United States Patent [19]

Poliak et al.

[11] **3,856,376**

[45] **Dec. 24, 1974**

[54] **ELECTRICAL CONNECTOR**

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[22] Filed: **Apr. 27, 1972**

[21] Appl. No.: **248,030**

Related U.S. Application Data

[63] Continuation of Ser. No. 30,143, April 20, 1970, abandoned.

[52] **U.S. Cl.** **339/107**

[51] **Int. Cl.** **H01r 13/58**

[58] **Field of Search** 339/103, 105, 107, 208

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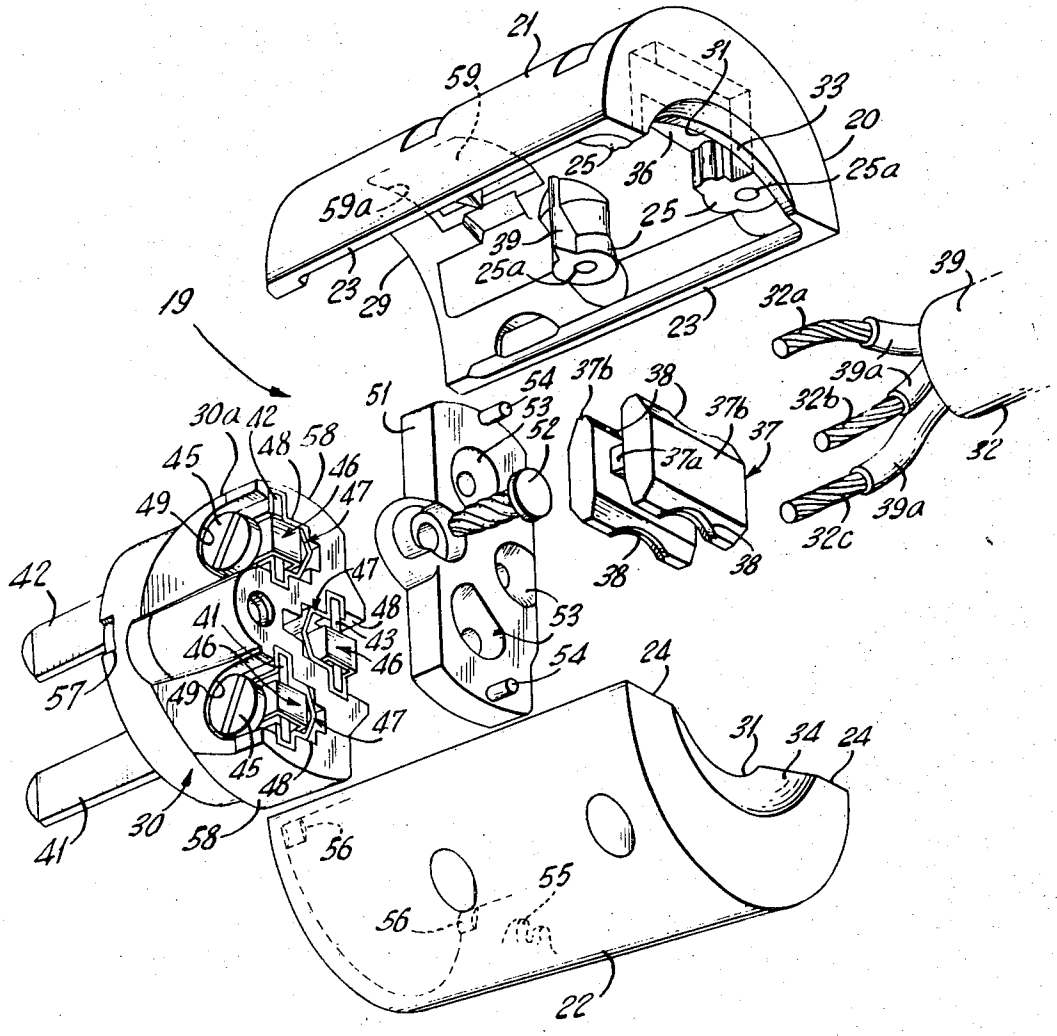
Attorney, Agent, or Firm—Cushman, Darby & Cushman

[57] **ABSTRACT**

This invention relates to an electrical connector for attachment to the end of an electrical cable. The connector includes a split body having contacts supported thereon for attachment to conductor wires of the cable. The split body accommodates cables of different diameters and is provided with a cable gripping member which can be placed in different positions to engage and hold cables of different diameters with a predetermined force when mating portions of the split body are brought into opposing engagement.

When assembled, the connector has no exposed metal parts on the contact-carrying face thereof except for the electrical contacts.

23 Claims, 16 Drawing Figures



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SHEET 1 OF 4

Fig. 1.

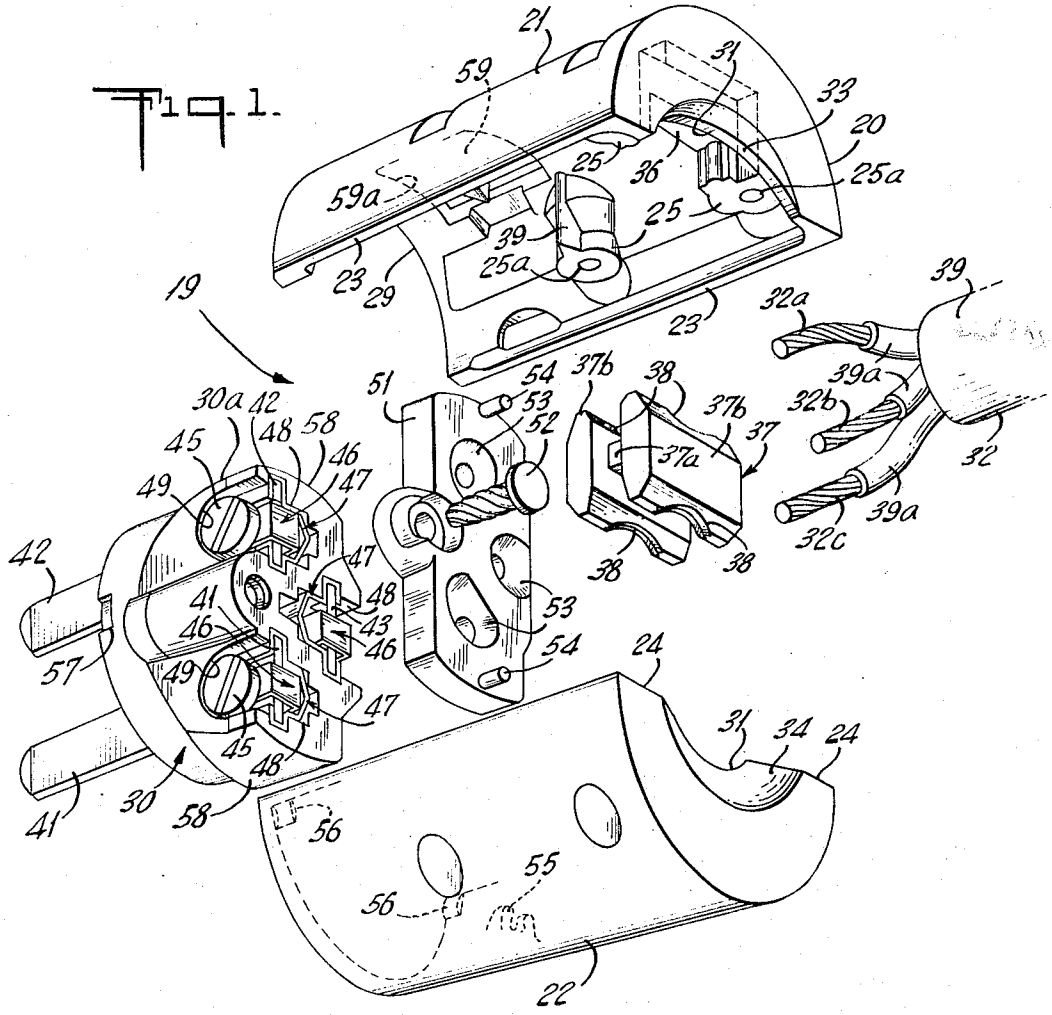
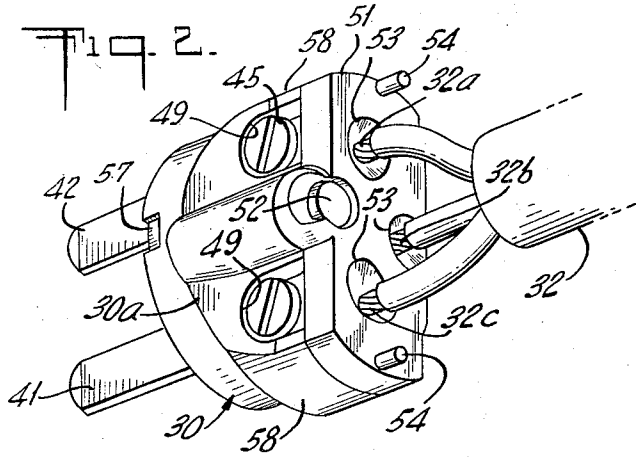


Fig. 2.



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Fig. 3.

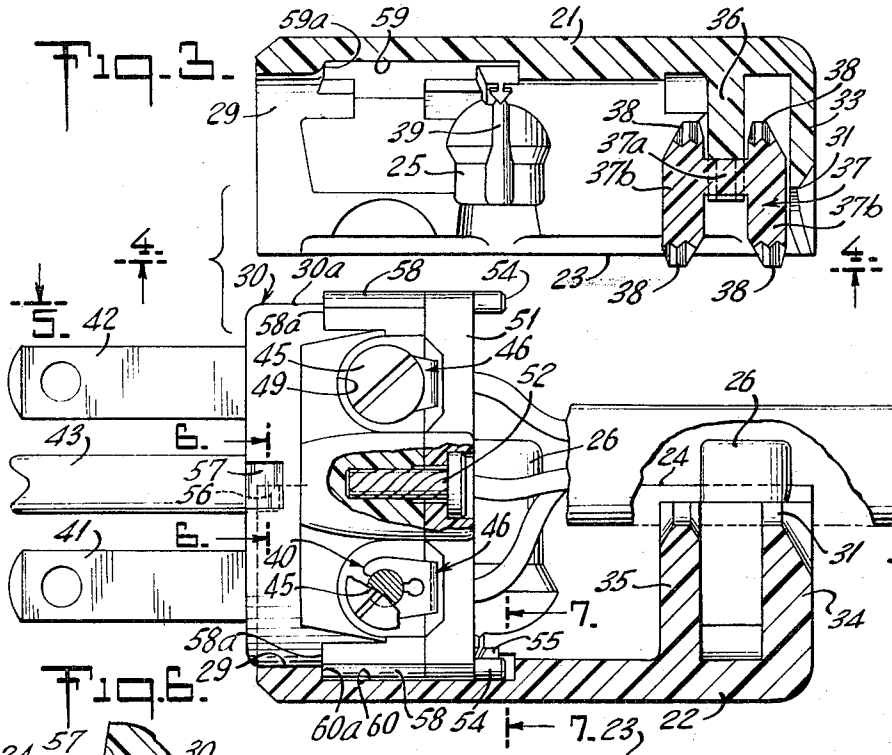


Fig. 6.

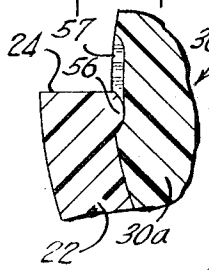


Fig. 7.

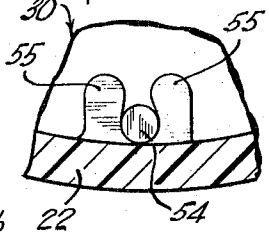


Fig. 4.

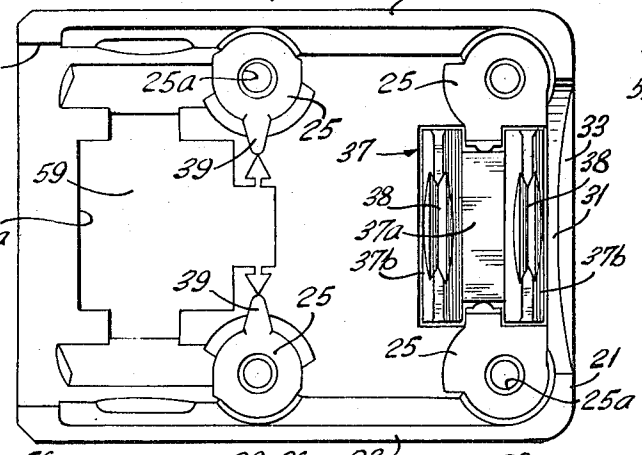
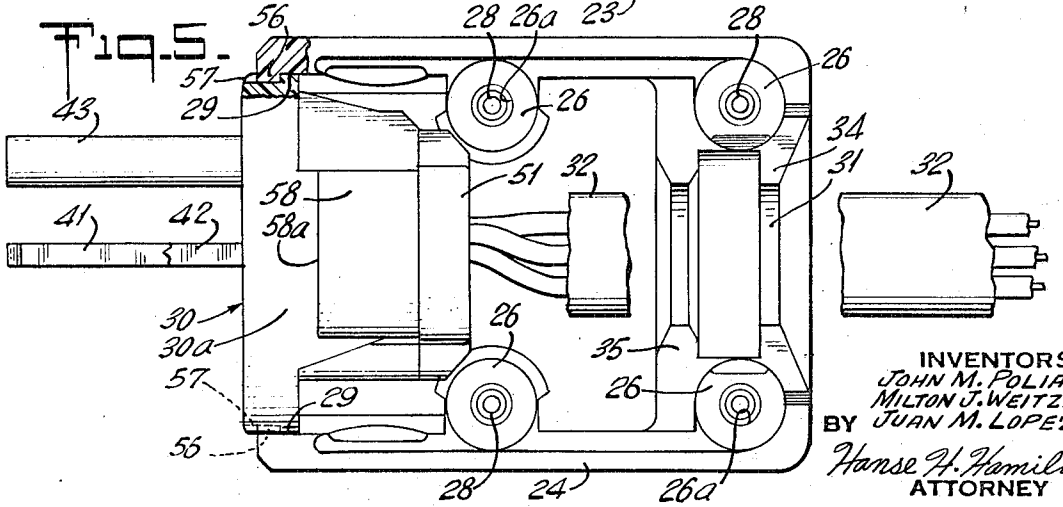


Fig. 5.



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Fig. 8.

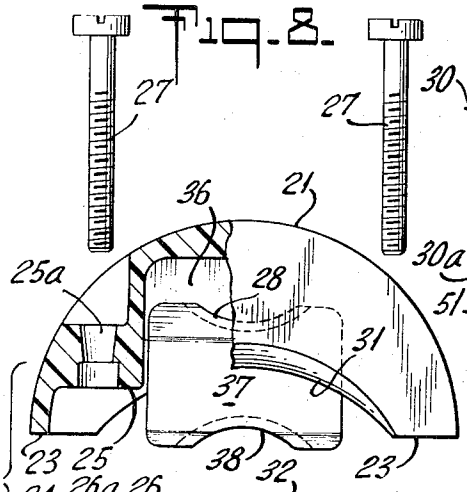


Fig. 9.

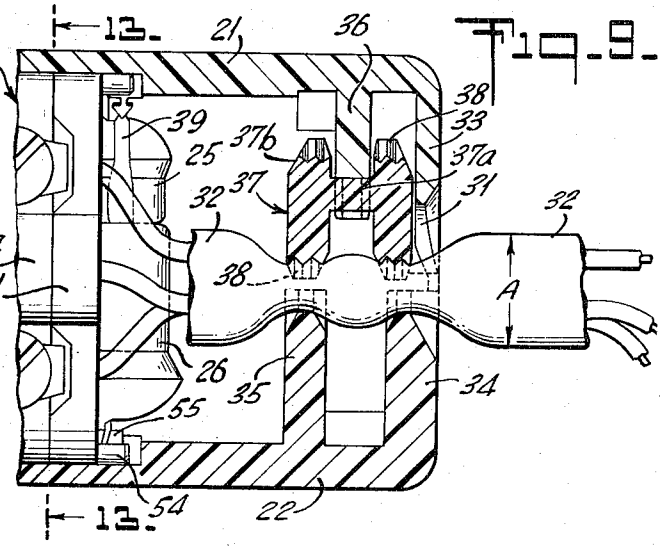
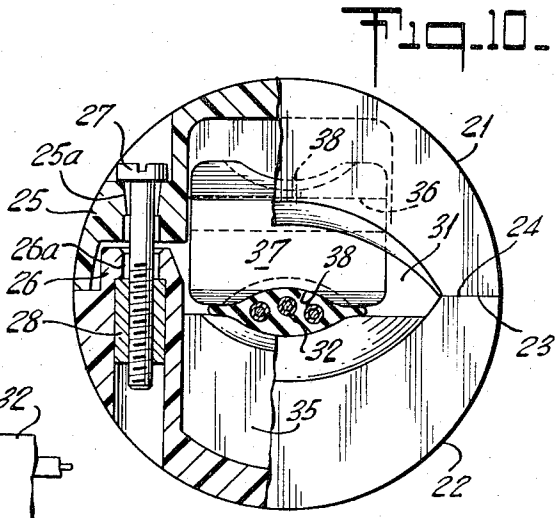


Fig. 10.



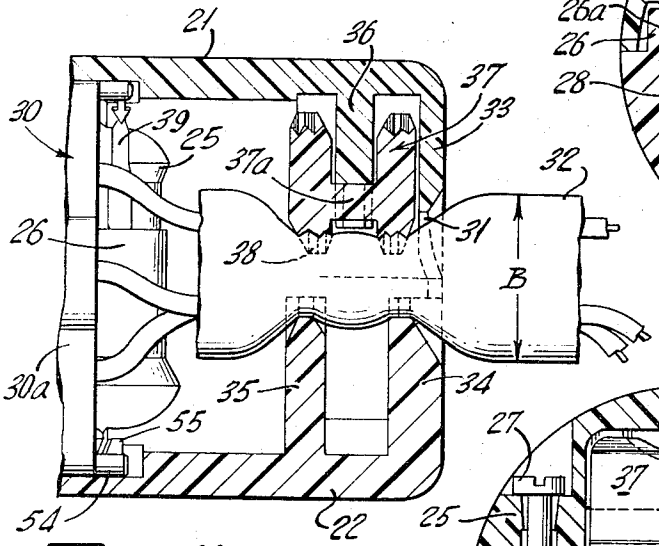
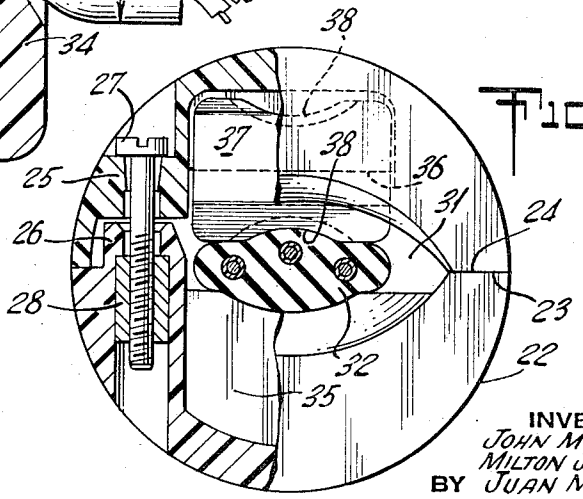


Fig. 11.

Fig. 12.



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Fig. 13.

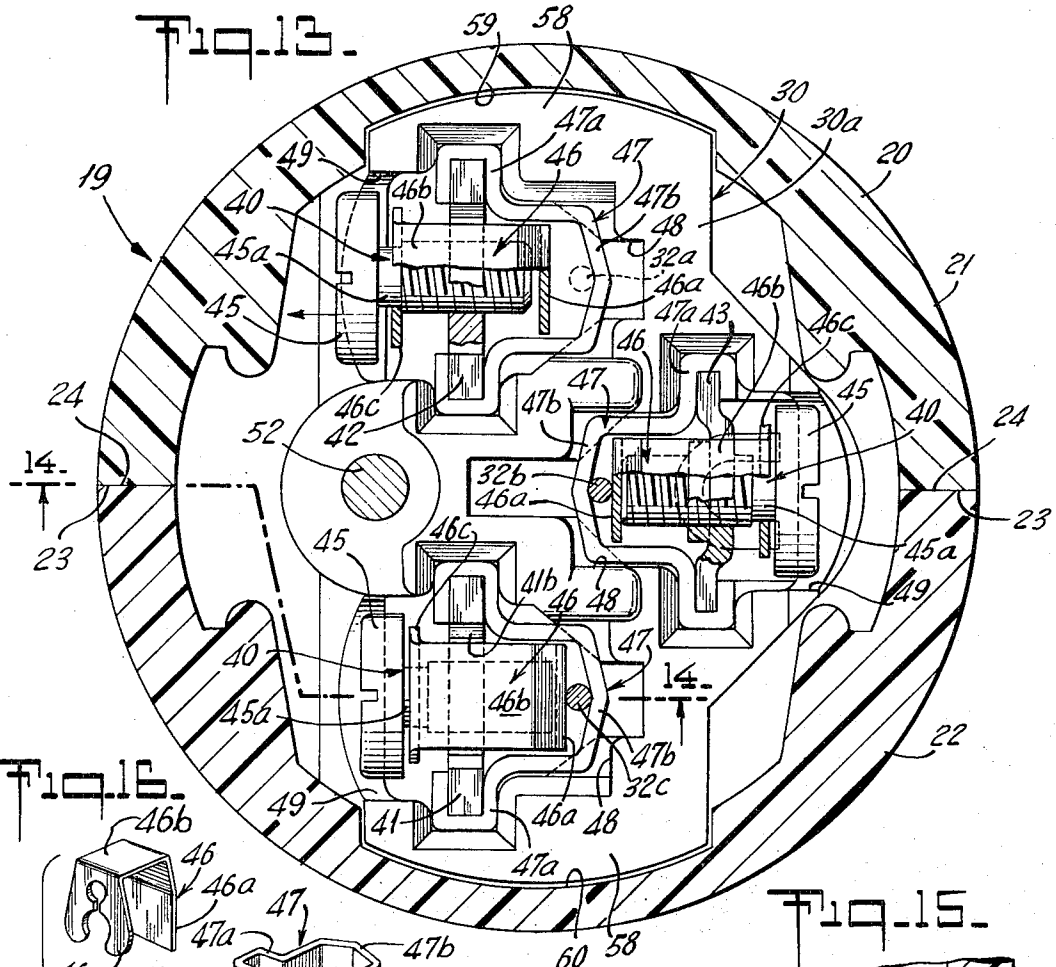


Fig. 16.

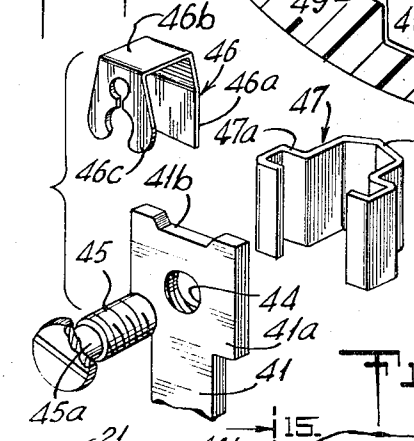


Fig. 14.

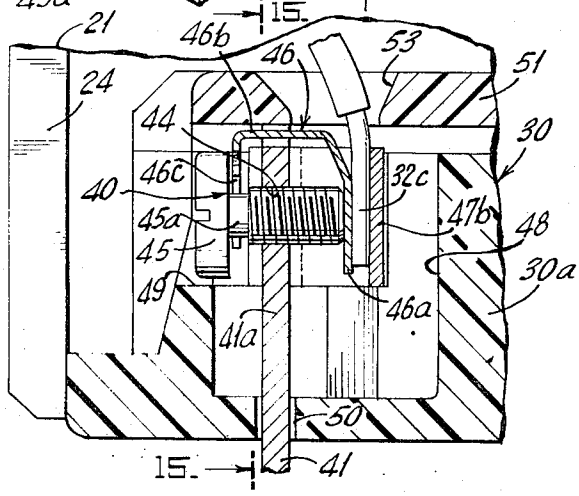
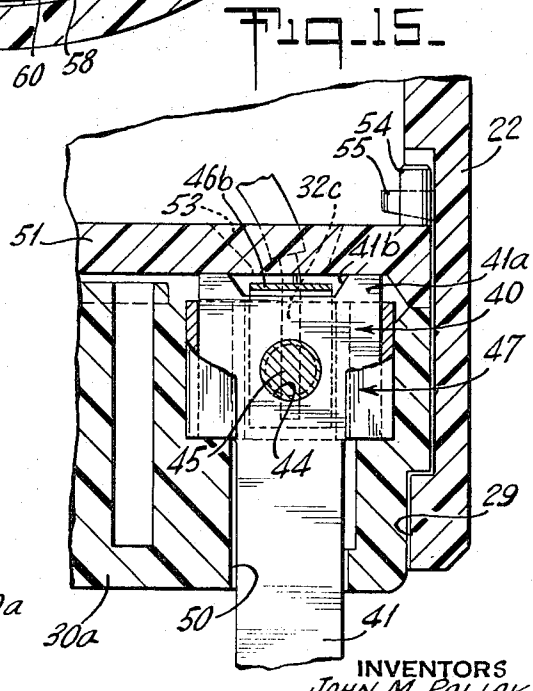


Fig. 15.



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ELECTRICAL CONNECTOR

This application is a continuation of our copending application Ser. No. 30,143, filed Apr. 20, 1970, now abandoned.

The present invention relates to an electrical connector for attachment to an end of an electric cord or cable. It relates, more particularly, to a heavy-duty connector for attachment to an electric cable containing a plurality of conductors which is capable of receiving and gripping different sizes of cable without damage or injury to such cables.

One of the principal problems with existing connectors arises from improper gripping or clamping of the cable when it is attached to the connector and the improper clamping of the cable is frequently a source of failure and accidents. One reason this is that existing cable clamping devices are designed to engage the cable independently of the connector as such and the clamping is dependent upon the judgement of the person tightening the clamp when installing the cable in the connector.

An object of the present invention is to overcome this problem by providing a connector in which portions of the connector body and a cable-gripping device act in conjunction with each other and automatically establish the desired gripping force which is to be exerted on a cable of a given diameter when parts of the connector body are brought into engagement with each other.

Another object of the invention is to provide a connector which will accommodate cables of different diameters while providing the desired gripping force with which such cables are to be held.

A further object of the invention is to provide an electrical connector which has no exposed metal parts on the contact-carrying face thereof for the contact elements themselves.

Still another object of the invention is to provide an electrical connector which is not readily subject to damage and which forms a substantially weather-resistant enclosure when attached to an electrical cable.

A further object of the invention is to provide an electrical connector which can be assembled and attached to the end of an electrical cable without difficulty or possible damage to the cable.

These and other features of the present invention will be better understood from the following description and the accompanying drawings, in which:

FIG. **1** is an exploded view in perspective illustrating various parts of an electrical connector embodying the invention in conjunction with an end of an electric cable containing three wires;

FIG. **2** is a perspective view of a contact-carrying insert forming part of the connector shown in FIG. **1** with the end of the cable being connected thereto;

FIG. **3** is a side view in vertical section of the connector shown in FIG. **1** with certain parts thereof being assembled;

FIG. **4** is an inverted plan view of the upper half of the connector body and strain relief as seen from the line **4—4** of FIG. **3**;

FIG. **5** is a plan view of the lower half of the connector body and contact-carrying insert as seen from line **5—5** of FIG. **3**;

FIG. **6** is a fragmentary view in section taken along line **6—6** of FIG. **3** and is drawn to a somewhat enlarged scale;

FIG. **7** is a fragmentary view in vertical section taken along line **7—7** of FIG. **3**;

FIG. **8** is a rear end view in partial section of the partially assembled connector shown in FIG. **3** with certain parts being omitted for purposes of clarity;

FIG. **9** is a fragmentary view in vertical section of a portion of the connector shown in FIGS. **1** and **3** after assembly;

FIG. **10** is a rear end view in partial section of the assembled connector shown in FIG. **9**;

FIG. **11** is a fragmentary view in vertical section of the connector shown in FIG. **9** when attached to a cable of a large diameter.

FIG. **12** is a rear end view in partial section of the connector shown in FIG. **11**;

FIG. **13** is a section view taken along line **13—13** of FIG. **9**;

FIG. **14** is a fragmentary view in section taken along line **14—14** of FIG. **13**;

FIG. **15** is a fragmentary view in section taken along line **15—15** of FIG. **14**; and

FIG. **16** is an exploded view in perspective illustrating parts of a terminal for connecting bare ends of the wires of the cable to the contact elements.

Referring to the drawings in detail, there is a connector **19** embodying the invention. The connector **19** includes a split body or shell **20** of cylindrical shape which has a hollow interior to receive and support various parts of the connector assembly.

The split body or shell **20** consists of two parts, an upper part **21** and a lower part **22** which may be molded from nylon or other suitable insulating material. The two parts **21** and **22** are complementary and have opposing surfaces **23** and **24** which, respectively, extend along the opposite side edges thereof and when the opposing surfaces are brought into mating engagement, a tight closure is formed along the sides of the split body.

Spaced interior bosses **25** are formed in the upper part **21** of the body and oppose spaced interior bosses **26** formed in the lower part **22** of the body when the two parts of the body are secured together. The bosses **25** in the upper part **21** of the body contain screw-receiving openings **25***a* are aligned with openings **26***a* in the bosses **26** in the lower part **22** of the body. The two parts of the body are secured together by screws **27** which extend through the openings **25***a* and engage with threaded bushings **28** located in the bosses **26** in the lower part of the body. If desired, the bushings **28** may be molded in the bosses **26** and the screws **27** will be the only metal parts exposed on the exterior of the connector other than current-carrying parts with the screws **27** being remotely located relative to such current-carrying parts.

The split connector body **20** has an opening **29** at its front or forward end which makes a close fit with the front end of a contact-carrying insert **30.** The opposite or rear end of the connector body **20** also has an opening **31** formed therein to receive the end of an electrical cable **32** to which the connector is to be attached.

The cable-receiving opening **31** at the rear of the body **20** is oval in shape and is defined by flanges **33** and **34** extending inwardly from the upper and lower parts **21** and **22** of the body. The upper or inner end of

the flange 34 carried by the lower half 22 of the body is displaced inwardly relative to the lower end of the flange 33 carried by the upper half 21 of the body and acts as a cable-gripping member forming part of a strain-relief (see FIGS. 9 and 11). For this reason, the lower flange 34 is made somewhat thicker than the upper flange 33 with its upper end being relieved so that the opposing ends of the flanges are offset. In addition, the lower flange 34 is of greater height than the upper flange 33 to engage with the cable 32. A rib or flange 35 also corresponding in height to the flange 34 extends inwardly from the lower part 22 of the body at a point spaced inwardly relative to the end flange 34 and also acts as a cable-engaging member forming part of the strain relief.

In the upper part 21 of the split body, a supporting rib 36 extends inwardly therefrom at a point opposite the space between the end flange 34 and the rib 35 carried by the lower part of the body. A reversible H-shaped cable-clamping member 37 straddles the rib 36 and is supported thereon with the ends of the H-shaped member being in opposing spaced relation to the flanges 34 and 35 in the lower half of the body.

A connecting bar 37*a* of the H-shaped member rests on and is supported by the rib 36 and the legs 37*b* extend downwardly therefrom in opposing relation to the rib 35 and the flange 34. The bar 37*a* is offset in relation to the length of the legs 37*b* of the H, and the space between the ends of legs 37*b* and the opposing ends of the flange 34 and the rib 35 may be changed to accommodate and grip different sizes of cables by reversing the position of the H-shaped member on the supporting rib. This permits the strain-relief or cable-clamping members to engage cables of different diameters with the proper gripping action. If desired, the ends of the legs 37*b* may be provided with tooth-like serrations 38 to increase the gripping action.

As will be seen from FIG. 8, the opposing ends of the strain-relief or cable-gripping members define an opening having a generally oval-shaped configuration with the dimension along the minor axis thereof being somewhat smaller than the outer diameter of the cable 32. Thus, the cable which is deformable, is compressed between the opposing member and is forced outwardly along the major axis of the oval-shaped opening when the clamping takes place, as shown, for example, in FIGS. 10 and 12. This prevents possible damage to the conductors of the cable.

As illustrated, the electrical cable 32 has an outer covering 39 of insulating material and contains three conductor wires 32*a*, 32*b* and 32*c*, each of which has a covering 39*a* of insulating material. One of the conductors may serve as ground wire and the size or outer diameter of the cable 32 will depend to some extent on the size or gauge of the conductor wires 32*a*, 32*b* and 32*c* used therein.

In the embodiment illustrated, the connector will accommodate cables varying from about .296 inches in diameter to about .500 inches in diameter in one position of the H-shaped member (as shown in FIG. 10) and cables varying from about .500 inches in diameter to about .703 inches in diameter in the reversed position of the H-shaped member (as shown in FIG. 12).

In either case, the gripping action or force exerted on the cable will exceed the established standards or requirements without damage to the cable or the conductors therein. In addition, the gripping force exerted on the cable will be established and exerted to the full extent required by securing the two parts of the connector body together with their opposing side edges in engagement. This eliminates the possibilities of there being too great a clamping force which may damage the cable or insufficient force being exerted on the cable.

The foregoing is illustrated in FIGS. 9 and 10 where the reversible H-shaped clamping member 37 is positioned to engage with a cable of a diameter A and in FIGS. 11 and 12 where the H-shaped clamping member 37 is shown in reversed position to engage with a cable of a larger diameter B.

To determine the proper position of the H-shaped member, opposing fingers 39 extending inwardly from the bosses 25 in the upper half of the body (see FIG. 4) may be provided as a gauge. Where the diameter of the cable is greater than the spacing between the fingers, the H-shaped clamping member 37 will be set at a position for a large cable and where the diameter of the cable is smaller than the space between the gauge fingers, the H-shaped clamping member will be set in a position for a smaller cable.

As shown in FIGS. 1–5, the end of the cable 32 extends into the split shell or body and a portion of the outer covering 39 of insulating material is removed to expose the individual conductor wires 32*a*, 32*b* and 32*c*. In addition, portions of the insulation 39*a* are removed from the conductors to expose the bare ends thereof. The bare ends of the conductors wires are then connected, respectively, to wiring terminals 40 at the inner ends of contact elements 41, 42 and 43.

The contact elements 41, 42 and 43 are supported in spaced relation to each other on a block 30*a* of insulating material forming part of the contact-carrying insert 30. As shown, each of the contact elements 41, 42 and 43 has a male contact prong which extends outwardly from the face or front end of the insert 30 and beyond the end of the connector body. The prongs for contact elements 41 and 42 are in the form of flat blades while the prong for the contact element 43 has a U-shaped configuration which is customarily used for a grounding contact. Otherwise, the contact elements 41, 42 and 43 and the wiring terminals 40 carried thereby are similar and to avoid repetition, only one of the contact elements and the wiring terminal carried thereby will be described.

It will also be understood that female contacts may be employed in place of the male prongs of the contact elements 41, 42 and 43 where the connector is to serve as a receptacle.

Each of the wiring terminals 40 is of a slider type. As shown in FIGS. 13–16, the contact element 41 has an enlarged upper end 41*a* with a threaded opening 44 being formed therein. A screw 45 is threaded in the opening 44 and its forward end engaging a leg 46*a* carried by a slider element 46 formed from a conductive material. The leg 46*a* extends in front of the end of screw and is connected to a lateral arm 46*b*. The arm 46*b* extends rearwardly through a recess 41*b* in the upper end of the contact element 41 and carries a downwardly extending bifurcated leg 46*c*. The leg 46*c* engages with an undercut 45*a* in the shank of the screw 45. Thus, turning of the screw 45 causes the slider element 46 to move with the screw toward or away from a yoke-like retainer 47 of conductive material. The retainer has rearwardly extending arms 47*a* which extend

around and engage with the upper end of the contact **41.** The retainer also has a trough-shaped center portion **47***b* which is positioned in opposing relation to the forward leg **46***a* of the slider element **46.** The trough-shaped portion of the retainer serves to guide the bare end of a conductor wire into position between the retainer and the forward leg **46***a* of the slider element **46** where it will be clamped between these parts by advancing movement of the screw **45.** Such an arrangement avoids the necessity for looping the bar end of the conductor wire around a terminal screw and avoids damage to the wire.

As shown best in FIG. **13,** the terminals **40** carried by the contact elements **41, 42** and **43** are located, respectively, in spaced recesses **48** formed in the upper or inner face of the supporting block **30***a* and which are shaped to receive the terminals **40.** The recesses **48** are provided with side openings **49** through which the headed ends of the screws **45** for the respective terminals are accessible. The bottoms of the recesses **48** contain slotted openings **50** through which the prongs of the contact elements extend. The enlarged upper ends of the contact elements rest on the bottoms of the recesses and support the contact elements in the block **30***a*, as shown for example in FIG. **15.**

A cover **51** extends over the top of the insulating block **30***a* and the upper ends of the contact elements **41, 42** and **43** to hold the contact elements in place. The cover **51** may be secured to the upper end of the insulating block **30***a* by means of a drive screw **52** or other suitable fastening means.

The cover **51** contains three spaced openings **53,** each of which is aligned with one of the terminals **40** carried by the contact elements **41, 42** and **43** so as to permit the introduction of the bare ends of the conductor wires into position for clamping between slider element **46** and retainer **47.** To facilitate introduction of the bare ends of the wire, the openings **53** may be enlarged at their outer ends.

As shown in FIG. **2,** the contact-carrying insert **30** is a self-contained unit to which the conductor wires may be easily attached prior to final assembly of the connector.

To aid in assembly of the conductor, the contact-carrying insert **30** is provided with locating pins **54** which extend rearwardly from the cover adjacent opposite sides thereof. When the contact-carrying insert **30** is placed in the lower part **22** of the split body **20,** one of the pins **54** will engage with a set of opposing resilient spring fingers **55** which are formed on and extend upwardly from the lower part **22** of the split body **20.** At the same time, a pair of detents **56** will snap into engagement with the walls of recesses **57** in sides of the contact-carrying insert **30** at the forward end thereof so that the insert will be firmly held in place in the lower part **22** of the split body **20** during further assembly of the connector. It will be noted that the contact-carrying insert **30** has projections **58** extending along opposite sides thereon at points spaced rearwardly of its front face. The projections **58** fit into cavities **59** and **60** formed in the inner faces of the upper and lower halves **21** and **22** of the split body **20.** Shoulders **59***a* and **60***a* at the forward ends of the cavities **59** and **60** engage with the forward ends **58***a* of the side projections **58** on the contact-carrying insert and hold the insert against forward movement relative to the split body **20.** However, the sides of the contact-carrying insert are symmetrical and the insert can be placed in the lower part **22** of the body **20** with either side facing upwardly.

After the contact-carrying insert **30** with the cable **32** connected thereto has been placed in the lower part **22** of the split body **20,** the upper part **21** of the split body **20** is then brought into opposing relation to the lower part **22** with the H-shaped strain-relief member **37** being in proper position to engage with the outer circumference of the cable employed as described above. The four fastenings screws or bolts **27** are then threaded into the bushings **28** and the opposing side edges of the upper and lower parts of the split body are brought into firm engagement. This brings the legs of the H-shaped member **37** and the opposing members **34** and **35** in the lower half of the body into clamping engagement with the exterior of the cable **32.** This completes the assembly of the connector and its attachment to the end of a cable.

It will be understood that various changes and modifications may be made by those skilled in the art in the embodiments of the invention illustrated and described herein without departing from the spirit or scope of the invention.

We claim:

1. In an electrical connector for attachment to the end of an electrical cable, the improvement which comprises:

a. a split body formed of an insulating material;

b. said body being split along its longitudinal axis into two complementary parts and having an opening at a rear end thereof to receive an electrical cable;

c. said two parts of the body having opposing surfaces adapted to be brought into engagement with each other;

d. fastening means located along opposite sides of said body for securing the two parts of the body together; and

e. strain-relief means carried by and located within said body adjacent the opening in the rear end thereof for engagement with the cable received therein;

f. said relief means exerting a predetermined clamping force on the cable when the two parts of the body are brought into engagement; wherein:

g. the strain-relief means includes cable-clamping members carried by the two parts of the split body;

h. said cable-clamping members having opposing spaced surfaces for receiving and clamping a cable therebetween;

i. at least one of said clamping members is capable of being placed in different positions in one part of the body with the spacing between the clamping surfaces of said members being different in each of said different positions; and wherein:

j. said one cable clamping member has an H-shape having legs with clamping surfaces at the ends thereof;

k. said H-shaped member including a bar connecting said legs with said bar being offset relative to the ends of the legs.

2. An electrical connector for attachment to an end of an electrical cable, which comprises:

a. split body of insulating material;

b. said body having upper and lower parts and opposing surfaces extending along opposite side edges

thereof with opening at front and rear ends thereof;

c. a contact-carrying insert of insulating material located within said body with a front end of said insert being fitted in the opening at the front end of the split body;
d. a plurality of spaced contact elements carried by said insert;
e. said contact elements having exposed portions on the front end of said insert;
f. a wiring terminal carried by each of said contact elements at a rear end of said insert for connection of a conductor wire of an electrical cable thereto;
g. strain-relief means carried by the split body at the opening in the rear end thereof for engagement with an electric cable extending into the body through said rear opening; and
h. means for securing the two parts of the split body together with the opposing side edges thereof being in engagement and with the strain-relief means being in engagement with the electrical cable;
i. said securing means being located along opposite sides of the split body and remote from the exposed portions of the contact elements; wherein:
j. said strain-relief means includes a pair of spaced cable-engaging members carried by each part of the split body;
k. said pair of cable-engaging members having spaced opposing surfaces for reception of the cable therebetween;
l. one of said cable-engaging members being an H-shaped member having a pair of legs and a bar extending between and connecting said legs at a point offset relative to a center of said legs;
m. a support formed in one part of the body and engaging with the connecting bar of said H-shaped member;
n. said H-shaped member being reversible relative to said support whereby the opposing surfaces of the cable-engaging members are spaced by different distances in different positions of the H-shaped member on said support.

3. An electrical connector as defined in claim **2,** which includes:

a. interengaging members formed on one part of the split body and the contact-carrying insert for retaining the insert in said one part of the body during assembly of the connector.

4. An electrical connector for attachment to an end of an electrical cable, which comprises:

a. a split body of insulating material;
b. said body having upper and lower parts and opposing surfaces extending along opposite side edges thereof with opening at front and rear ends thereof;
c. a contact-carrying insert of insulating material located within said body with a front end of said insert being fitted in the opening at the front end of the split body;
d. a plurality of spaced contact elements carried by said insert;
e. said contact elements having exposed portions on the front end of said insert;
f. a wiring terminal carried by each of said contact elements at a rear end of said insert for connection of a conductor wire of an electrical cable thereto;
g. strain-relief means carried by the split body at the opening in the rear end thereof for engagement with an electric cable extending into the body through said rear opening; and
h. means for securing the two parts of the split body together with the opposing side edges thereof being in engagement and with the strain-relief means being in engagement with the electrical cable;
i. said securing means being located along opposite sides of the split body and remote from the exposed portions of the contact elements; wherein:
j. the contact-carrying insert includes a block of insulating material for supporting the spaced contact elements therein;
k. said block containing spaced recesses in a rear end thereof;
l. each of said recesses being shaped to receive an end of one of the contact elements and the wiring terminal attached thereto;
m. said block also having side openings communicating with said recesses and the wiring terminals therein;
n. a cover attached to and extending over the rear end of said block and the ends of the contact elements;
o. said cover having spaced openings therein aligned with the wiring terminals for the introduction of bare ends of conductor wires therethrough.

5. An electrical connector as defined in claim **4,** wherein:

a. each of the wiring terminals includes a terminal screw which is accessible through one of the openings in the block; and
b. a slider element of a conductive material carried by said screw;
c. said slider element being slidably movable into clamping engagement with a bare end of the conductor wire under pressure exerted thereon by the screw.

6. In an electrical connector for attachment to an end of an electrical cable, the improvement which comprises:

a. a split body of insulating material,
b. said body being formed in two parts and having a cable-receiving opening at a rear end thereof;
c. a pair of inwardly extending spaced cable-clamping members formed in a first part of the body adjacent said cable-receiving opening;
d. a rib-like support formed in a second part of the body and extending inwardly therefrom at a point spaced from the cable-receiving opening; and
e. an H-shaped cable-clamping member having a connecting bar seated on said rib-like support and being reversible relative to said support;
f. said connecting bar extending between a pair of spaced legs and being offset relative to the center of said legs;
g. said legs having ends disposed in opposing spaced relation to opposing ends of the cable-engaging members in the first part of the body;
h. the spacing between the ends of said legs and the ends of the opposing members being different in each of the positions of the H-shaped member on the rib-like support.

7. In an electrical connector, the improvement as defined in claim 6 wherein:
a. the two parts of the split body having mating faces extending along opposite sides thereof; and
b. means located on opposite sides of the split body for bringing the two parts of the body into engagement with each other and simultaneously bringing the opposing surfaces of the cable-clamping members into engagement with the cable;
c. said securing means being located along the sides of the split body.

8. In an electrical connector, the improvement as defined in claim 7 wherein:
a. the opening in the rear end of the body is elongated along an axis extending at right angles to the direction in which clamping pressure is applied to the cable.

9. In an electrical connector for attachment to an insulated cable containing a plurality of conductors, the combination comprising:
a. a split body of insulating material;
b. said body being split lengthwise into two complementary parts of arcuate shape and having a passageway extending therethrough with openings at front and rear ends thereof;
c. said two parts of the body each carrying a cable-grippin member with opposing surfaces of said members defining an opening at the rear end of the body dimensioned to accommodate a range of cable sizes;
d. a contact-carrying insert of insulating material mounted in said passageway at the opening in the front end of the body;
e. contacts carried by said insert for connection to each of the conductors contained in the cable;
f. said contacts facing the opening in the front end of the body;
g. terminal means carried by each of said contacts for connecting one of the conductors of the cable thereto;
h. said terminal means being located at a rear end of said insert and being enclosed by said body;
i. a retainer plate attached to the rear end of the insert and holding the contacts in place in the insert;
j. said retainer plate having conductor receiving openings therein aligned with and providing access to each of said terminal means on the contacts;
k. fastening means for securing the two parts of the split body together enclosing the insert and simultaneously gripping the cable between said two parts of the body;
l. said fastening means being located along opposing side edges of the two body parts at spaced points located between the front and rear ends thereof; wherein:
m. each of the terminal means includes a movable slider for clamping a bare end of a conductor wire in electrical engagement with the contact; and
n. an adjustment screw for moving said slider into clamping engagement with the bare end of a conductor wire;
o. said adjustment screws being exposed on vertical sides of the insert for adjustment of the sliders.

10. In an electrical connector for attachment to an electrical cable, the improvement which comprises:
a. a split body of generally cylindrical shape formed of an insulating material;
b. said body being split along its longitudinal axis into two complementary parts of arcuate shape defining a passageway extending between openings at the front and rear ends of the body;
c. said opening at the rear end being shaped to receive an electrical cable containing a plurality of conductors;
d. said two parts of the split body having mating side edges extending lengthwise along opposite sides thereof;
e. a pair of opposing cable gripping members carried by said body at said opening in the rear end thereof;
f. said cable-clamping members having spaced opposing surfaces which define an opening of predetermined size when the mating side edges of the two parts of the body are brought into engagement;
g. fastening means located along the mating side edges of the two complementary parts of the split body for securing said parts together and simultaneously bringing the opposing surfaces of the clamping members into predetermined spaced relation; and
h. a contact-carrying insert held between said two parts of the body and within said passageway adjacent the opening in the front end of the body; wherein:
i. at least one of the cable-clamping members is reversible to different positions in one part of the split body with the opposing surfaces of the cable-clamping members in said different positions defining openings for cables of different sizes; and in which:
j. one part of the split body contains an inwardly extending rib adjacent the opening in the rear end of said body; and
k. the reversible cable-clamping member has an H-shaped configuration having a bar connecting spaced legs of said H-shape;
l. said leg being offset relative to ends of said legs and said H-shaped member being reversibly seated on said rib.

11. In an electrical connector for attachment to an end of an insulated electrical cable, the improvement which comprises:
a. a hollow split body formed of an insulating material,
b. said body being split along a longitudinal axis into two complementary parts with an opening in a rear end thereof for insertion of an end of an insulated electrical cable into the body;
c. said two parts of the body having mating faces on opposite sides of the body which close the sides of the body;
d. fastening means located along the opposite sides of the body for securing said two parts together with the mating surfaces thereof in engagement; and
e. strain-relief means carried by and located within the body adjacent the opening in the rear end thereof;
f. said strain-relief means comprising a cable-clamping member carried by each of the two parts of the split body;

g. said cable clamping members having transverse opposing faces spaced for deformable engagement with a range of different cable sizes;
h. at least one of said cable-clamping members being movable in one part of the body to different positions relative to the opposing member;
i. said movable cable-clamping member being H-shaped;
j. said H-shaped member having spaced legs with cable-clamping faces formed at opposite ends of said legs;
k. a supporting bar connecting said legs and being offset relative to the ends thereof;
l. said bar reversible supporting the H-shaped cable-clamping member with the ends of the legs in different spaced relation relative to the opposing faces of the cable-clamping member in the other part of the body.

12. In an electrical connector for attachment to an end of an insulated electrical cable, the combination as defined in claim **11** which includes:
a. a contact-carrying insert of insulating material secured within said body at an opening at a front end thereof;
b. a plurality of spaced contact elements carried by said insert;
c. each of said contact elements including a portion exposed through the opening in the front end of the body;
d. a wiring terminal carried by each of said contact elements at a rear end of said insert for connection of a conductor wire of an electrical cable thereto; and
e. a supporting rib formed in one part of the body;
f. said rib engaging with the connecting bar of the H-shaped member and reversibly supporting the H-shaped member in said one part of the body.

13. In an electrical connector for attachment to an end of an insulated cable, the combination as defined in claim **12**, which includes:
a. interengaging means formed on one part of the split body and the contact-carrying insert for holding said insert in a fixed position in said one part of the split body during assembly of the two parts of the body.

14. In an electrical connector for attachment to an end of an insulated electrical cable, the combination which comprises:
a. a split body formed of an insulating material;
b. said split body including two halves having mating surfaces closing opposite sides of the body and having openings at a front and a rear end thereof;
c. a contact-carrying insert secured between the two halves of the body with a front face of the insert aligned with the opening at the front end of the body;
d. said insert comprising a block of insulating material and having a plurality of spaced recesses formed therein;
e. a contact element having an end slidably fitted into each of said spaced recesses and having an exposed end located at the front face of said block;
f. an enlarged wiring terminal carried by each of said contact elements and fitting within said recesses;
g. said block having side openings communicating with said wiring terminals;
h. a cover plate attached to a rear face of the block and extending over the wiring terminals of the contact elements mounted therein;
i. said cover plate containing spaced openings aligned with each of the wiring terminals for introduction of bare ends of conductor wires into engagement with said terminals;
j. strain-relief means carried by the split body at the opening in the rear end thereof for clamping engagement with an end of an insulated electric cable connected to the contact elements and extending into the body through said rear opening; and
k. means on opposite sides of the body for securing the two parts of the split body together with the mating surfaces on the side edges thereof in engagement and simultaneously bringing the strain relief means into clamping engagement with the insulated electrical cable.

15. In an electrical connector for attachment to an end of an insulated electrical cable, the combination as defined in claim **14** wherein:
a. each of the wiring terminals includes a terminal screw carried by each of the terminals and being accessible through one of the side openings in the block of insulating material;
b. a slider of conductive material attached to and movable with said screw; and
c. a fixed member attached to the terminal in opposing relation to the movable slider whereby a bare end of a conductor is clamped between the slider and the fixed member under pressure exerted on the slider through the terminal screw.

16. In an electrical connector for attachment to an end of an insulated cable containing a plurality of conductors, the combination which comprises:
a. a hollow body of insulating material;
b. said body being split lengthwise into two complementary parts of arcuate shape and having a passageway extending therethrough with openings at a front end and a rear end thereof;
c. said two parts of the body each carrying a cable-gripping member;
d. said cable-gripping members having spaced opposed faces defining an opening at the rear end of the body;
e. said faces being spaced to receive and deformably engage with a predetermined range of different cable sizes;
f. a contact-carrying insert of insulating material mounted in said passageway at the opening in the front end of the body;
g. contacts carried by said insert for connection to each conductor contained in a cable with ends of the contacts facing the opening in the front end of the body;
h. terminal means carried by each of said contacts for connecting one of the conductors of the cable thereto;
i. said terminal means being located at a rear end of said insert and being enclosed by said body;
j. said terminal means including a movable slider for clamping a bare end of a conductor wire in electrical engagement with the contact;
k. an adjustment screw for moving said slider into clamping engagement with the bare end of the conductor wire;

l. said adjustment screws being exposed on vertical sides of the insert for adjustment of the sliders;
m. a retainer plate attached to a rear face of the insert and holding the contacts in the insert;
n. said retainer plate having conductor receiving openings therein aligned with and providing access to each of the terminal means on the contacts; and

o. fastening means on opposite sides of the body for securing the two parts of the body together enclosing the insert and simultaneously gripping the cable between said cable-gripping members;
p. said fastening means being located at spaced points between the openings at the front and rear ends of the body.

17. In an electrical connector for attachment to an end of an insulated electrical cable, the improvement which comprises:
a. a split body of generally cylindrical shape formed of an insulating material;
b. said body being split along a longitudinal axis into two complementary parts of arcuate shape defining a passageway having an opening at a front end and at a rear end thereof;
c. said opening at the rear end of the body being shaped to receive an end of an insulated electrical cable containing a plurality of conductors;
d. said two parts of the body having mating side faces extending lengthwise along opposite sides thereof;

e. a pair of opposing cable-gripping members carried by said body at said opening in the rear end thereof;
f. said cable-gripping members having spaced opposing surfaces which define an opening of a predetermined size when the mating side faces of the two parts of the body are in engagement;
g. one of said cable-gripping members being H-shaped and being reversibly supported in one of the two parts of the body to define openings of different sizes;
h. said H-shaped member having spaced legs connected by a bar offset relative to the ends of said legs;
i. an inwardly extending rib carried by said one part of the body;
j. said rib reversibly engaging with and supporting the offset bar connecting the legs of said H-shaped member;
k. fastening means located on opposite sides of the split body for closing the sides of the body and simultaneously bringing the surfaces of the cable-gripping members into said predetermined spaced relation relative to each other; and
l. a contact-carrying insert held between said two parts of the body and within said passageway at the opening in the front end of the body.

18. In an electrical connector for use with different size electrical cables, the improvement which comprises:
a. a hollow body of generally cylindrical shape formed of an insulating material;
b. said body having a rear end and a front end and being split along a longitudinal axis into two complementary parts defining a passageway including an opening at said rear end of the body;
c. said opening at the rear end being shaped to receive an electrical cable containing a plurality of conductors;
d. said two parts of the split body having mating side edges extending lengthwise along opposite sides thereof;
e. a pair of opposing rigid cable clamping members carried by said body adjacent said opening in the rear end thereof;
f. each of said cable clamping members having at least two longitudinally spaced clamping sections respectively opposing the clamping sections of the other opposing clamping member when the mating side edges of the two parts of the body are in engagement;
g. seat means in one of said parts of the split body adjacent the said rear opening thereof for supporting and releasably seating a first of said clamping members in a predetermined position;
h. the clamping sections of said other clamping member having a set of gripping surfaces of a given concave shape;
i. the said spaced clamping sections of said first clamping member having a plurality of concavely shaped sets of gripping surfaces and being removable from and replacable in said seat means so that a selected one of said concavely shaped sets of gripping surfaces spacedly opposes the said set of gripping surfaces of the said other clamping member with unique spacing to define one of a plurality of different size openings for different size cables; and
j. fastening means located along the mating side edges of the two complementary parts of the split body for securing said parts together and simultaneously bringing the opposing gripping surfaces of the clamping members into predetermined spaced relation relative to each other to effect the desired gripping force for any of said different size cables.

19. The combination as defined in claim **18** wherein said passageway has an opening at the said front end of the body and which includes:
a. a contact-carrying insert held between the two parts of the split body at the opening in the front end of said body; and
b. electrical contacts carried by said insert whcih are respectively connected to all of the conductors of the cable.

20. An electrical connector as in claim **18** and further including:
means in said split body for gauging the size of an electrical cable to be used in said connector for determining which of said concavely shaped sets of gripping surfaces of said one clamping member is to be selected to oppose the gripping surfaces of the said other clamping member.

21. An electrical cable clamp for accommodating an insert of either a male plug or female receptacle type and to which an electrical cable is to be attached through said clamp, said insert being of the type having a front face and an insertable body of predetermined shape extending rearwardly a given distance with that shape and thereafter being increased in size in at least one area and decreased in size in at least a second area containing connections for said cable, said cable clamp comprising:

a. a hollow split clamp body of generally cylindrical shape formed of an insulating material;
b. said clamp body being split along its longitudinal axis into two complemntary parts defining a passageway extending between openings at the front and rear ends of the body;
c. said opening at the rear end being shaped to receive an electrical cable containing a plurality of conductors;
d. said two parts of the split body having mating side edges extending legnthwise along opposite sides thereof;
e. a pair of opposing rigid cable clamping members carried by said clamp body at said opening in the rear end thereof;
f. said cable-clamping members having spaced opposing surfaces which define an opening of predetermined size when the mating side edges of the two parts of the clamp body are brought into engagement;
g. said front end opening and passageway being of said predetermined shape adjacent said front end opening for a predetermined distance inwardly and having at least one depression rearwardly thereof to accommodate said one area of increased size of said insert to hold said insert in said clamp body when the said mating side edges of the said two parts of the clamp body are brought into engagement;
h. each of said cable-clamping members having at least two spaced clamping sections respectively opposing the clamping sections of the other clamping member when the mating side edges of the two parts of the body are brought into engagement by said fastening means;
i. seat means in one of said parts of the split body adjacent the said rear opening thereof for supportingly carrying and releasably seating a first of said clamping members to a predetermined depth;
j. the clamping sections of said other clamping member having a set of gripping surfaces of a given concave shape;
k. the said clamping sections of said first clamping member having a pluraltiy of concavely shaped sets of gripping surfaces and being removable from and replaceable in said seat means so that a selected one of said concavely shaped sets of gripping surfaces spacedly opposes the said set of gripping surfaces of the said other clamping member with unique spacing to define one of a corresponding plurality of different size openings for different size cables; and
l. fastening means located along the mating side edges of the two complementary parts of the split body for securing said parts together and simultaneously bringing the selected opposing surfaces of the clamping members into predetermined spaced relation relative to each other to effect the required gripping force for any of the said different size cables selected.

22. An electrical connector as in claim **21** and further including:

means in said split body for gauging the size of an electrical cable to be used in said connector for determining which of said different concavely shaped sets of clamping surfaces of said one clamping member is to be selected to oppose the clamping surfaces of the said other clamping member.

23. An electrical cable clamp as in claim **21** in combination with said insert with said cable clamp and insert having respective cooperating means for releasably holding said insert in proper position in one of said parts of said split clamp body while the other of said parts thereof is placed onto said one part and fastened thereto by said fastening means.

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