

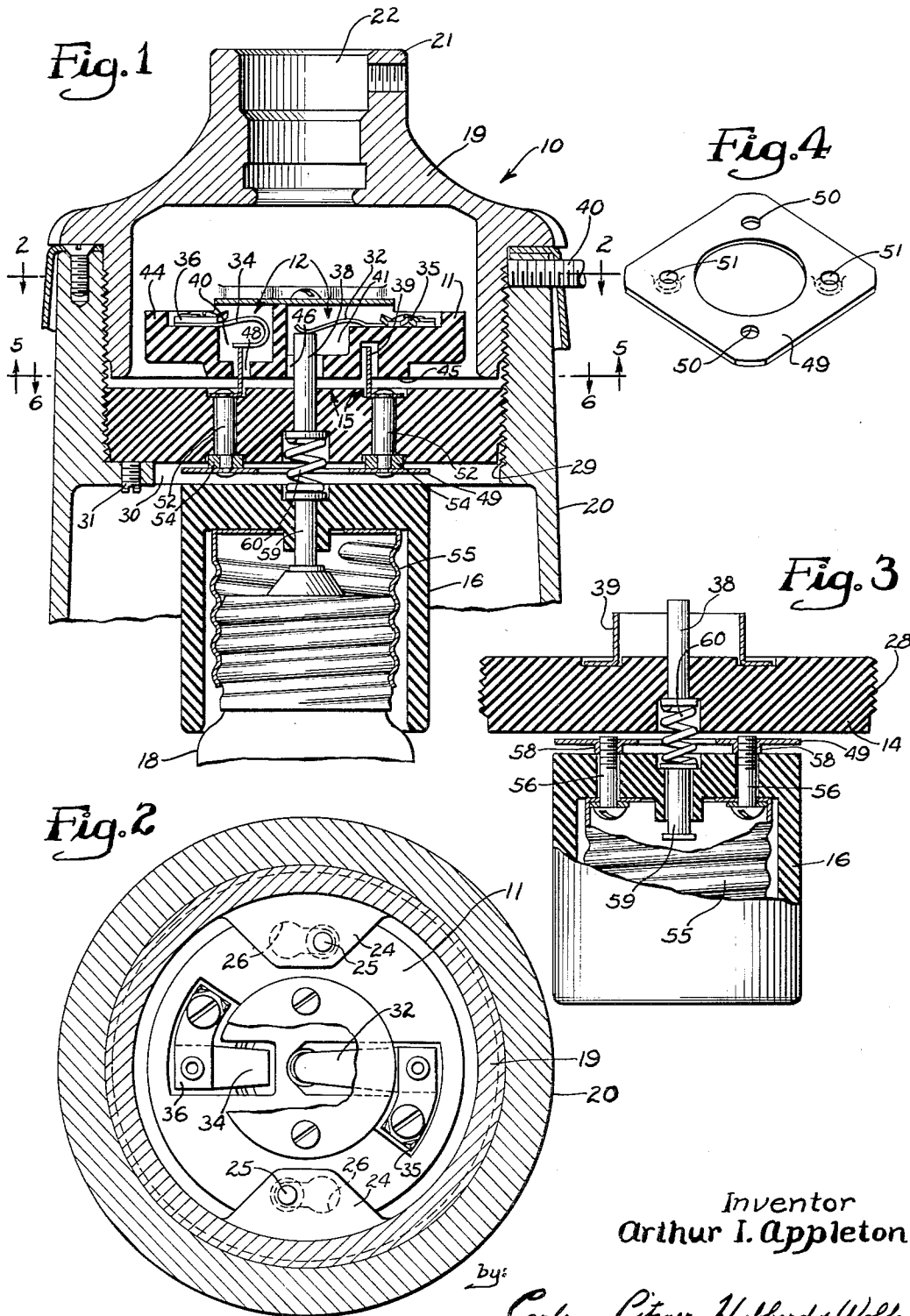
Aug. 9, 1955

A. I. APPLETON
DETACHABLE TERMINAL ASSEMBLY FOR
ELECTRICAL LIGHTING FIXTURE

2,715,214

Filed July 22, 1950

2 Sheets-Sheet 1



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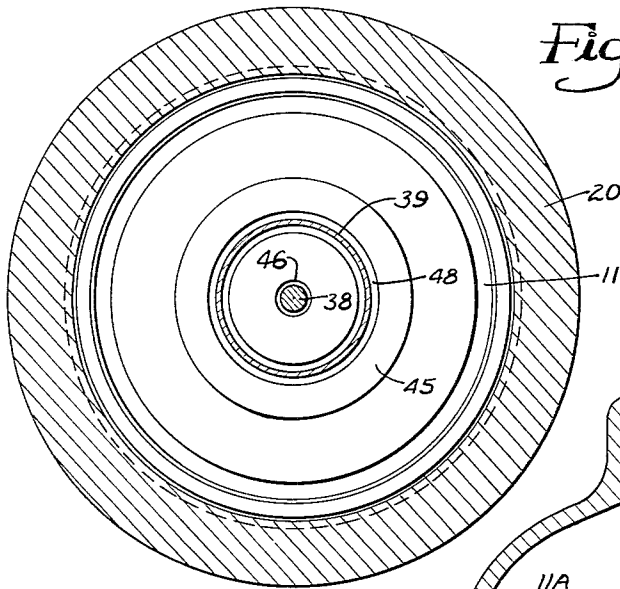


Fig. 5

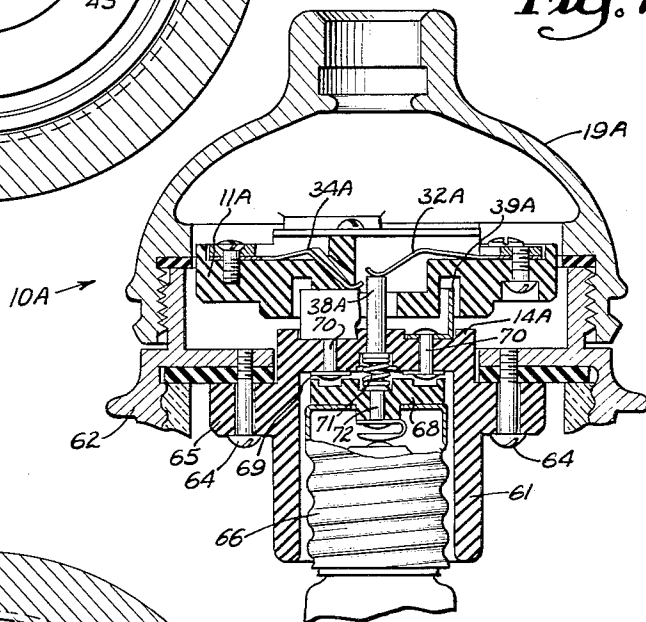
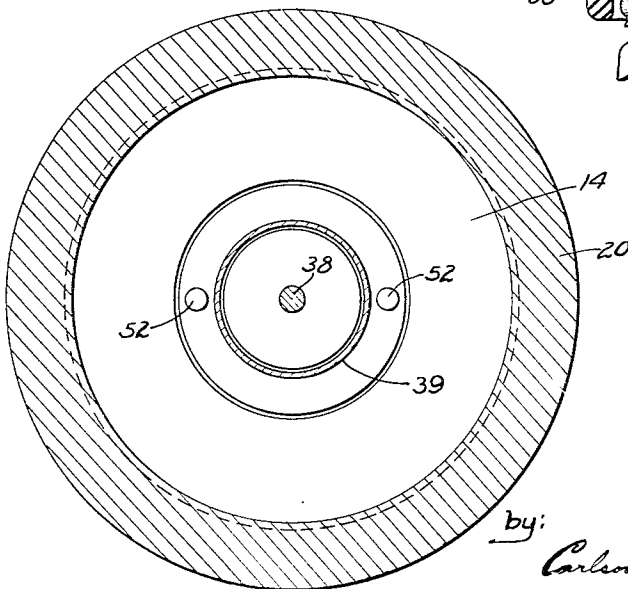


Fig. 7

Fig. 6



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DETACHABLE TERMINAL ASSEMBLY FOR ELECTRICAL LIGHTING FIXTURE

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Application July 22, 1950, Serial No. 175,419

4 Claims. (Cl. 339—180)

The present invention pertains to electrical fittings in general and more specifically to a novel detachable terminal assembly having particular, but by no means exclusive utility, in connection with the overhead mounting of explosion-proof and vapor-proof lighting fixtures.

One object of the invention is to provide a terminal assembly of the character set forth and which will permit a lighting fixture to be readily attached to or detached from a supporting canopy by a simple mechanical operation performed entirely without regard to the electrical wiring.

Another object is to provide a detachable terminal assembly of relatively simple, inexpensive construction and which will be sufficiently foolproof to preclude the possibility of shock or injury to even the most unskilled servicer.

A further object is to provide a detachable terminal assembly which will be particularly well suited for use with explosion-proof and vapor-proof type fixtures where relamping and other maintenance operations normally require the performance of several steps to disassemble the fixture while the servicer is positioned upon a high ladder or is working under other unfavorable conditions.

Other objects and advantages of the invention will become apparent as the following detailed description proceeds, taken in the light of the accompanying drawing wherein:

Figure 1 is an enlarged fragmentary vertical sectional view through an illustrative terminal assembly embodying the present invention.

Fig. 2 is a transverse sectional view through the assembly of Fig. 1 and taken in the plane of the line 2—2.

Fig. 3 is an enlarged fragmentary vertical sectional view through one of the major components of the assembly shown in Fig. 1.

Fig. 4 is a perspective view detailing one of the flexible connecting elements of the assembly shown in Fig. 1.

Figs. 5 and 6 are transverse sectional views taken in opposite directions along the plane of the line 5—5, 6—6 in Fig. 1.

Fig. 7 is an enlarged fragmentary vertical sectional view through a modified form of detachable terminal assembly also embodying the present invention.

While the invention is susceptible of various modifications and alternative constructions, certain preferred embodiments have been shown in the drawings and will be described below in considerable detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more specifically to the drawings, there is shown in Fig. 1 an illustrative terminal assembly 10 embodying the present invention. The assembly 10 comprises a first terminal block 11 having contact means 12 and a second terminal block 14 having contact means

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15 adapted for coaction with the contact means 12. Associated with the second terminal block 14 and dependably supported therefrom is a receptacle 16 for holding the base of a lamp 18 or the like. The assembly 10 is housed within a fixed support, which in the present instance is a hollow fixture canopy 19, together with a detachable support which happens to be the casing 20 of a lighting fixture (shown fragmentarily in Fig. 1). The canopy 19 is of frusto-conical shape, being provided with a neck 21 for attachment to an appropriate overhead support and having a passage 22 for receiving suitable power supply wiring. The terminal blocks 11, 14, may be fixed to their respective supports in any suitable manner. Thus the block 11 is disposed in underlying relation with a pair of lugs 24 integral with the canopy 19, being secured in place as by means of screws 25 threaded into the lugs 24 and which engage keyhole slots 26 in the terminal block 11 (see Fig. 2). The terminal block 14, on the other hand, happens to be provided with peripheral threads 28 which engage corresponding threads 29 within the fixture casing 20. The block 14 in this instance seats against an annular shoulder 30 integral with the casing 20 and is locked in place as by means of one or more set screws 31. Provision is made for automatically disconnecting the contact means 15 of the terminal block 14 from the contact means 12 of the terminal block 11 as an incident to the simple mechanical step of detaching the fixture casing 20 from the canopy 19. By the same token, provision is also made for automatically connecting the foregoing electrical contact means as an incident to the step of attaching the casing 20 to the canopy 19. For this purpose, the contact means 12, 15, are bodily separable in one direction and movable relative to each other in a plane transverse to the direction of bodily separation. In the illustrative assembly 10, the contact means of the terminal block 11 comprises slip type contact elements in the form of resilient prongs 32, 34, respectively attached to terminal elements 35, 36, the latter being adapted for permanent connection with the power supply wiring. By the same token, the contact means of the terminal block 14 comprises upstanding contact elements in the form of a central pin 38 and a surrounding ring 39.

By reason of the structure thus far described, when the assembly 10 is in the condition indicated in Fig. 1, the fixture casing 20 may readily be detached from the canopy 19 simply by loosening set screw 40 and unscrewing the casing 20 from the threaded skirt of the canopy. The terminal block 14, together with the central pin 38 and the surrounding ring 39, rotates with the fixture casing 20 during such action, the pin 38 pivoting relative to the resilient prong 32 of the terminal block 11 and the ring 39 sliding relative to the prong 34 of the block 11. This relative sliding and pivoting occurs in a plane transverse to the rotational axis of bodily movement between the fixture casing 20 and the canopy 19 as the casing 20 is attached to or detached from the canopy 19.

Means is provided for protecting the person who services the assembly 10 against electrical shock due to inadvertent contact with the "live" one of the terminal blocks upon separation of the same in the manner described above. This is accomplished by imparting a so-called "dead front" characteristic to the "live" terminal block, the latter being the block 11 attached to the canopy 19. In keeping with such purpose, the contact elements 32, 34 of the terminal block 11 are housed within recesses 41, 42 formed in the inside face 44 of the terminal block. This face is, of course, protectively enclosed within the canopy 19. Communicating between respective ones of the recesses 41, 42, and the opposite face 45 of the terminal block 11, are relatively narrow apertures 46, 48. The latter are adapted to receive telescopically the upstand-

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ing contact pin 38 and the surrounding contact ring 39 of the terminal block 14. Preferably, each of the apertures 46, 48 has a cross section only slightly larger than the corresponding one of the elements 38, 39 which it receives. Consequently, when the casing 20 and the terminal block 14 are separated from the canopy 19 and the terminal block 11, it is possible to bring one's hand into contact with the exposed face 45 of the block 11 without danger of receiving an electrical shock. Moreover, the relatively small cross sectional area of the apertures 46, 48 makes it extremely unlikely that a servicer will inadvertently bring a screw driver or the like into contact with either or both of the "live" prongs 32, 34.

For the purpose of protecting the receptacle 16 from vibration and shock, resort is had to common resilient supporting and conducting means. Referring more particularly to Figs. 1, 3, and 4, it will be noted that such means comprises resilient plate 49 of Phosphor bronze or the like. The plate 49 is of generally annular shape and in this instance has two pairs of diametrically opposed holes 50, 51, each pair being located on a diameter perpendicular to that of the other. The plate 49 is fixed mechanically to the terminal block 14 and connected electrically to the contact ring 39 as by means of rivets 52 and surrounding bushings 54, the rivets 52 projecting through the holes 50. The plate 49 is fixed mechanically to the receptacle 16 and connected electrically to a socket fitting 55 within the same as by means of screws 56. The latter engage suitable threads formed in embossments 58 surrounding the holes 51. Interposed between the terminal block 14 and central contact pin 38, on the one hand, and the receptacle 16 and a central contact post 59, on the other hand, is a coil spring 60 which serves as an appropriate electrical connecting link between the parts 38, 59. The spring 60, of course, yieldably urges the parts 38, 59 in opposite directions.

Turning now to Fig. 7, there is shown another illustrative detachable terminal assembly 10A of slightly modified form but also embodying the present invention. The assembly 10A comprises a supporting canopy 19A generally similar to the canopy 19, together with a pair of terminal blocks 11A, 14A having contact elements 32A, 34A, 38A, 39A substantially identical with those already described above. In the present instance, however, the terminal block 14A is made integral with receptacle 61 which is rigidly fixed to removable member 62 of a lighting fixture as by means of screws 64 and annular shoulder 65. The receptacle 61 is given a vibration-proof characteristic by mounting its socket fitting 66 in a manner closely similar to that used for mounting the receptacle 16 of the assembly 10. In this case, however, the socket fitting 66 has fixed to its inside end a block of insulating material 68. An annular resilient conductor plate 69 is mechanically and electrically interposed between the contact ring 39A and terminal block 14A, on the one hand, and the socket fitting 66 and insulating block 68, on the other hand. This is readily accomplished as by means of rivets 70 and suitable connecting screws (not shown) such as the screws 56. A loading spring 71 is interposed between central contact pin 38A and central post 72 of the receptacle 61. Since the action of the modified terminal assembly 10A is substantially identical to that of the assembly 10 upon installation and removal of the fixture member from the canopy 19A, further comment in that regard would appear to be unnecessary.

In the light of the foregoing description, it will be readily appreciated by those skilled in the art that detachable terminal assemblies embodying the present invention possess a number of important advantages. First of all, such assemblies possess considerable versatility, being susceptible of mass productive manufacture in standardized sizes for use with a wide variety of light fixtures. The performance of relamping and other maintenance operations is greatly facilitated by the use of these assemblies since they permit a servicer to detach an entire fixture by a simple mechanical operation which can easily be

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performed at the top of a ladder, and at the same time to replace such fixture with a spare by an equally simple operation. There is no need for the servicer to concern himself with the disassembly of numerous small electrical and mechanical parts under difficult and hazardous conditions.

From the electrical standpoint, terminal assemblies embodying the invention possess a high degree of safety. For example, there is no need to de-energize the power supply circuit when a fixture is being removed from or attached to its supporting canopy, since a servicer has no occasion to handle any of the wiring or connections. In the event that he should inadvertently touch the upper terminal block, either by hand or with a screw driver or other tool, it is virtually impossible for him to receive an electrical shock due to the "dead front" characteristic of the terminal block.

I claim as my invention:

1. A detachable terminal assembly for lighting fixtures, said assembly comprising the combination of a supporting canopy, a first terminal block fixed to said canopy and having an inside face enclosed by said canopy and an outside face exposed through the entrance to said canopy, said inside face having recesses therein, said first terminal block also having relatively narrow concentric apertures therein communicating between respective ones of said recesses and the outside face of said block, contact elements in the form of cantilever supported resilient arms located within said recesses but totally behind said apertures, a second terminal block having means for mounting the same within a lighting fixture detachably secured to said canopy, and coating slip type contact elements fixed to said second terminal block in concentric projecting relation with each other, said coating contact elements being telescopically housed within said narrow apertures and disposed in substantially perpendicular abutting relation with said resilient arms when said terminal blocks are in assembled relation.

2. In a detachable terminal assembly for lighting fixtures, the combination comprising a supporting canopy, a dead front terminal block mounted on said canopy and having recesses in the inside face thereof, said block having substantially concentric apertures of relatively small cross section communicating between said recesses and the outside face of said block, contact elements mounted in said recesses, means for connecting said contact elements to a source of power supply via conductors housed within said canopy, a second terminal block, a support for said second terminal block having threads thereon, additional upstanding concentric contact elements including means mounting the same on said second terminal block in registry with said concentric apertures, and thread means on said canopy for guiding said additional contact elements into said concentric apertures to establish contact with said first contact elements.

3. In a detachable terminal assembly for lighting fixtures, the combination of a fixed terminal block having recesses in its inside face, said block also having a relatively small central aperture and a relatively narrow surrounding circular aperture underlying respective ones of said recesses and communicating between the same and the outside face of said block, resilient prong contact elements cantilever supported within said recesses but totally behind said outside face, a movable terminal block susceptible of both bodily and rotational movement along and about a common central axis relative to said fixed terminal block, a central contact pin and a surrounding contact ring mounted upon said movable terminal block, and means locating said pin and ring on said movable terminal block for abutting engagement in substantially perpendicular relation with said resilient prong elements while telescoped within respective ones of said central and surrounding circular apertures.

4. In a detachable terminal assembly, the combination comprising a dead front terminal block, a fixed cup-shaped

support, means for mounting said block in said support with the inner face of the former substantially enclosed by the latter, yieldable resilient contact arms and means mounting the same in spaced relation on the inner face of said block, said block having relatively narrow concentric circular apertures therein underlying respective ones of said contact arms, a second terminal block having upstanding concentric circular contact elements fixed thereto for substantially perpendicular abutting engagement with said contact arms when said elements are inserted through corresponding ones of said apertures, a second support having means for detachably securing the same to said fixed support, and means for mounting said second block on said second support to align said

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contact elements for insertion through said apertures as an incident to attachment of the two supports.

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