

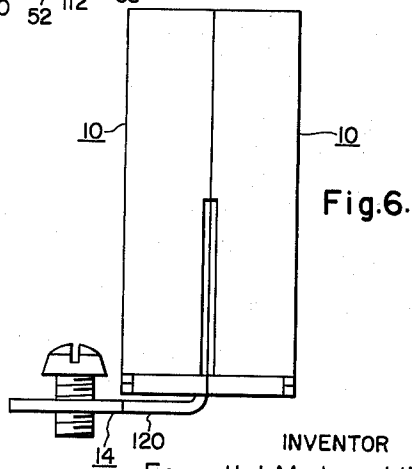
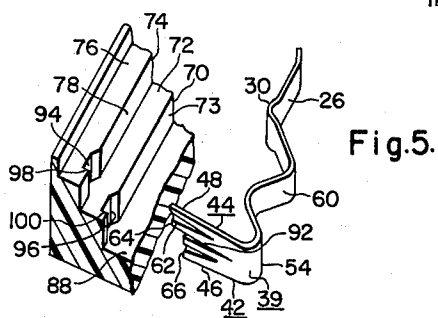
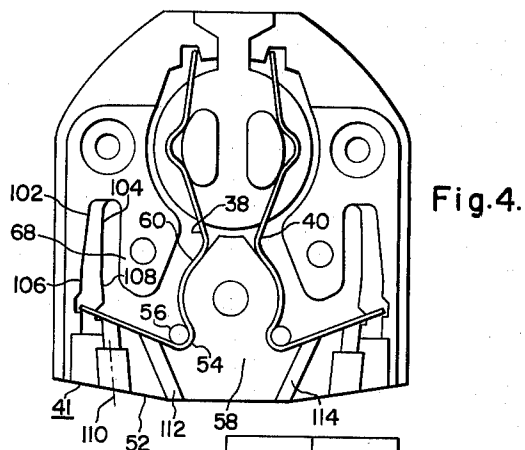
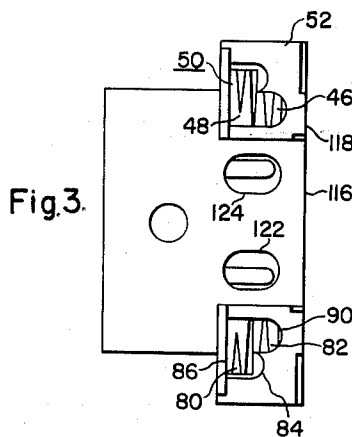
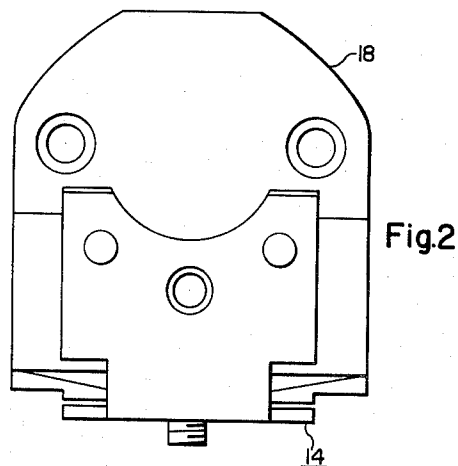
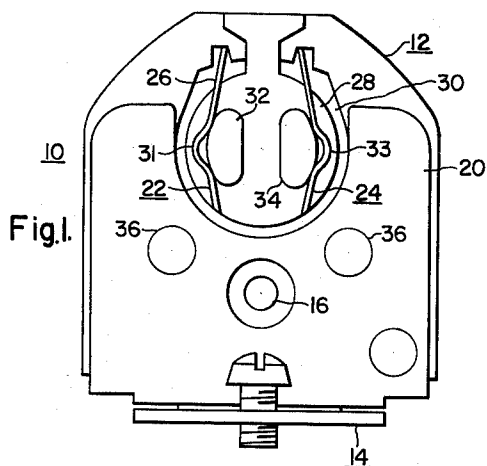
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3,206,710

WIRING DEVICE AND WIRE ENGAGEMENT ARRANGEMENT

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WITNESSES

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WIRING DEVICE AND WIRE ENGAGEMENT ARRANGEMENT

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The present invention relates to wiring devices and lampholders, and more particularly to wire engagement arrangements for use therein.

In wiring devices or lampholders where "quick" wire attachment is provided by means of an arrangement having resilient wire engagement spring means, it is generally desirable that the wire engagement arrangement be economically organized to provide those functional features which are identified with user efficiency. In the particular case where two or more spring means or resilient arms are provided on a single spring or terminal member for engaging respective wires inserted side-by-side, it is desirable that the overall structure assure wire separation so as to avoid the unreliability associated with physical interference between adjacent wires at the point of attachment. Further, it is desirable that increasing wire insertion result in increasing wire engagement force irrespective of whether the spring means or arms set to some degree upon wire insertion. The latter provision thus increases user efficiency through reliability of wire attachment and it simultaneously offers economy for the manufacturer through some measure of relaxation in the required quality of the resiliency property of the spring means or arms. Finally, any improved structural portions of the wire engagement arrangement should be integrable in a device in a manner compatible with efficiency of device operation.

With these goals in the foreground, there is provided in accordance with the principles of the invention a wiring device or lampholder comprising an insulative housing within which there is disposed at least one terminal means and at least two generally parallel resilient wire engagement arms preferably integral with the terminal means. Separate wire insertion channels extending through the housing are defined cooperatively by structural portions of the housing and by end portions of the terminal arms. These channels are arranged to assure increasing wire holding force with increasing wire insertion even if some degree of set occurs in either or both of the wire engagement arms. The device is otherwise structured compatibly with the wire attachment structure.

Accordingly, it is an object of the invention to provide a novel wiring device having a housing and at least two generally parallel resilient wire engagement arms wherein wires are inserted side-by-side through the housing and engaged and maintained in separated relation.

Another object of the invention is to provide a novel wiring device having a housing and at least one wire engagement arm and a wire insertion channel associated therewith increasing wire insertion is accompanied by increasing wire holding force even if some degree of set occurs in the wire engagement arm.

These and other objects of the invention will become more apparent upon consideration of the following detailed description along with the attached drawing, in which:

FIGURE 1 is a top plan view of a lampholder constructed in accordance with the principles of the invention;

FIG. 2 is a bottom plan view of the lampholder shown in FIG. 1;

FIG. 3 is an end view of the lampholder shown in FIG. 1;

FIG. 4 is a top plan view of the lampholder with its cover removed;

FIG. 5 shows a perspective view of wire attachment portions of the lampholder of FIG. 1; and

FIG. 6 shows a side view of a combination of FIG. 1 lampholders in mounting relation.

More specifically, there is shown in FIG. 1 a wiring device or fluorescent lampholder 10 comprising an insulative housing 12 and mounting member or bracket 14 secured to the housing 12 by suitable means such as rivet 16. The housing 12 is in this instance provided with an insulative base member 18 and cover member 20 disposed thereon and generally is provided with a geometry within industry dimensional standards. A pair of the lampholders 10 are used to support a fluorescent lamp (not shown) in a standard or other fluorescent lighting fixture.

To energize the lamp, there are provided a pair of terminal and contact means 22 and 24 having respective end contact portions 26 and 28 thereof disposed in the base member 18 and exposed in the frontal direction through an opening 30 in the housing 12 for engagement with the standard lamp contact pins. Contact is established when the lamp end is inserted through the housing opening 30 such that the lamp pins slide along the outer side of housing bosses 32 and 34 into respective engagements with the lampholder contact portions 26 and 28 adjacent indents 31 and 33 thereof.

The cover 20 is disposed on the front side of the base member 18 is secured thereto by suitable means such as a pair of drive pins 36. Generally, the cover 20 is disposed over a portion of the base member 18 which houses respective terminal portions 38 and 40 of the terminal and contact means 22 and 24.

A wire engagement arrangement 41 includes two or more generally parallel wire engagement spring arms or tongues 42 and 44, in this instance extending from a spring means end portion 39 of and integral with each terminal portion 38 or 40. End portions 46 and 48 of the wire engagement arms 42 and 44 are aligned with opening means or a single opening 50 in end face 52 of the housing 12 so as to provide passage means for insertion of wires to be engaged respectively by the wire engagement arms 42 and 44.

An inserted wire tends to deflect wire engagement arm 42 or 44 about pivot portion 54 which is seated or fixed in the housing base member 18 between insulative post 56 and housing portion 58. To assure isolation of bending forces produced in the wire engagement arms 42 or 44 and to prevent such forces from being transmitted to contact portion 26 or 28, intermediate portion 60 of the terminal portion 38 or 40 is also seated against housing portion 58 and is thus also substantially fixed in place. The opposite relationship is also true, that is bending forces produced in the contact portion 26 or 28 of the terminal and contact means 22 or 24 when a lamp is inserted in the device 10 are substantially isolated from transmittal to the wire engagement arms 42 and 44 of the terminal portion 38 or 40.

Each of the wire engagement arms 42 or 44 is provided with an elongated rib 62 extending along the length thereof to an end edge 64 or 66. A depression is thus produced on the side of the wire engagement arm 42 or 44 facing through housing end face 52. This depression serves as a guide during wire insertion so as to assure positive capture of the inserted wire by the associated wire engagement arm 42 or 44. The rib 62 itself provides added strength and rigidity for the wire engagement arm 42 or 44. Deflection of the arm 42 or 44 is characterized with resiliency since the terminal and contact means 22 or 24 is formed from a resilient conductive material such as brass, and

deflection of each arm 42 or 44 is limited by housing portion 68 so as to prevent excessive arm bending.

It has been common in "quick" wiring devices to employ a pair of wire engagement arms of equal length and some difficulty has thus been encountered in maintaining a pair of inserted wires in separate engagement with the respective arms. In many cases, satisfactory separate connections are established, but nonetheless in a substantial number of cases the insertion of a second wire after insertion of the first wire results in physical interference with the connection previously established for the first wire. In some cases, it has been possible even for the first connection to be interrupted without the installer's knowledge. Some provision thus has been needed for assuring separation of the wires while good contact engagement is established for each of the wires.

This result is achieved by the structural organization of the wire engagement arrangement 41. Thus, one of the wire engagement arms, namely the arm 44, is provided with a greater length than is the other, specifically the arm 42. Cooperatively with this feature, the housing base member 18 is provided with an elongated ledge portion 70 which has a wire bracing surface 73 in a front to rear reference plane and an elongated wire resting surface 72 in a reference plane generally perpendicular to the front to rear direction. Another elongated ledge portion 74 is provided, in this instance, with a cover support surface 76 generally parallel with the wire resting surface 72 and, in addition, a wire bracing surface 78 generally parallel with the bracing surface 73.

With this structure, the wire engagement arrangement 41 is thus provided with separate wire insertion channels 80 and 82 (FIG. 3), and once a wire is inserted into either of the channels 80 or 82, there is extremely little probability that it can be misdirected into the other wire insertion channel 82 or 80. Thus, the wire insertion channel 80 is defined by wire resting surface 72 (which is preferably somewhat concave in the rearward direction as indicated by the reference character 84 in FIG. 3), wire bracing surface 78, portion 86 of the inner surface of the cover member 20 and finally by end edge 64 of the wire engagement arm 44. Similarly, the wire insertion channel 82 is defined by wire resting surface 88 on the base member 18 (which is also somewhat concave as indicated by the reference character 90), wire bracing surface 73, to some extent rearward side edge 92 of the wire engagement arm 44 and finally end edge 66 of the wire engagement arm 42.

In each case as a wire is inserted in the channel 80 or 82, deflection of the wire engagement arm 44 or 42 results in a widening of the channel 80 or 82 as the arm end edge 64 or 66 is deflected outwardly from the associated wire bracing surface 78 or 73. When the wire is fully inserted, the arm end edge 64 or 66 reacts against the wire with resilient force to bite into it to some extent and to brace it against the wire bracing surface 78 or 73.

Preferably, respective notches 94 and 96 are provided in the wire bracing surfaces 78 and 73 so as to provide added assurance of positive wire engagement and retention. Thus, upon wire insertion, an adjacent portion of the inserted wire tends to bend somewhat into the notch 94 or 96. In addition to friction forces between the wire and the wire bracing surface 78 or 73, there accordingly result positive bearing forces by inwardly facing surface 98 or 100 against the adjacent wire portion to aid in the wire engagement.

In order to assure good wire engagement with successive operations of the wire engagement arms 42 and 44, the channels 80 and 82 or the wire bracing surfaces 78 and 73 are generally inwardly curved or angled, with a surface portion 102 or 104 disposed inwardly of arm edges 64 and 66 and extending inwardly at an angle to the extending direction of outmost surface portion 106 or 108. Thus, if some degree of set occurs in the arm 42 or 44 during the given operation thereof, such that it fails to return completely to its original position after release from its deflected position, reliable engagement

is nonetheless assured since in a subsequent wire insertion, increasing extent of wire insertion results in the leading portion of the inserted wire being directed toward the wire engagement arm 44 or 42 by wire bracing surface 102 or 104. Upon contact of the leading portion of the wire with wire engagement arm edge 64 or 66, deflection of the wire engagement arm 44 or 42 occurs in a manner similar to the case where the arm 44 or 42 is normally positioned in an unset state with the wires removed.

It is noted, of course, that even in the case where the wire engagement arms 44 and 42 are normally positioned at the beginning of wire insertion, the wire bracing portion 102 or 104 serves to produce increased wire engagement or attachment force as the leading wire portion is inserted thereover. However, satisfactory wire engagement can be produced, particularly when the arm 44 or 42 is unset prior to wire insertion, without the wire directing action of the inwardly curved or angled wire bracing surface 102 or 104.

Preferably, the wire insertion channel 82 is somewhat outwardly directed as indicated by the reference character 110 along portion 108 thereof so as to facilitate wire insertion and engagement with the shorter wire engagement arm 42. In this instance, the wire bracing surface portion 104, being angled with the portion 108, is thus directed less inwardly than is the wire bracing surface portion 102 in the wire insertion channel 80.

To provide for wire release, channels 112 and 114 extend through the housing base member 18 from end face 50 thereof for insertion of a tool such as a screwdriver into contact with the arms 42 and 44 when it is desired to release engaged wires. The mounting member bracket 14 is provided with a plate portion 116 along rearside 118 of the base member 18 and a forwardly extending plate portion 120 across end face 52 of the housing 12. To provide compatibility between the mounting bracket 14 and the release feature of the wire engagement arrangement 41, respective openings 122 and 124 are provided in the mounting bracket portion 120 in alignment with the housing channels 112 and 114. In FIG. 6 there are shown a pair of devices 10 which can be mounted while secured in back-to-back relation by suitable means, such as a fastener similar to the fastener 16, and a single mounting bracket 14 on one of the devices 10 can then serve to mount the combined pair. This mounting arrangement is useful in fixtures where it is desired to dispose fluorescent lamps physically in series. Other arrangements, of course, can be provided for mounting the device 10 either with or without a mounting bracket such as the mounting bracket 14.

The foregoing description has been presented only to illustrate the principles of the invention. Accordingly, it is desired that the invention be not limited by the embodiment or embodiments described, but, rather, that it be accorded an interpretation consistent with the scope and spirit of its broad principles.

What is claimed is:

1. A wiring device comprising an insulative housing having at least one spring means supported therein, said spring means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said spring means, respective end portions of said arms disposed in alignment with opening means in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening means, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing side surface which forms one side of the other of said channels, and one of said arms having a greater length than the other arm and extending over said other channel and said ledge top surface to define cooperatively said one channel and to brace an inserted wire toward another inwardly

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facing housing bracing surface, said other arm extending toward said ledge bracing surface to define cooperatively said other channel and to brace an inserted wire theretoward.

2. A wiring device comprising an insulative housing having at least one terminal means disposed therein, said terminal means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said terminal means, respective end portions of said arms disposed in alignment with opening means in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening means, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing side surface which forms one side of the other of said channels, and one of said arms having a greater length than the other arm and extending over said other channel and said ledge top surface to define cooperatively said one channel and to brace an inserted wire against another inwardly facing housing bracing surface, said other arm extending toward said ledge bracing surface to define cooperatively said other channel and to brace an inserted wire thereagainst, another housing wire resting surface disposed in spaced relation from said one arm with said other arm extending thereover and defining the bottom of said other channel, each of said wire resting surfaces having an outwardly concave cross section to provide a wire seat in each channel.

3. A wiring device comprising an insulative housing having at least one terminal means disposed therein, said terminal means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said terminal means, respective end portions of said arms disposed in alignment with opening means in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening means, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing side surface which forms one side of the other of said channels, and one of said arms having a greater length than the other arm and extending over said other channel and said ledge top surface to define cooperatively said one channel and to brace an inserted wire against another inwardly facing housing bracing surface, said other arm extending toward said ledge bracing surface to define cooperatively said other channel and to brace an inserted wire thereagainst, at least a portion of each of said wire bracing surfaces which is disposed inwardly from said one housing side and from a wire biting edge of the associated terminal arm extending along the associated channel and inwardly from said inward direction with which the associated channel begins.

4. A lampholder comprising an insulative housing having base and cover members secured together and generally arranged to support and energize a lamp, at least one terminal means disposed in said housing, said terminal means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said terminal means, respective end portions of said arms disposed in alignment with open means in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening means, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing side surface which forms one side of the other of said channels, another housing ledge projecting inwardly of said other housing side and substantially perpendicularly of said channels and having a

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cover supporting top surface and a wire bracing inwardly facing said surface which forms one side of said one channel, one of said arms having a greater length than the other arm and extending over said other channel and the first mentioned housing ledge top surface to define cooperatively said one channel and to brace an inserted wire against said other housing ledge bracing surface, said cover member having a portion thereof supported on said other housing ledge support surface and defining a top of said one channel said other terminal arm extending toward the first mentioned housing ledge bracing surface to define cooperatively said other channel and to brace an inserted wire thereagainst.

5. A lampholder comprising an insulative housing having base and cover members secured together and generally arranged to support and energize a lamp, at least one terminal means disposed in said housing, said terminal means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said terminal means, respective end portions of said arms disposed in alignment with opening means in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening means, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing side surface which forms one side of the other of said channels, another housing ledge projecting inwardly of said other housing side and substantially perpendicularly of said channels and having a cover supporting top surface and a wire bracing inwardly facing side surface which forms one side of said one channel, one of said arms having a greater length than the other arm and extending over said other channel and the first mentioned housing ledge top surface to define cooperatively said one channel and to brace an inserted wire against said other housing ledge bracing surface, said cover member having a portion thereof supported on said other housing ledge support surface and defining a top of said one channel, said other terminal arm extending toward the first mentioned housing ledge bracing surface to define cooperatively said other channel and to brace an inserted wire thereagainst, at least one wire release channel extending from said one housing side inwardly to said terminal arms, and a mounting bracket secured to said housing and having a plate portion thereof extending along said one housing side and over said wire release channel, said mounting bracket plate portion having an opening therein in alignment with said wire release channel.

6. A lampholder comprising an insulative housing having base and cover members secured together and generally arranged to support and energize a lamp, at least one terminal means disposed in said housing, said terminal means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said terminal means, respective end portions of said arms disposed in alignment with a single opening in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing side surface which forms one side of the other of said channels, another housing ledge projecting inwardly of said other housing side and substantially perpendicularly of said channels and having a cover supporting top surface and a wire bracing inwardly facing side surface which forms one side of said one channels, one of said arms having a greater length than the other arm and extending over said other channel and the first mentioned housing ledge to surface to define cooperatively said one channel and

to brace an inserted wire against said other housing ledge bracing surface, said cover member having a portion thereof supported on said other housing ledge support surface and defining a top of said one channel, said other terminal arm extending toward the first mentioned housing ledge bracing surface to define cooperatively said one channel and to brace an inserted wire thereagainst, another housing wire resting surface disposed in spaced relation from said one terminal arm with said other terminal arm extending thereover such that said other wire resting surface defines the bottom of said other channel, each of said wire resting surfaces having an outwardly concave cross section to provide a wire seat in each channel.

7. A lampholder comprising an insulative housing having base and cover members secured together and generally arranged to support and energize a lamp, at least one terminal means disposed in said housing, said terminal means having at least a pair of resilient wire engaging arms extending in generally parallel relation from a pivot portion of said terminal means, respective end portions of said arms disposed in alignment with opening means in a side of said housing, substantially separate wire entrance channels extending in an inward direction from said opening means, a housing ledge projecting inwardly of another side of said housing and substantially perpendicularly of said channels and having a wire resting top surface which forms the bottom of one of said channels and a wire bracing inwardly facing

side surface which forms one side of the other of said channels, another housing ledge projecting inwardly of said other housing side and substantially perpendicularly of said channels and having a cover supporting top surface and a wire bracing inwardly facing side surface which forms one side of said one channel, one of said arms having a greater length than the other arm and extending over said other channel and the first mentioned housing ledge top surface to define cooperatively said one channel and to brace an inserted wire against said other housing ledge bracing surface, said cover member having a portion thereof supported on said other housing ledge support surface and defining a top of said one channel, said other terminal arm extending toward the first mentioned housing ledge bracing surface to define cooperatively said other channel and to brace an inserted wire thereagainst, at least a portion of each of said wire bracing surfaces which is disposed inwardly from said one housing side and from a wire biting edge of the associated terminal arm extending along the associated channel and inwardly from said inward direction with which the associated channel begins.

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