June 19, 1951 G. R. EDDY 2,557,818

PLUG AND SOCKET ELECTRIC CONNECTOR

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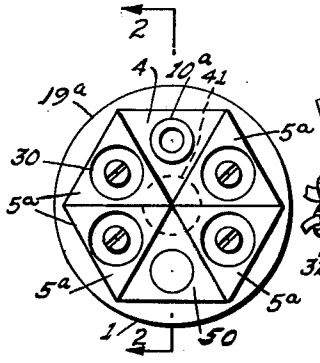


FIG. 5.

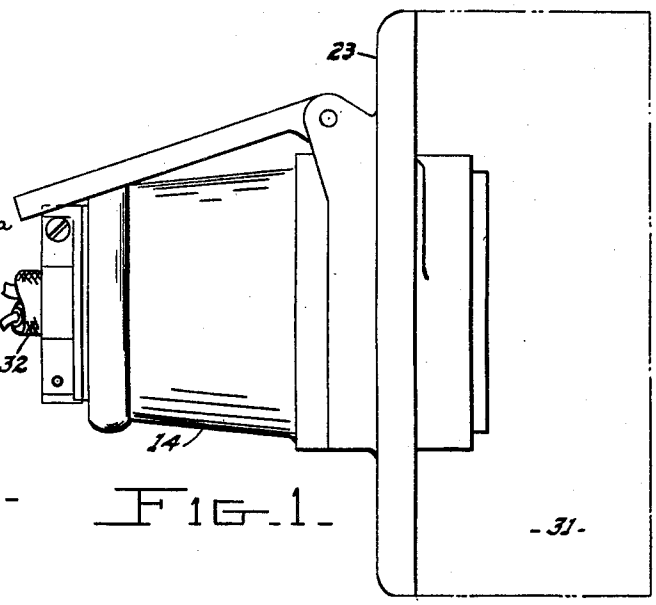


FIG. 1.

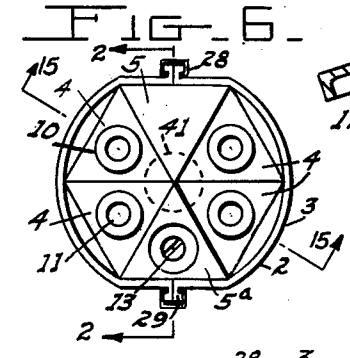


FIG. 6.

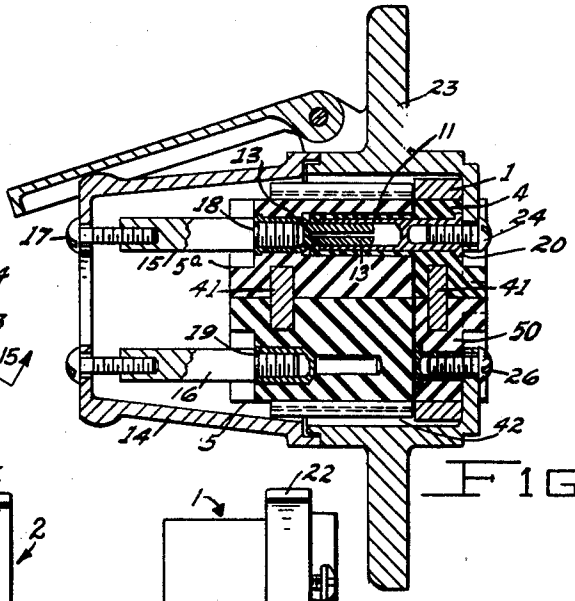


FIG. 2.

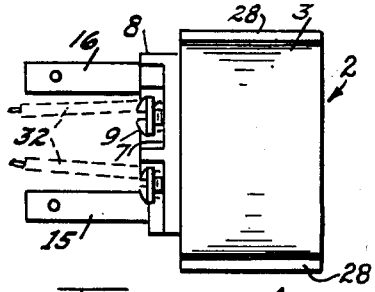


FIG. 4.

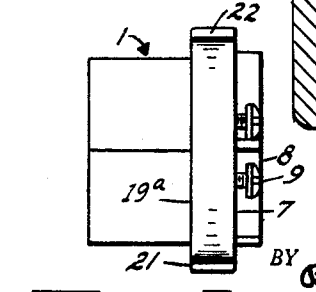


FIG. 3.

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PLUG AND SOCKET ELECTRIC CONNECTOR

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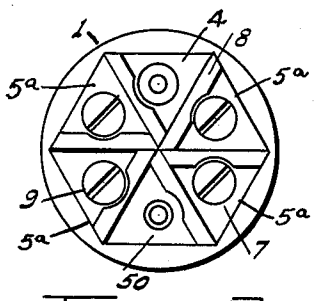


FIG. 7.

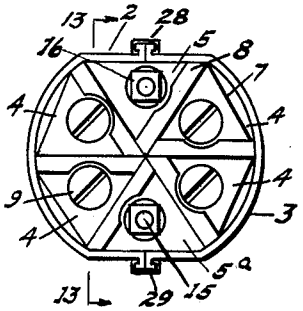


FIG. 8.

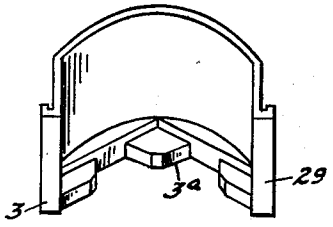


FIG. 9.

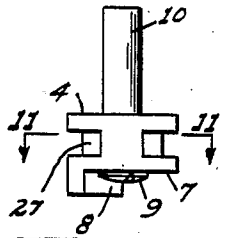


FIG. 10.



FIG. 11.

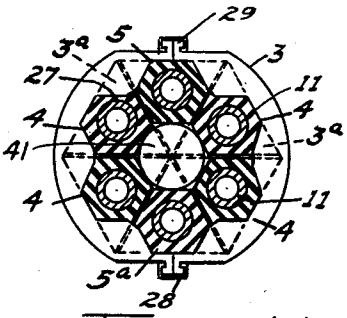


FIG. 14.

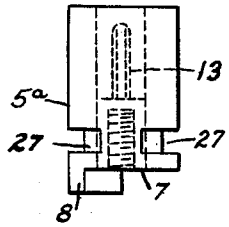


FIG. 12.

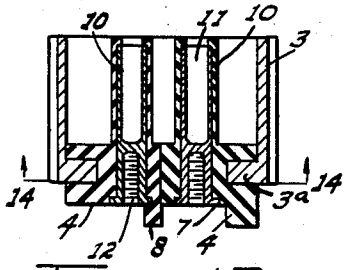


FIG. 13.

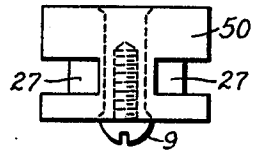


FIG. 16.

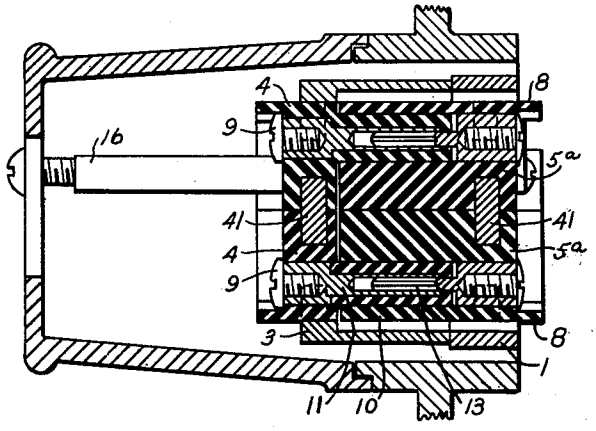


FIG. 15.

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UNITED STATES PATENT OFFICE

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PLUG AND SOCKET ELECTRIC CONNECTOR

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Application October 27, 1948, Serial No. 56,892

5 Claims. (Cl. 173—328)

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This invention relates to plug and socket electric connectors, and has for its object a plug and socket connector by which a connector for various situations requiring different numbers and groupings, or arrangements of plug and socket coacting terminals can be assembled from a number of duplicate standard stock parts so that instead of providing a plug and socket for each of the various situations, a plug and socket for any one of such situations can be assembled from the stock parts.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of a connector embodying my invention.

Figure 2 is a vertical central, longitudinal sectional view of the structure shown in Figure 1, taken on a line corresponding to lines 2—2, Figures 5 and 6.

Figure 3 is a side elevational view of the contact unit mounted in the receptacle or socket section of the connector.

Figure 4 is a side elevation of the contact unit mounted in the plug section of the connector.

Figure 5 is an end elevation of the contact unit in the socket or receptacle, looking to the right Figure 3.

Figure 6 is a similar view of the contact unit of the plug, looking to the left Figure 4.

Figure 7 is a bottom plan view of the receptacle or socket contact unit.

Figure 8 is a bottom plan view of the plug contact unit.

Figure 9 is a perspective view of one of the sections of the base of the plug unit.

Figure 10 is a side elevation of one of the male contact members of the plug.

Figure 11 is a sectional view taken on line 11—11, Figure 10.

Figure 12 is a side elevational view of one of the female contact members of the socket.

Figure 13 is a sectional view taken on line 13—13, Figure 8.

Figure 14 is a sectional view taken on a line corresponding to line 14—14, Figure 13.

Figure 15 is a sectional view, similar to Figure 2, but taken on line 15—15, Figure 6, sixty degrees from the section shown in Figure 2.

Figure 16 is a view similar to Figure 10 of the short blank block.

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This plug and socket connector comprises plug and socket bases or terminal holders, individual segment blocks assemblable with each base and abutting at their sides against each other around the axis of the base, some of the blocks having wire terminals at like ends, as their outer or base ends, and contact terminals for coacting with complemental contact terminals of blocks on the other base, and other blocks being blanks.

The socket and the plug elements or units are of complemental construction and their general construction is substantially the same, or complemental, insofar as the block arrangement is concerned.

The numerals 1, 2, Figure 3, Figure 4, designate respectively the socket and the plug units. Each consists of a base and segmental blocks carried by the base.

The numeral 3, Figures 4, 6, 8, 9, and 13, designates the base of the plug unit, and 4, 5, and 5a, Figures 6, 8 and 10, segmental blocks thereon, these blocks being triangular, or at least having triangular base portions which abut against each other along their lateral sides, which lateral sides extend in a general radial direction relative to the axis of the base 3. Each block is formed with a barrier or flange 8 along one only of the lateral sides of the block, the flanges of the assembled blocks providing the depressions 7 in which wire terminals, as binding screws 9, or other terminals, may be located. The blocks 4 of the plug unit are provided with tubular axial male portions 10, Figures 6, 10 and 13, projecting from the triangular base portions in which tubular contact terminals 11 are located. The contact terminals extend through the triangular base and are internally threaded at 12, Figure 13, to receive the binding screws 9. The blocks 5 are shown as blanks, not provided with terminals 10 but only inserts to receive the screws 9, or one of them, as 5a, Figures 2 and 6, may be provided with a terminal 13 as a grounding terminal which, in turn, is grounded in any suitable manner as to the electric conduit system through a complemental ground terminal in the socket unit.

The base 3 is shown as mounted in a casing 14 which forms the handle of the plug unit. The base 3 is connected to the casing 14 by posts, as 15, 16, extending axially from the blocks 5, and 5a, the posts being connected to the head of the casing 14, Figure 2, as by screws 17 extending through the head and threading axially into the posts 15, 16. The posts 15, 16, are shown in Figure 2 as threading into the base of terminal

18 and an insert 19, in the blocks 5, 5a, the terminal 13 entering the base 20 of the tubular terminal 11, Figure 2, on a triangular block 4 of the socket assembly. The block 4 consists of a triangular base portion and the tubular terminal 11 which telescopes onto the terminal 13 in the block 5a of the plug unit to which the post 15 is secured. The ground contact 20 extends through the block 4 of the socket assembly and is grounded to the conduit outlet box cover 23 by a screw 24 threading into the terminal base 20. The other block 5, to which the post 16 is secured, merely abuts against a short block 50 of the socket assembly, this being secured to the cover 23 of the outlet box by a screw 26.

The blocks of the plug unit are interlocked with the base 3. As shown in Figures 9 and 10, the base 3 is formed in two separate sections or halves provided with inwardly extending lugs 3a which interlock in notches 27 at the corners of the triangular formation of the outer ends or base portions of the blocks 4, 5, 5a, when the two sections are brought together. The two sections are secured together in any suitable manner, as by sliding channel shaped clips 28 having inturned lips at the entrance of the channel formation. The clips slide endwise along undercut outwardly extending lengthwise flanges 29 at the meeting edges of the sections, Figures 8 and 14.

The block 50 is merely a triangular base abutting against the end of the block 5 of the plug unit, Figure 2. In other words, the blocks 5 and 50 are blanks not carrying complemental engaging terminals. The socket blocks 5a coact with plug blocks 4, the base portions of which only are triangular, see Figure 10. The plug blocks 5 and 5a interfit between the socket blocks 40 and coact with the socket blocks 50 and 4. The base portion only of the socket block 4 is triangular, the remainder is an axial tubular portion.

The socket terminal base 1 is here shown as mounted in the cover 23 of the outlet box 31 in the electric conduit system. The blocks may be secured in the base 1 in any suitable manner, as in the same manner that the blocks are secured in the base 3 of the plug unit. The socket base 1 is here shown in Figure 7 as a one piece collar, and the socket block assembly secured therein by the screws 24, 26, the assembly itself being held together by the key 41, as will be presently described. As seen in Figure 3, the socket base 1 may be formed in halves secured by clips 21 similar to the halves and clips of the plug socket base 3, Figure 8.

The block assemblies of the plug unit and the socket unit may be held assembled as by keys 41 in the form of disks, Figures 2, 5, 6, and 14, fitting into the notches 27 at the apex portions of the triangular blocks, positioned at the axes of the plug and socket units. Because the base 3, holding the triangular blocks of the plug, must fit into the circular passage 42 in the cover 23 of the outlet box, diametrically opposite sides of the base are flattened or chordal to provide clearances for the flanges 29 and the clips 28 coacting therewith which secure the sections or halves of the plug base together.

It will be apparent that the plug and socket units each include a series of six blocks which are triangular in cross section, at least at their bases, the group of six blocks in each unit being detachably mounted in a holder or base member. Certain of these blocks, such as those designated 50, consist only of a base portion. Certain others, as those designated 5, are of full length but do not carry any contacts. These serve as blanks. Certain of the blocks, as designated 4, have tubular portions extending from the base and carry tubular or female contacts, and the remaining type of blocks, designated as 5a, are of full length and formed with an axially extending passage in which a male contact 13 is positioned. With this arrangement, the blocks can be assembled in the plug and socket units to provide a connector having one to six poles without polarity or, one to five poles with polarity. The polarity is obtained by using a short block 50 in the receptacle and a blank full length block 5 in the plug unit, or vice-versa, and as previously explained, inasmuch as the base portions of all of the blocks are identical, the blocks 5a may be interchanged with the blocks 4. The purpose of such a reversal of a pair of blocks is to provide a grounding circuit and have it appear different than the current carrying circuits. Accordingly, the arrangement is extremely flexible and affords good insulating protection. The arrangement is economical because all of the blocks can be formed in a common die or mould, the shorter blocks, as 50, being run with a longer pilot in the die, and the other various blocks being run with pilots to obtain proper formation of the outer end portions of the blocks.

In the drawings, a four pole connector is shown and the wires from the incoming cable 32 are connected to the wire terminals of the blocks 4 of the plug unit, the outgoing or service wires to the wire terminals of the socket unit. In this formation, there is one blank block in the plug and socket bases between two of the wire terminal blocks, and also one block having a grounding terminal, this also serving as a locater to insure the bringing together of the plug and socket with the correct polarity. Obviously, with the bases of the connector the same and triangular, all of the various types of plug and socket connectors, with a multitude of groupings of the terminals, can be readily assembled from stock parts, or blocks, some of which carry contact and wire terminals, and others of which are blank and serve as spacers.

What I claim is:

1. A plug and socket electric connector comprising plug and socket bases, individual segment blocks on each base having at least the base portion generally triangular in cross section with the lateral sides of the triangular formation extending in a general radial direction relatively to the axis of the base and the lateral sides of the bases of the blocks abutting against each other, some of the blocks having wire terminals at like ends and contact terminals for coacting with complemental contact terminals of the blocks on the other base, and other blocks being blanks, and means for securing the blocks to the base.

2. A plug and socket electric connector comprising plug and socket bases, individual segment blocks on each base having at least the base portion generally triangular in cross section with the lateral sides of the triangular formation extending in a general radial direction relatively to the axis of the base and the lateral sides of the bases of the blocks abutting against each other, some of the blocks having wire terminals at like ends and contact terminals for coacting with complemental contact terminals of the blocks on the other base, and other blocks being blanks, and means for securing the blocks to the base, the

corners of the triangular formation being formed with notches, and the base being formed with lugs for interlocking with the notches.

3. A plug and socket electric connector comprising plug and socket bases, individual segment blocks on each base having at least the base portion generally triangular in cross section with the lateral sides of the triangular formation extending in a general radial direction relatively to the axis of the base and the lateral sides of the bases of the blocks abutting against each other, some of the blocks having wire terminals at like ends and contact terminals for coacting with complemental contact terminals of the blocks on the other base, and other blocks being blanks, and means for securing the blocks to the base, the outer base end of each block along one of the lateral sides thereof being formed with a recess providing a barrier between the recess of each block and the recess of the adjacent block, the wire terminals being located in the recesses.

4. A plug and socket electric connector comprising plug and socket bases, individual segment blocks on each base having at least the base portion generally triangular in cross section with the lateral sides of the triangular formation extending in a general radial direction relatively to the axis of the base and the lateral sides of the bases of the blocks abutting against each other, some of the blocks having wire terminals at like ends and contact terminals for coacting with complemental contact terminals of the blocks on the other base, and other blocks being blanks, means for securing the blocks to the base, and interlocking means between the blocks of the block assembly of each base.

5. A plug and socket electric connector comprising plug and socket bases, individual segment blocks on each base having at least the base portion generally triangular in cross section with the lateral sides of the triangular formation extending in a general radial direction relatively to the axis of the base and the lateral sides of the bases of the blocks abutting against each other, some of the blocks having wire terminals at like ends and contact terminals for coacting with complemental contact terminals of the blocks on the other base, and other blocks being blanks, means for securing the blocks to the base, and interlocking means between the blocks of the block assembly of each base comprising a key common to all the blocks on each base interlocking in notches at the meeting corners of the triangular blocks.

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