2 of the frame. The other ends of the conductors 16 extend into the column 3 and are free to move within chambers 17 between the side walls 18 of the frame and the members 11 of the conductor 9. The mid portion of the members 16 are anchored between a thickened portion of the walls 18 and partitions 19 which insulate them from the member 9.

The rear face of the socket is entirely closed in the usual manner by an insulating plate 20. Thus the conductors 16 are rendered inaccessible to bodily contact. Slots 21 are formed in the base 2 and the plate 20 through which current carrying wires may pass.

It will be observed that when the socket is connected in its circuit and before a lamp is inserted that the member 9 makes no contact with the external circuit and is therefore completely neutral. The member 9 which is the only member with which bodily contact may be made is therefore unenergized unless and until a lamp is inserted in the socket at which time the pins 6 force the spring member 11 into engagement with the members 16 thus completing the circuit to the lamp. However, with a lamp in place no contact of the body with a live conductor is possible. A person working with, removing or inserting lamps in sockets embodying the invention is protected from injury from contact with live elements thereof.

A feature of the invention resides in the construction of the opening to the recess 5. The general contour of the end face 22 of the column 3 is straight and flat. A slot 23 extends from the recess 5 to the face 22 and desirably flares outwardly to present a wide mouth 24 which acts to guide the lamp pins through the slot into the recess.

The recess opening has a conformation bounded by 3 substantially equal outwardly convexed sides one side of which is disposed horizontally at the inner end of the slot 23; the slot intersecting it at substantially its central portion. The purpose of the specially designed opening is to provide a firm support for the lamp which when seated in operating position is prevented from becoming loosened or detached from the socket even under adverse conditions as for instance where the lamp is subjected to shocks and severe vibration.

The shape of the opening is such that when the lamp is in its socket at least one of the lamp pins 6 must be received in the sharply defined junction or corner between two of its sides. When one pin is so situated a slight turn of the lamp causes its other pin to become seated in an adjacent corner of the opening. No lateral play of the lamp is permitted at any time once the pins are within the opening because the opening is shaped to closely embrace the pins at all positions of the lamp. Desirably the curvature of the sides of the opening are obtained by swinging an arc from each corner having a radius substantially equal to the outside distance across the pins.

The design of the socket opening is highly effective in rigidly holding the lamp with the socket mounted in any position but is particularly effective when the socket is mounted in its usual position with its column portion extending downward. In this position the pins 6 lie in the two horizontally opposite corners 28 of the opening where the weight of the lamp tends to keep them firmly seated.

The contact members 11 on the conductor 9 are provided with notched portions 29 which are situated in line with the corners 28 when the lamp is seated in operating position and coact with the socket opening to rigidly retain the lamp in the socket.

To insert a lamp in the fixture the pins in its end caps are aligned with the slots 23 in the two sockets. The lamp is then moved into proper position as the pins pass through the slots aided by the flared outer end of the slots. The lamp is then rotated until the pins enter the corners 28 of the opening at which time the pins also will have moved the members 11 into engagement with the members 17 and they will also have entered the notches 29.

The distance from the plane of the flat face 22 to the pin recess 5 is slightly greater than the distance between the pins. It is not possible therefore to insert the lamp with one pin in the socket and one outside. This constitutes another safeguard against bodily contact with a live conductor.

A lamp received in sockets embodying the invention may be operated in the same manner as a cold cathode or hot cathode gaseous discharge lamp. The invention, however, is particularly adapted to the type of circuit illustrated in Figure 8, wherein a single lamp is shown operated by suitable power supply elements. Two or more lamps may be operated, however, by simple obvious changes in the circuit.

The lamp 7 and the other elements are shown diagrammatically. Energy to operate the lamp is derived from a power supply circuit 30 having a switch 31 for controlling the lamp. One side of the circuit is connected to one terminal of the primary of an auto transformer 33. The other side of the supply line is connected to one of the conductors 16 on the socket 34 while the other conductor 16 is connected to the other terminal of the transformer primary. A current limiting ballast 35 is connected in series with the secondary of the transformer and it in turn is connected to the other lamp socket 36 through one of its conductors 16.

The supply line voltage as increased by the transformer is sufficient to start the lamp discharge. When the switch 31 is closed, current is conducted to the transformer primary through the socket 34 which acts as a switch in the line. When a lamp is in operating position the circuit is closed and when the lamp is removed the circuit is broken.

With the lamp in proper position and the switch 31 closed full voltage of the transformer is impressed across the lamp filaments and thus

the lamp is started and will continue to function thereafter as a normal, hot cathode lamp.

A socket constructed in the manner herein described having two terminals for connection in the power supply circuit becomes a flexible unit which may be utilized at any position in the circuit requiring a socket. If it is used as a switch as described above both terminals are employed while if only one connection is required the other terminal is left disconnected. Also in replacing a socket or repairing it only one type of socket need be available and moreover in designing a fixture in which the socket is used a choice of positions for making connection thereto is available.

What I claim is:

1. A socket for supporting and conducting electrical energy to a fluorescent lamp having spaced contact pins comprising a unitary frame of insulating material presenting an attaching base portion and an upright column portion, a recess in said upright opening away from said base portion and closed at its bottom, a slot extending from the recess to the top end of said frame through which said pins are passed to enter the recess, the surface of the top end of the socket being spaced from the said recess a distance slightly greater than the space between said pins whereby the lamp cannot be inserted in the socket with one pin outside, a conductor member anchored in said frame having a pair of spring contact members extending into said recess in position to be engaged and sprung outward by said pins when a lamp is put into the socket, at least one additional conductor anchored at one end and at its other end extending into the path of said extensions on said first named conductor and means for connecting said second named conductor to a source of electric current.

2. A socket for gaseous discharge lamps having spaced contact pins comprising a unitary frame member of insulating material having a recess for the reception of the lamp pins, said recess being generally triangular and bounded by three curved sides the radius of curvature of which is equal to the distance from the axis of one pin to the outer periphery of the other, the axis of each curve being situated at the junction of adjacent sides, a conductor anchored at one end in the socket and having contact members projecting into said recess, at least one live conductor in a position in the socket inaccessible to bodily contact having means for connection to an electric supply line and an extension adjacent to at least one of said contact members whereby when a lamp is inserted in the socket said contacts are moved into engagement with said live contacts.

3. A socket for gaseous discharge lamps having spaced contact pins comprising a unitary frame member of insulating material having a recess for the reception of the pins, said recess being generally triangular with its side opposite its base substantially horizontal and bounded by curved sides the radius of curvature of which is equal to the distance from the axis of one pin to the outer periphery of the other, the axis of each curve being situated at the junction of its adjacent sides, a conductor anchored in the socket and having a pair of spring contact members extending into said recess, said contact members having notches for the reception of said pins so situated that when a lamp is in operating position the notches are in line with the two horizontally opposite corners of the recess opening, at least one live conductor anchored in the socket in a position inaccessible to bodily contact having means at one end for connection to an electric supply line and having its other end extending adjacent one of said contacts whereby when a lamp is inserted in the socket at least one of said contacts is moved into engagement with said live conductor.

4. A socket for a tubular gaseous discharge lamp having a pair of endwise extending contact pins, a socket comprising a body of insulating material, a triangular recess in said body to receive the lamp pins said recess having its sides outwardly curved from corner to corner, a slot for admitting the lamp pin and extending from the upper end of the body into the recess, said recess having one of its sides transversely disposed to said slot and communicating therewith at substantially the midpoint of each side and conductors extending into said recess to contact said pin.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,224,829	McCarthy	Dec. 10, 1940
2,241,065	Hawkins	May 6, 1941
2,284,367	Bryant et al.	May 26, 1942
2,296,115	Mueller et al.	Sept. 15, 1942
2,304,108	McCarthy	Dec. 8, 1942
2,313,036	Burt	Mar. 9, 1943