United States Patent [19]

Urani

[11] **3,710,296**

[45] **Jan. 9, 1973**

[54] **PROTECTOR FOR ELECTRIC CIRCUITS**

[75] Inventor: **Angelo Urani**, St. Louis, Mo.

[73] Assignee: **McGraw-Edison Company**, Elgin, Ill.

[22] Filed: **Nov. 4, 1970**

[21] Appl. No.: **86,861**

[52] **U.S. Cl.** **337/213**, 337/188, 337/194, 337/197, 337/201

[51] **Int. Cl.**.....**H01h 85/50**

[58] **Field of Search**.....337/213, 188, 197, 198, 194, 337/201–205, 227, 228, 229, 230, 231, 233, 237; 255/137 R

[56] **References Cited**

UNITED STATES PATENTS

3,229,656	1/1966	Bodey	285/137 R X
2,649,742	8/1953	Armstrong	285/137 R X
3,214,195	10/1965	Zahuranec et al.	285/137 R X
3,551,869	12/1970	Robinson	337/201
2,733,314	1/1956	Schmidt	337/197
2,417,692	3/1947	Kline	337/188
1,813,582	7/1931	Mason	337/188
2,972,030	2/1961	Lindeman	337/197
2,740,017	3/1956	Luce et al.	337/201 X
3,417,359	12/1968	Urani	337/201
3,268,693	8/1966	Linton	337/201 X
2,477,360	7/1949	Bright	337/201 X

FOREIGN PATENTS OR APPLICATIONS

848,313	9/1960	Great Britain	337/201

Primary Examiner—J. V. Truhe
Assistant Examiner—Gale R. Peterson
Attorney—Rogers, Ezell, Eilers & Robbins

[57] **ABSTRACT**

A support for a plurality of "in-the-line" fuse holders selectively holds those fuse holders in fully assembled condition or initiates separation of the body portions of those fuse holders to permit the electric fuses held by those fuse holders to be inspected or replaced.

8 Claims, 7 Drawing Figures

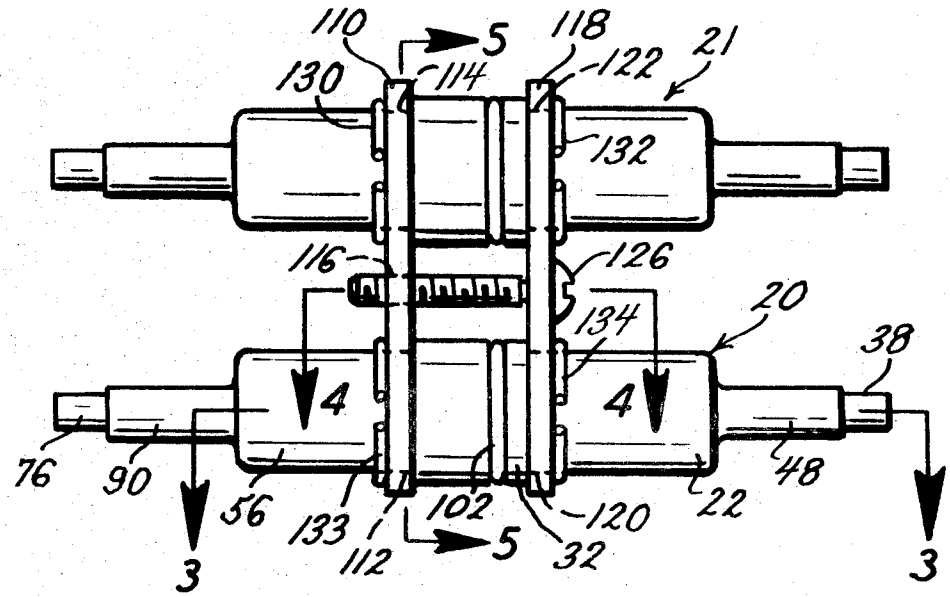


FIG. 1.

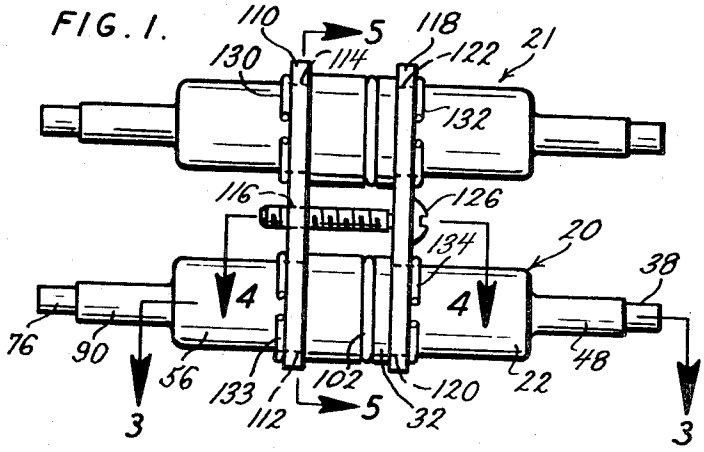


FIG. 2.

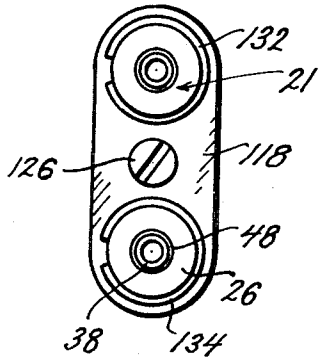


FIG. 3.

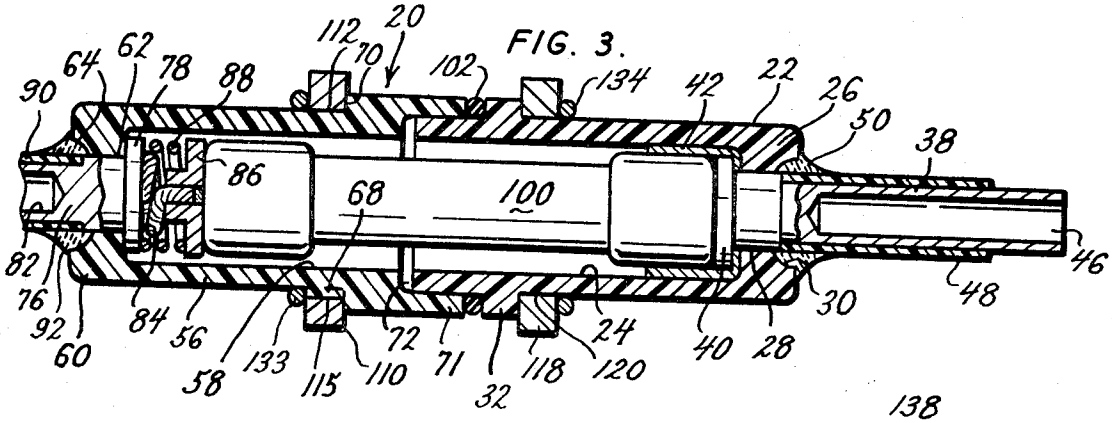
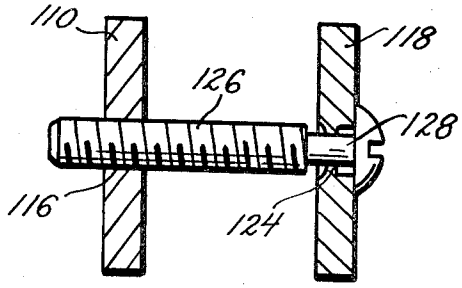


FIG. 4.



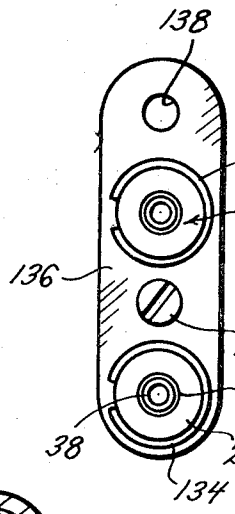
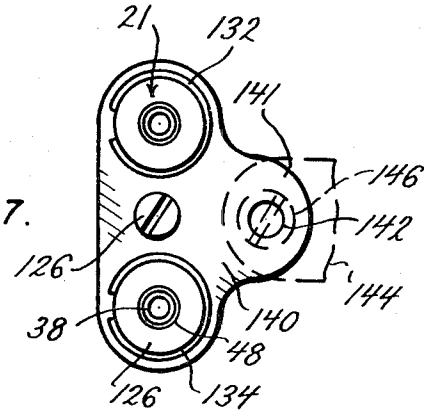


FIG. 6.

FIG. 7.



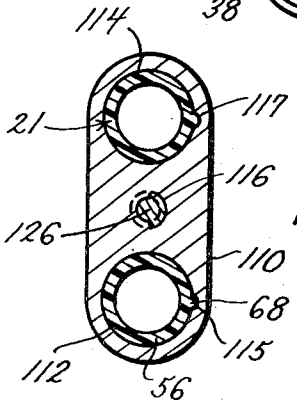


FIG. 5.

PROTECTOR FOR ELECTRIC CIRCUITS

This invention relates to improvements in Protectors For Electric Circuits. More particularly, this invention relates to improvements in supports for "in-the-line" fuse holders.

It is, therefore, an object of the present invention to provide an improved support for "in-the-line" fuse holders.

Where a number of closely adjacent conductors have "in-the-line"fuse holders incorporated into them, those fuse holders can often be moved into engagement with each other; and hence the portions of those conductors which are close to those fuse holders can be moved into engagement with each other. In some instances, it would be undesirable for "in-the-line" fuse holders to be moved into engagement with each other; and, in other instances, it would be undesirable for the conductors in which those fuse holders are incorporated to have portions thereof moved into engagement with each other. Consequently, it would be desirable to provide a support for a plurality of "in-the-line" fuse holders which could hold those fuse holders in spaced-apart relation. The present invention provides such a support; and it is, therefore, an object of the present invention to provide a support for a plurality of "in-the-line" fuse holders which can hold those fuse holders in spaced-apart relation.

The support provided by the present invention has two relatively-movable elements; and one of those elements receives and holds the male body portions of a plurality of "in-the-line" fuse holders, while the other element of that support receives and holds the female body portions of those fuse holders. Those elements are dimensioned so they automatically dispose the male body portions of the "in-the-line" fuse holders in register with the female body portions of those fuse holders whenever those elements are set in registry. Further, the relatively-movable elements of the support provided by the present invention are movable toward and away from each other by a threaded member; and that threaded member can co-act with those elements to draw the male and female body portions of the plurality of "in-the-line" fuse holders into fully assembled position, or to initiate movement of those body portions out of fully assembled position. As a result, the support provided by the present invention can assure movement of the male and female body portions of a plurality of "in-the-line" fuse holders into and out of fully assembled position. It is, therefore, an object of the present invention to provide a support which has an element that receives and holds the male body portions of a plurality of "in-the-line" fuse holders, has a second element that receives and holds the female body portions of those fuse holders, and has a threaded member than can move those elements toward and away from each other to move those male and female body portions into and out of fully assembled position.

Other and further objects and advantages of the present invention should become apparent from an examination of the drawing and accompanying description.

In the drawing and accompanying description, several preferred embodiments of the present invention are shown and described but it is to be understood that the drawing and accompanying description are for the purpose of illustration only and do not limit the invention, and that the invention will be defined by the appended claims.

In the drawing,

FIG. 1 is an elevational view of one preferred form of support that is made in accordance with the principles and teachings of the present invention, and it shows that support holding two "in-the-line" fuse holders in spaced-apart relation;

FIG. 2 is an elevational view of the right-hand ends of the support and of the fuse holders shown in FIG. 1;

FIG. 3 is a sectional view, on a larger scale, through the support and through one of the fuse holders shown in FIG. 1, and it is taken along the plane indicated by the line 3—3 in FIG. 1;

FIG. 4 is a sectional view, on the scale of FIG. 3, through the support shown in FIG. 1, and it is taken along the plane indicated by the line 4—4 in FIG. 1;

FIG. 5 is a sectional view, on the scale of FIG. 1, through the support and the fuse holders of FIG. 1, and it is taken along the plane indicated by the line 5—5 in FIG. 1;

FIG. 6 is an end elevational view of one of the elements of a second preferred embodiment of support that is made in accordance with the principles and teachings of the present invention, and it shows that support holding two "in-the-line" fuse holders in spaced-apart relation; and

FIG. 7 is an end elevational view of one of the elements of a third preferred embodiment of support that is made in accordance with the principles and teachings of the present invention, and it shows that support holding two "in-the-line" fuse holders in spaced-apart relation.

Referring to the drawing in detail, the numeral 20 generally denotes an "in-the-line" fuse holder which is very similar to the "in-the-line" fuse holder shown in my U.S. Pat. No. 3,356,806 for PROTECTORS FOR ELECTRIC CIRCUIT which was granted on Dec. 5, 1967. The numeral 21 denotes a second "in-the-line" fuse holder which can be identical to the fuse holder 20.

The fuse holder 20 has a body portion 22 of cylindrical form with a cylindrical recess 24 therein. A wall 26 is provided at one end of the cylindrical recess 24, and the other end of that recess is open. A passage 28 is provided in the wall 26; and an annular recess 30 is provided in the outer face of that wall. An annular shoulder 32, of rectangular cross section, is formed at the exterior of the body portion 22; and that annular shoulder is closer to the left-hand of that body portion than it is to the right-hand end of that body portion, as shown particularly by FIG. 3. The body portion 22 is preferably formed from an inexpensive but tough plastic material; and phenolic resins constitute plastic materials which are very useful in forming that body portion.

The numeral 38 denotes a metal terminal which has a flanged inner face 40; and a short portion of that terminal is dimensioned to fit snugly within the passage 28 in the end wall 26 of the body portion 22, while the flanged inner face 40 is dimensioned so it cannot pass through that passage. The terminal 38 also has an elongated shank with an elongated recess 46 therein; and the diameter of that shank is smaller than the diameter of the short portion which is disposed within the

passage 28. A metal cup-like contact 42 has an opening in the closed end thereof through which the shank and the short portion of the terminal 38 extend; but the flanged inner face 40 of that terminal is too large to pass through that opening. The flanged inner face 40 of the terminal 38 is used to press the cup-like contact 42 against the end wall 26 of the body portion 22; and then the periphery of the short portion of that terminal is staked or riveted into the annular recess 30 in that body portion to fixedly secure that terminal and that contact to each other and to that body portion.

A sleeve 48 of heat-shrinkable insulation is telescoped over the shank of the terminal 38; and that sleeve extends into the annular recess 30 in the body portion 22 to abut the short portion of that terminal. That sleeve is shrunk into intimate engagement with the terminal 38 by suitable application of heat. A sealing material 50, such as an epoxy resin, is used to fill the annular recess 30 in the right-hand end of the body portion 22. That sealing material provides a water-tight seal between that body portion and the terminal 38.

The numeral 56 denotes a body portion of cylindrical form with a cylindrical recess 58 therein. A wall 60 is provided at one end of the recess 58; and the other end of that recess communicates with a larger-diameter cylindrical recess 72 in the body portion 56. The recess 72 is dimensioned to telescope over the left-hand end of the body portion 22, as shown by FIG. 3. An abrupt annular shoulder 70 is provided intermediate the larger-diameter section 71 of the body portion 56 and the rest of that body portion. A shallow, axially-extending rib 68 is formed on the exterior of the body portion 56; and that rib abuts, and extends a short distance to the left from, the shoulder 70. A passage 62 is provided in the end wall 60 of the body portion 56; and an annular recess 64 is provided in the outer face of that wall, and that recess communicates with that passage. The body portion 56 is preferably formed from an inexpensive but tough plastic material; and phenolic resins constitute plastic materials which are very useful in forming that body portion.

The numeral 76 denotes a metal terminal which has a flanged inner face 78; and a short portion of that terminal is dimensioned to fit snugly within the passage 62 in the end wall 60 of the body portion 56, while the flanged inner face 78 of that terminal is dimensioned so it cannot pass through that passage. The terminal 76 has an elongated shank with an elongated recess 82 therein; and that recess opens to the left-hand end of that terminal. The flanged inner face 78 is pressed into engagement with the end wall 60, and then the periphery of the short portion of that terminal is staked or riveted into the annular recess 64 in the body portion 56 to fixedly secure that terminal to that body portion. The numeral 86 denotes a movable metal contact which has the form of a shallow cylinder with a radially-extending flange at the right-hand face thereof. A socket is formed in the left-hand face of that contact; and the right-hand end of a flexible conductor 84 extends into that socket. The left-hand end of that flexible conductor extends into a socket, not shown, in the right-hand face of the terminal 76; and solder is used to bond that flexible conductor to the terminal 78 and to the contact 86. A helical compression spring 88 surrounds the flexible conductor 74; and the left-hand end of that spring bears against the flanged inner face 78 of the terminal 76, while the right-hand end of that spring bears against the radially-extending flange on the contact 86. That helical compression spring biases the contact 86 to the right in FIG. 3; but it can yield to permit that contact to be moved to, and held in, the position shown by FIG. 3. The flexible conductor 84 shunts the spring 88, and thereby keeps sudden surges of current from heating that spring to temperatures at which that spring could lose some of its restorative force.

A sleeve 90 of heat-shrinkable insulation is shrunk into intimate engagement with the shank of the terminal 76; and that sleeve extends into the recess 64 to abut the short portion of the terminal 76. A sealing material 92, such as an epoxy resin, is disposed within the recess 64 in the left-hand end wall of the body portion 56; and that sealing material will fill that recess and will provide a water-tight seal between the terminal 76 and the body portion 56.

The numeral 100 denotes an electric fuse which is dimensioned to telescope within the cylindrical recesses 24 and 58, respectively, in the body portions 22 and 56. That fuse has ferrule-like terminals at the opposite ends thereof; and one of those terminals will extend into, and be held by, the cup-like contact 42, while the other of those terminals will abut the radially-extending flange on the contact 86.

The numeral 102 denotes an O-ring which is made from a resilient material. That O-ring is dimensioned to telescope over the left-hand end of the body portion 22 and to abut the left-hand face of the annular shoulder 32 on that body portion. The O-ring 102 will be engaged by the right-hand end face of the larger-diameter section 71 of the body portion 56.

The numeral 110 denotes a stiff plate which constitutes one of the relatively-movable elements of the preferred embodiment of support shown by FIGS. 1–5; and that stiff plate has openings 112, 114 and 116 therein. The opening 112 is circular in form; and it is dimensioned to readily accommodate the left-hand end of the body portion 56. The opening 114 also is circular in form; and it is dimensioned to readily accommodate the left-hand end of the left-hand body portion of the fuse holder 21. The opening 112 has a notch 115 contiguous therewith; and that notch is dimensioned to accommodate the rib 68, as shown by FIG. 5. The opening 114 has a notch 117 contiguous therewith; and that notch is dimensioned to accommodate a shallow, axially-extending rib on the female body portion of the fuse holder 21, as shown by FIG. 5. The notches 115 and 117 coact with the ribs disposed therein to prevent any appreciable rotation of the female body portions of the fuse holders 20 and 21 relative to the stiff plate 110. The opening 116 is located between the openings 112 and 114, as indicated particularly by FIG. 1; and it is a threaded opening.

The numeral 118 denotes a second stiff plate which constitutes the other relatively movable element of the preferred form of support shown by FIGS. 1–5; and it has openings 120, 122 and 124 therein. The opening 120 is circular in form; and it is dimensioned to readily accommodate the right-hand end of the body portion 22. The opening 122 also is circular in form; and it is dimensioned to readily accommodate the right-hand end of the right-hand body portion of the fuse holder

21. The opening 124 will initially be large enough to readily accommodate the threaded shank of a machine screw 126; but, after that shank has been telescoped through that opening, the diameter of that opening will be reduced in diameter by a cold flow process to cause it to closely approach the reduced diameter neck 128 of that machine screw. As a result, while the machine screw 126 can readily be rotated relative to the plate 118, it cannot be separated from that plate. The plates 110 and 118 are dimensioned so the openings 114 and 122 can be in register with each other, the openings 116 and 124 can be in register with each other, and the openings 112 and 120 can be in register with each other whenever those plates are set in registry.

The numerals 130, 132, 133 and 134 denote split rings; and those rings are made from metal, and they are made so they are relatively stiff. The normal, unstressed inner diameter of the ring 133 is smaller than the outer diameter of the left-hand end of the body portion 56 of the fuse holder 20, but that ring can be spread to telescope over that left-hand end. Similarly, the split ring 130 can be spread to telescope over the left-hand end of the left-hand body portion of the fuse holder 21. In similar fashion, the split ring 132 can be spread to telescope over the right-hand end of the right-hand body portion of the fuse holder 21; and the split ring 134 can be spread to telescope over the right-hand end of the body portion 22. The split ring 130 will be telescoped over the left-hand end of the left-hand body portion of the fuse holder 21 after that left-hand end has been passed through the opening 114 in the stiff plate 110; and then the restorative force within that ring will be permitted to press that ring into holding engagement with that body portion. Similarly, the split ring 133 will be telescoped over the left-hand end of the body portion 56 of the fuse holder 20 after that left-hand end has been passed through the opening 112 in the stiff plate 118; and then the restorative force within that ring will be permitted to press that ring into holding engagement with that body portion. The split ring 132 will be telescoped over the right-hand end of the right-hand body portion of the fuse holder 21 after that right-hand end has been passed through the opening 122 in the stiff plate 118; and then the restorative force within that ring will be permitted to press that ring into holding engagement with that body portion. Similarly, the split ring 134 will be telescoped over the right-hand end of the body portion 22 of the fuse holder 20 after that right-hand end has been passed through the opening 120 in the stiff plate 118; and then the restorative force within that ring will be permitted to press that ring into holding engagement with that body portion.

The split rings 130 and 133 will fixedly secure the female body portions of the fuse holders 20 and 21 to the stiff plate 110; and the split rings 132 and 134 will fixedly secure the male body portions of those fuse holders to the stiff plate 118. Further, those split rings can co-act with those stiff plates to dispose the confronting ends of the male and female body portions of the fuse holders 20 and 21 in register with each other whenever the stiff plates 110 and 118 are in registry. At such time, the right-hand ends of the female body portions of the fuse holders 20 and 21 can be telescoped over the left-hand ends of the male body portions of those fuse holders; and, during or after the telescoping of those right-hand ends over those left-hand ends, the threaded shank of the machine screw 126 can be threaded into the opening 116 in the stiff plate 110. Continued rotation of the machine screw 126 in the tightening direction will draw the male and female body portions of the fuse holders 20 and 21 into fully assembled condition. At such time, the support shown by FIGS. 1–5 will hold the fuse holders 20 and 21 in spaced-apart parallel relation, and thus will tend to hold the conductors, connected to the terminals of those fuse holders, in spaced-apart relation.

Whenever it is desirable to inspect or remove one of the electric fuses 100 held within the fuse holders 20 and 21, the machine screw 126 will be rotated in the loosening direction. At such time, that machine screw will co-act with the stiff plates 110 and 118 to start moving the body portions of the fuse holders 20 and 21 apart. After the threaded shank of that machine screw has been separated from the threaded opening 116 in the stiff plate 110, the stiff plates 110 and 118 can be separated to move the body portions of the fuse holders 20 and 21 apart any desired distance. At such time, the electric fuses 100 within the male body portions of those fuse holders can be inspected and, if necessary, removed and replaced. Thereafter, the body portions of the fuse holders 20 and 21 can be reassembled, and then held in fully assembled position by the machine screw 126 and the stiff plates 110 and 118.

Referring particularly to FIG. 6, the numeral 136 denotes a stiff plate which can be substituted for the stiff plate 118. The plate 136 has openings, not shown, therein which can be identical to the openings 120 and 122; and those openings will receive the right-hand ends of the right-hand body portions of the fuse holders 20 and 21, respectively. Split rings 132 and 134 will hold those body portions fixedly in position within those openings. The plate 136 also has an opening, not shown, which can be identical to the opening 124 in the plate 118; and that opening will rotatably support a machine screw 126.

The plate 136 differs from the plate 118 in FIGS. 1–5, in that it is longer and it has an additional opening 138 therein. That opening can accommodate a fastener which can be used to suitably secure the plate 136 to a boss, bracket or other structural element in an electrical box or the like. When it is secured to that boss, bracket or other structural element, the plate 136 will be able to hold the fuse holders 20 and 21 fixed relative to that electrical box or the like.

Referring particularly to FIG. 7, the numeral 140 denotes another stiff plate which can be substituted for the stiff plate 118. The plate 140 has openings, not shown, therein which can be identical to the openings 120 and 122; and those openings can accommodate the right-hand ends of the right-hand body portions of fuse holders 20 and 21, respectively. Split rings 132 and 134 will hold those body portions fixedly in position within those openings. The plate 140 also has an opening, not shown, which can be identical to the opening 124 in the plate 118; and that opening will rotatably support a machine screw 126.

The plate 140 differs from the plate 118 in FIGS. 1–5, in that it has an ear 141 projecting outwardly beyond one edge thereof. That ear has an opening 142

therein which can accommodate a fastener **146** that can secure the plate **140** to a boss, bracket or other structural element **144** in an electrical box or the like. As a result, the plate **140** is able to hold the fuse holders **20** and **21** fixed relative to that electrical box or the like.

The three embodiments of support shown in the drawing are simple and inexpensive; but they are very effective in holding a plurality of "in-the-line" fuse holders in spaced-apart relation. Further, those three embodiments make it possible to move the confronting ends of the male and female body portions of those fuse holders into and out of fully assembled relation. While the three embodiments of supports are particularly useful with the fuse holders **20** and **21**, those embodiments could be used with other fuse holders. For example, by increasing decreasing or changing the configurations of the openings in the stiff plates thereof, it would be possible to enable the embodiments of support provided by the present invention to be used to hold fuse holders of many different sizes and configurations.

Whereas the drawing and accompanying description have shown and described several preferred embodiments of the present invention, it should be apparent to those skilled in the art that various changes may be made in the form of the invention without affecting the scope thereof.

What I claim is:

1. A support that can hold a plurality of "in-the-line" fuse holders, each of which has a male body portion and a female body portion to enclose an electric fuse and each of which has a stop on said male body portion thereof and a stop on said female body portion thereof, in spaced-apart relation and that comprises a first supporting element which has a plurality of spaced openings therein to accommodate and support said male body portions of said plurality of "in-the-line" fuse holders while permitting parts of said male body portions to pass completely through said first said supporting element, said plurality of spaced openings in said first said supporting element being dimensioned to prevent the passage therethrough of said stops on said male body portions whereby said stops on said male body portions will engage and be held by one face of said first said supporting element, a second supporting element that has a plurality of spaced openings therein to accommodate and support said female body portions of said plurality of "in-the-line" fuse holders while permitting parts of said female body portions to pass completely through said second supporting element, said plurality of spaced openings in said second supporting element being dimensioned to prevent the passage therethrough of said stops on said female body portions whereby said stops on said female body portions will engage and be held by one face of said second supporting element, retaining members that continuously hold all of said male body portions within said plurality of spaced openings in said first said supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, further retaining members that continuously hold all of said female body portions within said plurality of spaced openings in said second supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, the first said retaining members being adjacent to and engageable with the opposite face of said first said supporting element, said further retaining members being adjacent to and engageable with the opposite face of said second supporting element, and securing means engageable with said first said and said second supporting elements and releasably spanning the distances between said stops on said male body portions and said stops on said female body portions to releasably secure all of said body portions of said "in-the-line" fuse holders in assembled relation with each other and to releasably hold said first said and said second supporting elements in predetermined spaced-apart relation, said securing means holding said one face of said first said supporting element in confronting relation with said one face of said second supporting element whenever said securing means is securing said first said and said second supporting elements in said predetermined spaced-apart relation, said first said retaining members engaging the exterior surfaces of said male body portions at points displaced from said stops on said male body portions to prevent accidental separation of said male body portions from said first said supporting element and said further retaining members engaging the exterior surfaces of said female body portions at points displaced from said stops on said female body portions to prevent accidental separation of said female body portions from said second supporting element, whereby said first said retaining members are readily applied to said male body portions and whereby said further retaining members are readily applied to said female body portions.

2. A support as claimed in claim 1 wherein said first said supporting element is plate-like in configuration, wherein said second supporting element is plate-like in configuration, wherein said plurality of openings in said first said supporting element have the axes thereof normal to said first said supporting element, wherein said plurality of openings in said second supporting element have the axes thereof normal to said second supporting element, and wherein said plurality of openings in said first said supporting element have the same center-to-center distance as said plurality of openings in said second supporting element, whereby said first said supporting element can automatically align said male portions with said plurality of female portions whenever said one faces of said first said and said second supporting elements are in confronting relation and said first said and said second supporting elements are aligned with each other.

3. A support as claimed in claim 1 wherein said male body portions of said fuse holders have fuse-receiving ends which project beyond said one face of said first supporting element and extend toward said one face of said second supporting element, wherein said female body portions of said fuse holders have fuse-receiving ends which project beyond said one face of said second supporting element and extend toward said one face of said first said supporting element, wherein said first said retaining members coact with said stops on said male body portions to hold said male body portions transverse of said first said supporting element and with the opposite ends of said male body portions projecting outwardly beyond said opposite face of said first said supporting element, wherein said further retaining

members coact with said stops on said female body portions to hold said female body portions transverse of said second supporting element and with the opposite ends of said female body portions projecting outwardly beyond said opposite face of said second supporting element.

4. A support as claimed in claim 1 wherein said retaining members and said further retaining members are split rings which have normal, un-stressed inner diameters smaller than the outer diameters of said male and female body portions, wherein the restorative forces within some of said split rings fixedly hold said male body portions in assembled relation with said first said supporting element, wherein the restorative forces within other of said split rings fixedly hold said female body portions in assembled relation with said second supporting element, and wherein said first said and said second supporting elements and said first said and said further retaining members coact with securing means to effect substantially simultaneous closing of said "in-the-line" fuse holders.

5. A support as claimed in claim 1 wherein one of said supporting elements has one end thereof projecting beyond the body portion closest to that end and wherein said one end of said one supporting element has an opening therein to accommodate a fastener that can secure said one supporting element, and hence said support and said fuse holders, to a fixed member.

6. A support that can hold a plurality of "in-the-line" fuseholders, each of which has a male body portion and a female body portion to enclose an electric fuse and each of which has a radially-projecting shoulder on said male body portion thereof and a radially-projecting shoulder on said female body portion thereof, in spaced-apart relation and that comprises a first supporting element which has a plurality of spaced openings therein to accommodate and support said male body portions of said plurality of "in-the-line" fuse holders while permitting parts of said male body portions to pass completely through said first said supporting element, said plurality of spaced openings in said first said supporting element being dimensioned to prevent the passage therethrough of said radially-projecting shoulders on said male body portions whereby said radially-projecting shoulders on said male body portions will engage and be held by one face of said first said supporting element, a second supporting element that has a plurality of spaced openings therein to accommodate and support said female body portions of said plurality of "in-the-line" fuse holders while permitting part of said female body portions to pass completely through said second supporting element, said plurality of spaced openings in said second supporting element being dimensioned to prevent the passage therethrough of said radially-projecting shoulders on said female body portions whereby said radially-projecting shoulders on said female body portions will engage and be held by one face of said second supporting element, retaining members that continuously hold all of said male body portions within said plurality of spaced openings in said first said supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, further retaining members that continuously hold all of said female body portions within said plurality of spaced openings in said second supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, the first said retaining members being adjacent to and engageable with the opposite face of said first said supporting element, said further retaining members being adjacent to and engageable with the opposite face of said second supporting element, securing means engageable with said first said and said second supporting elements and releasably spanning the distances between said radially-projecting shoulders on said male body portions and said radially-projecting shoulders on said female body portions to releasably secure all of said body portions of said "in-the-line" fuse holders in assembled relation with each other, said supporting elements having said one faces confronting each other whenever said supporting elements hold said body portions of said "in-the-line" fuse holders in assembled relation with each other, said one face on said first said supporting element engaging said radially-projecting shoulders on said male body portions, and said one face on said second supporting element engaging said radially-projecting shoulders on said female body portions, and said securing means releasably holding said one face of said first said supporting element tightly pressed against said radially-projecting shoulders on said male body portions and said one face of said second supporting element tightly pressed against said radially-projecting shoulders on said female body portions.

7. A support that can hold a plurality of "in-the-line" fuse holders, each of which has a male body portion and a female body portion to enclose an electric fuse and each of which has a stop on said male body portion thereof and a stop on said female body portion thereof, in spaced-apart relation and that comprises a first supporting element which has a plurality of spaced openings therein to accommodate and support said male body portions of said plurality of "in-the-line" fuse holders while permitting parts of said male body portions to pass completely through said first said supporting element, said plurality of spaced openings in said first said supporting element being dimensioned to prevent the passage therethrough of said stops on said male body portions whereby said stops on said male body portions will engage and be held by one face of said first said supporting element, a second supporting element that has a plurality of spaced openings therein to accommodate and support said female body portions of said plurality of "in-the-line" fuse holders while permitting parts of said female body portions to pass completely through said second supporting element, said plurality of spaced openings in said second supporting element being dimensioned to prevent the passage therethrough of said stops on said female body portions whereby said stops on said female body portions will engage and be held by one face of said second supporting element, retaining members that continuously hold all of said male body portions within said plurality of spaced openings in said first said supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, further retaining members that continuously hold all of said female body portions within said plurality of spaced openings in said second

supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, the first said retaining members being adjacent to and engageable with the opposite face of said first said supporting element, said further retaining members being adjacent to and engageable with the opposite face of said second supporting element, securing means engageable with said first said and said second supporting elements and releasably spanning the distances between said stops on said male body portions and said stops on said female body portions to releasably secure all of said body portions of said "in-the-line" fuse holders in assembled relation with each other and to releasably hold said first said and said second supporting elements in predetermined spaced-apart relation, said securing means holding said one face of said first said supporting element in confronting relation with said one face of said second supporting element whenever said securing means is securing said first said and said second supporting elements in said predetermined spaced-apart relation, one of said supporting elements having an ear projecting beyond one edge thereof, and said ear having an opening therein to accommodate a fastener that can secure said one supporting element, and hence said support and said fuse holders, to a fixed member.

8. A support that can hold a plurality of "in-the-line" fuse holders, each of which has a male body portion and a female body portion to enclose an electric fuse and each of which has a stop on said male body portion thereof and a stop on said female body portion thereof, in spaced-apart relation and that comprises a first supporting element which has a plurality of spaced openings therein to accommodate and support said male body portions of said plurality of "in-the-line" fuse holders while permitting parts of said male body portions to pass completely through said first said supporting element, said plurality of spaced openings in said first said supporting element being dimensioned to prevent the passage therethrough of said stops on said male body portions whereby said stops on said male body portions will engage and be held by one face of said first said supporting element, a second supporting element that has a plurality of spaced openings therein to accommodate and support said female body portions of said plurality of "in-the-line" fuse holders while permitting parts of said female body portions to pass completely through said second supporting element, said plurality of spaced openings in said second supporting element being dimensioned to prevent the passage therethrough of said stops on said female body portions whereby said stops on said female body portions will engage and be held by one face of said second supporting element, retaining members that continuously hold all of said male body portions within said plurality of spaced openings in said first said supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, further retaining members that continuously hold all of said female body portions within said plurality of spaced openings in said second supporting element while said male body portions and said female body portions are moved into and out of assembled relation with each other, the first said retaining members being adjacent to and engageable with the opposite face of said first said supporting element, said further retaining members being adjacent to and engageable with the opposite face of said second supporting element, securing means engageable with said first said and said second supporting elements and releasably spanning the distances between said stops on said male body portions and said stops on said female body portions to releasably secure all of said body portions of said "in-the-line" fuse holders in assembled relation with each other and to releasably hold said first said and said second supporting elements in predetermined spaced-apart relation, said securing means holding said one face of said first said supporting element in confronting relation with said one face of said second supporting element whenever said securing means is securing said first and said second supporting elements in said predetermined spaced-apart relation, said securing means including a machine screw with a reduced-diameter neck and an opening in one of said supporting elements which is larger than said reduced-diameter neck but is smaller than the shank of said machine screw, whereby said machine screw can be rotated relative to said one supporting element but can not be separated from said one supporting element, said machine screw being rotatable in one direction relative to said one supporting element to move said male body portions toward said female body portions, said machine screw being rotatable in the opposite direction relative to said one supporting element to move said male body portions away from said female body portions.

* * * * *