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SOCKET STRUCTURE FOR DOUBLE-ENDED FLUORESCENT LAMPS

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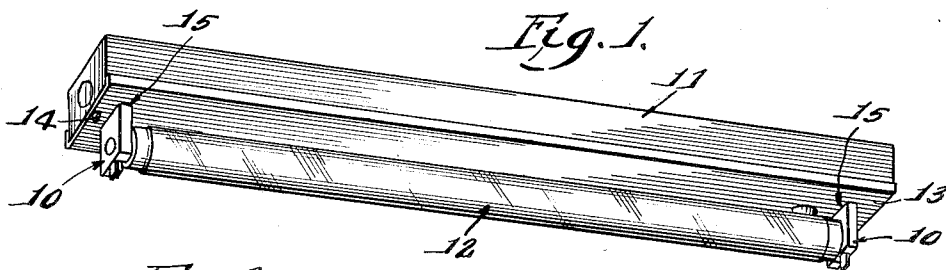


Fig. 2.

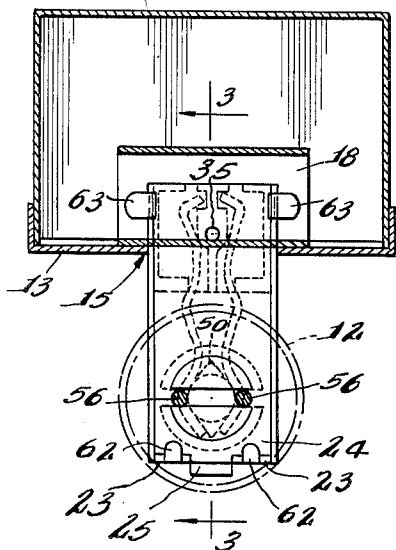


Fig. 3.

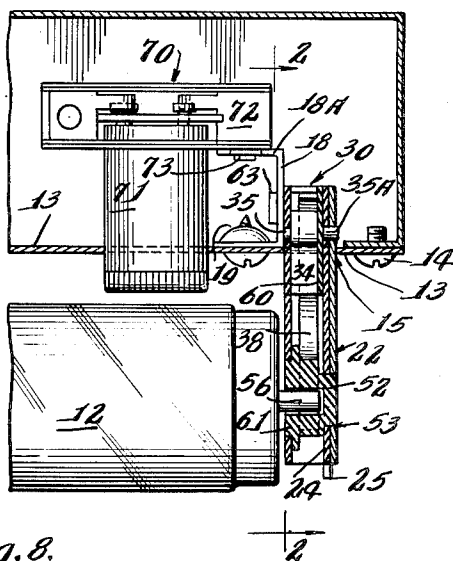


Fig. 4.

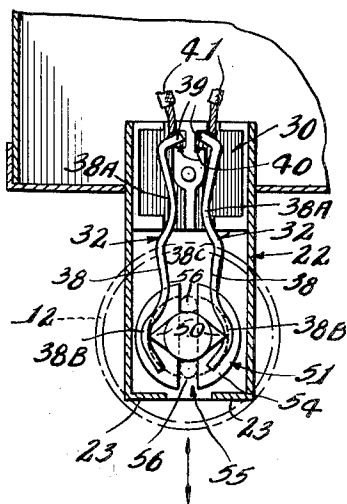


Fig. 8.

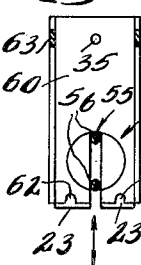


Fig. 5.

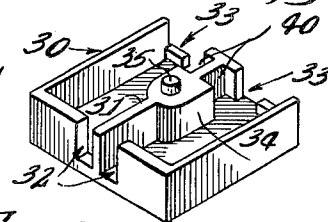


Fig. 6.

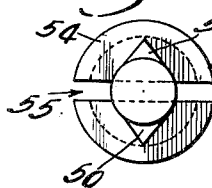
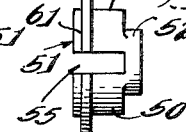


Fig. 7.



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UNITED STATES PATENT OFFICE

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SOCKET STRUCTURE FOR DOUBLE-ENDED FLUORESCENT LAMPS

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2 Claims. (Cl. 173—323)

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This invention has as its principal object the provision of an improved socket structure for electric lamps and the like, particularly the double-ended type of fluorescent lamps, although it will be apparent from the following specification that the socket structure is adaptable to other uses.

One of the particular objects of the invention is the provision of a socket structure which permits and facilitates the insertion and removal of tubular lamps of the double-ended variety in a single-handed operation by the act of inserting and turning the lamp, or turning and withdrawing the same, from the novel socket means.

A further and more particular object is the provision of a socket structure including a rotatable seating member receiving the contacts at the end of the lamp, and turning between socket contact fingers to releasably lock the lamp contacts in a condition of engagement with said contact fingers.

Another important object is the provision of a socket structure of the class described which, by reason of certain novelties in structural and functional details, affords a construction that is economically suited to large scale production, that is sufficiently rugged to withstand abuse in shipping, installation, and use, and one that contains relatively few and simply formed parts which are readily assembled or dis-assembled and easily connectible to lamp units in original or replacement installations.

Viewed from another aspect, it is an object to provide a socket including a rotary contact seat turning between spring contacts to lock lamp contacts with the latter when the rotary member is turned a certain amount, and to lock said rotary member in a contact-receiving position when turned an additional amount or reversely from the first-mentioned locking condition.

Still other objects relate to the provision of a socket of the class described which is especially suited for use with elongated, tubular lamps of the fluorescent variety; which permits easy single-handed insertion of said lamps or removal thereof, in fixtures, and without shifting of the longitudinal lamp axis, as is the case with many lock-turn types of socket; which requires no insertion pressure upon the lamp; which is so constructed as to be yieldable to distorting effects of heating due to lamp operation; which provides a novel attaching means for lamp ballast or starting element receptacles; which can be used with other so-called rotary or turning types of socket; which affords a closed-in construction of safe electrical properties.

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Additional objects and aspects of novelty relate to details of structure and function of the commercial embodiment of the invention illustrated and described hereinafter in view of an accompanying drawing in which:

Fig. 1 is a perspective view of a lamp fixture employing the novel socket structure;

Fig. 2 is a vertical section, to enlarged scale, through said fixture and socket structure, looking in the direction of lines 2—2 of Fig. 3;

Fig. 3 is another vertical section, to enlarged scale, through the fixture and socket structure, and taken in the direction of lines 3—3 of Fig. 2;

Fig. 4 is an elevational view of the interior of the socket structure after removal of the cover plate, showing the rotary element turned to open or lamp-receiving (or removal) condition;

Fig. 5 is a perspective detail of the contact seat or carrier; the scale of this view is enlarged;

Fig. 6 is an elevation view to magnified scale of the rotary element of the socket;

Fig. 7 is another elevation view of the rotary element looking at the side thereof;

Fig. 8 is a front elevational fragment, to reduced scale, of the face plate portion of the socket.

In the adaptation of the socket structure illustrated in Fig. 1, sockets 10 are mounted in pairs in pendant condition at opposite ends of a ceiling fixture 11, for example, with an elongated, tubular lamp member 12 supported by and between said sockets 10 in the manner and by the means more particularly described hereinafter.

As shown in Fig. 3, the fixture 11 includes a bottom plate 13 removably secured to the fixture proper by means such as screws 14 at opposite ends of said plate, and near said ends are slots 15 punched in said plate to receive a portion of one of the corresponding sockets 10 situated inwardly of the fixture, each said socket being provided with a U-shaped mounting bracket 18 having an extruded portion 19 into which is tapped a screw 20 securing the bracket, and hence the socket to the plate 13.

The socket proper, as viewed in Fig. 4, consists of a channel shaped metal shell 22 substantially open at its opposite ends excepting for a pair of lugs 23 struck up at the lower one of said ends and serving, among other things, as abutments for a fibre insulating wafer 24 (Figs. 2 and 3) having a short tongue portion 25 projecting outwardly of said shell between said lugs.

In Fig. 5 is shown, somewhat magnified, a molded contact seat or carrier 30 of rectangular form and including particularly a central rib 31 terminating at one end between contact slots 32,

and at the opposite end between contact lead passages 33, there being an intermediate boss 34 in said rib from the upper and lower (not seen) faces of which project locking pins 35.

As in Fig. 4, one of said contact seats 30 is situated at the upper open end of the channel shaped shell, the bottom pin 35A of the seat (Fig. 3) projecting through a hole in the underlying fibre wafer 24 and into a hole in the bottom of said shell; by means of said pin arrangement, the contact seat and wafer are in part secured in the shell.

A pair of elongated springy contact arms 38 is fitted lengthwise into the socket shell, each said contact having a hooked tail part 39 engaged in a notch portion 40 of the seat block, which is of insulating material suited to molding, for example Bakelite, said tail portions also being utilized as connection points for soldered connections with conductors 41, Fig. 4, leading out openings 33 in the seat.

Intermediate portions 38A of said contact arms are bent or offset for passage through slots 32 in the seating block, and the farther ends of said contact arms are crimped or bent to form confronting arcs or concavities 38B (Fig. 4) constituting locking formations, the important function of which will shortly appear.

By reason of the crimping of said contact arms, as at 38A and also at 38C, and the situation of said arms in formations 40 and 32, and on opposite sides of seat boss 34, said arms are spring biased toward each other, so that the arcuate locking formations 38B therein tend to spring toward each other, or to converge upon diametrically opposite projections 53 (see also Figs. 6 and 7) in a rotary locking and contact element 51 therebetween.

The rotary element 51 as seen in Fig. 7, has a reduced round or stud portion 52 at one end, which fits into a hole in the bottom of the socket shell, as at 53, Fig. 3, so that said rotary element may rotate between the contact arms, said element having (Figs. 7 and 4) a circular flange 54 which overlies the end portions of said contact arms to assist in maintaining the latter and the element in operative relation and alignment.

Rotated 90° from said diametric projections 53 in the rotary element, is a diametric contact seating slot 55, Figs. 4, 6, and 7, into which spaced contact pins 56, Figs. 2, 3 and 4, are received when a lamp is to be inserted, as in the condition represented in Fig. 4, wherein, and at which time, it will be noted that the diametric projections 53 on the rotary member are respectively engaged in corresponding arcuate or concave portions 38B of the contact arms, in which condition, the diametric contact slot 55 is in a relatively up-and-down disposition in readiness to receive (or remove) the pair of contact pins 56 of the lamp; when said lamp is positioned as aforesaid for insertion, a twist or turn of the lamp will cause the rotary element or elements (where a pair of these sockets is used) to turn the projections 53 out of the arcuate locking formations in the contact arms and rotate the contact pins 56 into said arcuate formations, where the pins will be firmly engaged by spring pressure with said pins, which are locked releasably in position by the convergent spring action of said contact arms.

The socket structure is completed by application of a cover plate of insulating material, indicated at 60, Fig. 3, there being a circular opening punched therein to interfit with a second

round or shallow stud portion 61 molded on the rotary element 51, so that the latter is firmly but freely seated for rotation with stud portions at opposite ends thereof seating in a hole in the bottom of the metal shell, on the one hand, and in a hole in the cover wafer or plate, on the other hand, said cover wafer 60 also having a small hole punched therein to receive the upper pin portion 35 (Fig. 3) on the contact seating block for mutual position of the latter and said cover plate in the shell.

The socket cover plate 60 is maintained in assembled position by means of ears 62, part of shell lugs 23, Fig. 2, struck over onto the outside of said plate, the latter being held down at the opposite end of the shell by the mounting bracket channel 18 (Figs. 2 and 3), which is secured to the shell by a pair of ears 63 passing through punchings in said cover plate and through slots in said bracket and struck over onto the latter.

In the face view of the socket shown to reduced scale in Fig. 8, it is important to observe that when a lamp is inserted, the lowermost one of the pair of lamp base contact pins 56 rests against the periphery of the hole in plate 60 into which fits the shallow stud portion 61 of the rotary element, and by this means the contact pins are properly located for turning motion into locked engagement with the spring contact arms, and the operator knows that the lamp may be turned home when the pins are stopped as aforesaid upon insertion into the diametric slot portion 55 of the rotary element.

A further feature of the combination face-plate retaining and mounting channel bracket 18, Fig. 3, is the disposition of one side portion 18A of the channel as a mounting surface for a socket 70 containing starter element 71. Socket 70 is of novel construction and subject matter of another patent application No. 716,631, issued as Patent No. 2,571,881 on October 16, 1951; however, from a spacer element 72 thereof, project a pair of ears, one of which, indicated at 73, Fig. 3, (like its companion ear, not seen) projects through and is bent over upon, the mounting surface portion 18A of the socket mounting bracket; thus, said bracket, 18, affords a simple means for attaching the socket to the lighting fixture; it also assists in securing the insulated cover plate 60 in position on the lamp socket; and finally, this bracket also affords a mounting means for the usual starter unit 71 associated with the type of lamp illustrated.

It will now appear in view of the foregoing detailed description that it is merely necessary to insert the contact pins 56 of the tubular lamp into the vertically disposed diametric slot 55 of Fig. 4 or 8, and when these pins have seated to the limit or inserting movement hereinabove described, that it is merely necessary to give the lamp a quarter-turn to lock said contact pins home in the arcuate or concave locking formations 38B of the contact arms; and it will further appear that when the rotary element is turned into the positions of Fig. 4 or 8, said element is in effect locked in position with the diametric contact slot in position to receive (or permit egress) of the lamp contacts. Thus no pressure is to be exerted upon the lamp in inserting or removing the contact pins thereof in said rotary element, good electrical contact being effected merely by rotating the lamp, once it is in the inserted condition aforesaid.

It will also appear that by reason of the mounting of the socket as at 19, Fig. 3, near one of its

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longitudinal ends, and by the channel bracket means 18, that the opposite end region, outside of the lamp fixture, may yield appreciably without damage to the socket or the lamp therein, this feature being regarded as important, since considerable heat may be generated in these fixtures, particularly in confined spaces, and other types of socket, not yieldable in the respect mentioned, are known to crack and break.

The construction of the socket will also appear to be rugged, electrically and mechanically; the metallic shell is a strong protective means; the contacts, while floating, are nevertheless securely located and afford good electrical connection. In prior types of socket, a common objection is found in that the long axis of the lamp usually shifts during some stage of manipulation, so that for security, two hands are generally needed in manipulating the lamp, involving in the case of an attendant servicing a hanging or pendant ceiling fixture, some risk in working from a ladder, for example, it being, however, one of the notable advantages of the novel socket of this invention that servicing of lamps with one hand is not only possible but wholly practicable.

While the invention, as exemplified by the illustrative embodiment selected for disclosure herein, has been described in great detail for the purpose of bringing out structural and functional features and advantages of the new socket structure, the scope of the invention is not thereby intended to be limited excepting as may be required by the appended claims fairly construed in the light of the prior art and the features of novelty and utility originating with this disclosure.

I claim:

1. A combination starter unit and lamp socket mounting structure for fluorescent lighting fixtures comprising; a U-shaped channel bracket having a flat bight flanked by opposite sidewalls upset at right angles from said bight, said bight and a first one of said sidewalls each having a lug-opening therein; a socket for a starter unit attached to a first one of said sidewalls by means of a lug thereon engaged in the lug-opening of said sidewall, said starter socket having a socket receptacle facing across the channel of said bracket and adapted to receive a starter unit and mount the same in a position extending across said channel; and a lamp socket fitted against and attached to said bight by means of a lug on the socket engaged in the lug-opening in said bight, and said lamp socket having a socket receptacle facing at right angles to the receptacle of said starter socket; together with a mounting

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plate having a first opening therethrough for said starter unit and a second and adjacent opening for said lamp socket, said bracket being mounted on said plate adjacent said openings by means of the second and remaining sidewall fitted against, and attached to, one side of said plate with said lamp socket projected though a first one of said openings beyond the opposite side of said plate, and said starter unit socket registered with the second one of said openings in the plate for reception of a starter unit therethrough.

2. In fluorescent lighting fixtures having a base plate with adjacent openings for passage therethrough of a lamp socket and a starter unit, the combination with said base plate of mounting means for a starter unit socket and a lamp socket, said means comprising; a bracket having a flat bight adjoined by a pair of opposite flat sidewalls upset therefrom, said bracket being attached to said plate adjacent said openings with one of said sidewalls fitted against said plate and secured thereto; a lamp socket attached to said bight by means of ears on the socket engaged in the bight, said socket extending at right angles to said plate and through a first one of said openings therein; a starter unit socket attached to the remaining one of said bracket sidewalls by means of ears on the socket engaged therein; said socket overlying said plate and a second one of said openings therein and having a receptacle for a starter unit which is registered with said second opening to receive a starter unit there-through.

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