May 16, 1967 H. A. SHERWOOD 3,320,385

ELECTRICAL CONNECTOR FOR TAPPING POWER FROM AN INSULATION COVERED CONDUCTOR

Filed July 28, 1965

FIG. 1.

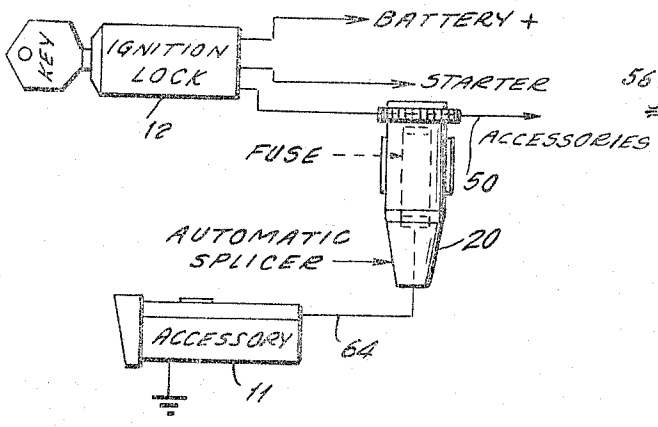


FIG. 2.

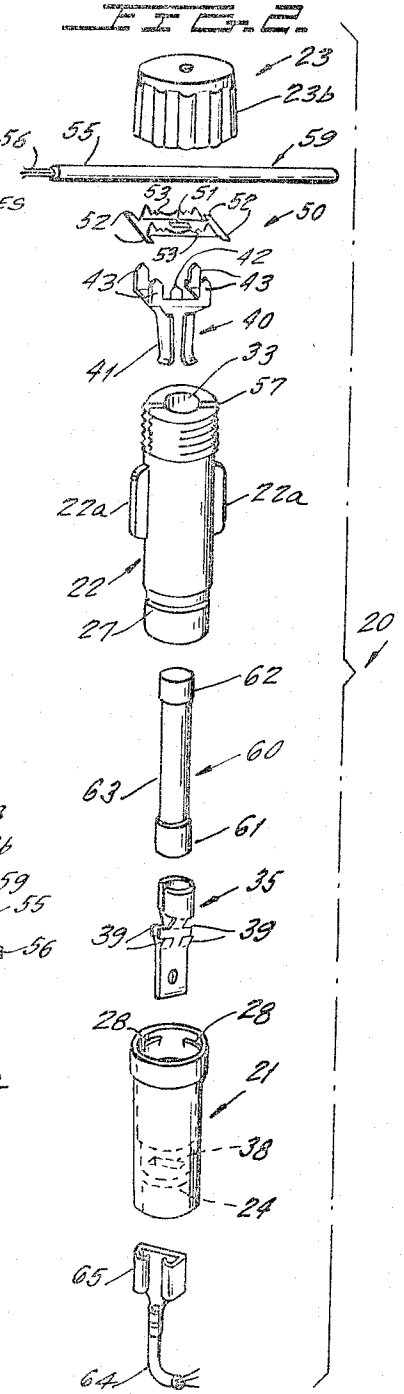


FIG. 3.

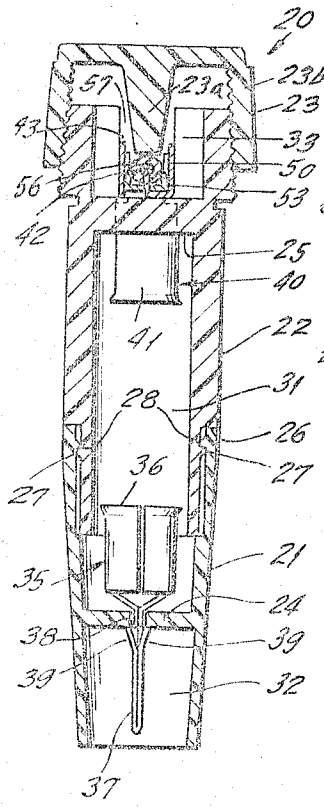
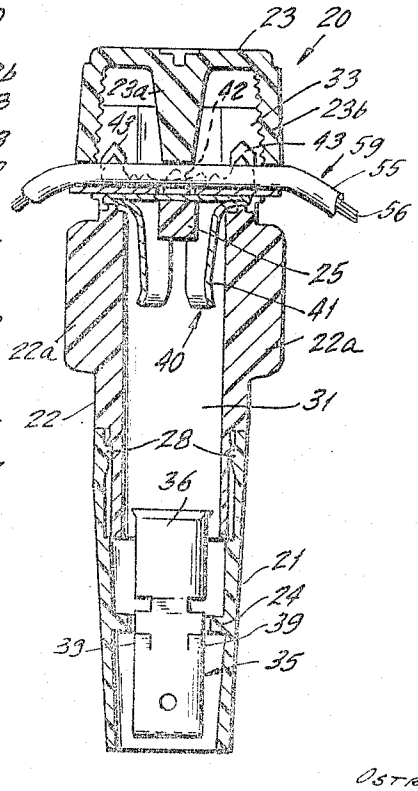


FIG. 4.



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ELECTRICAL CONNECTOR FOR TAPPING POWER FROM AN INSULATION COVERED CONDUCTOR

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The instant invention relates to electrical connectors in general and more particularly to connectors of this type having an automatic splicing means for making electrical connection to an insulation covered electrical conductor at a point remote from the ends thereof.

Today there are many accessory devices available for installation on a vehicle or machine after the latter has left the factory. A great number of these accessories are electrically operated and as a result must be connected to the electrical system of the vehicle or machine in question. It often happens that a convenient mounting position for the accessory is remote from electrical terminal points of the vehicle or machine and in some cases even when the terminal points are in reasonably close proximity a special adapter is required for making connection thereto.

Practice has shown that the installer of such accessories as often as not finds it more convenient to break into an electrical line at a point remote from the ends thereof rather than to run a line to a terminal point. Heretofore this has required the stripping of insulation from the conductor in question, the making of an electrical connection thereto and then taping the joint to provide insulation. The foregoing procedures are often inconvenient to perform in that the line being taped is often in a limited space. As a result the procedure is overly time consuming and the quality of the splice is questionable as to contact resistance and insulation quality.

Accordingly, a primary object of this invention is to provide a novel automatic splicing means for making electrical connection to a conductor at a point remote from the ends thereof.

Another object is to provide an automatic splicing device which is simple to operate and of relatively inexpensive construction yet can be quickly attached to an electrical conductor to provide a high quality electrical connection that is mechanically strong.

Still another object is to provide a novel fused automatic splicing device.

These as well as other objects of this invention will become readily apparent after reading the following description of the accompanying drawings in which:

FIGURE 1 is a schematic illustrating the manner in which an accessory is electrically connected to the electrical system of an automobile by utilizing a fused automatic splicing means constructed in accordance with the teachings of the instant invention.

FIGURE 2 is an exploded perspective of the fused automatic splicing means.

FIGURES 3 and 4 are longitudinal cross sections of the fused splicing means having the fuse removed with these cross sections being taken in planes disposed at right angles to one another.

Now referring to the figures and more particularly to the schematic of FIGURE 1. For purposes of illustration electrically operated accessory **11** (FIGURE 1) has been selected as one for an automobile and is connected to the battery thereof through the fused automatic splicer **20** of the instant invention and the key operated ignition lock **12** of the automobile in question.

Fused automatic splicer **20**, as best seen in FIGURES 2 through 4, includes a three piece housing consisting of lower housing section **21**, upper housing section **22** and

cap **23** threadably mounted to the upper end of upper housing section **22**. Housing sections **21** and **22** are hollow elongated generally cylindrical members, with lower housing section **21** having transverse partition **24** and upper housing section **22** having transverse strut **25** formed integrally therewith. The wall thickness of housing section **22** is reduced below external shoulder **26** with this reduced section having an outwardly extending annular protrusion **27** positioned close to, but spaced from shoulder **26**. Lower housing section **21** is provided, near its upper end, with three angularly displaced inward projections **28** which cooperate with annular projection **27** to provide means for releasably securing housing sections **21**, **22** to each other.

That is, housing sections **21**, **22** are constructed of a relatively stiff resilient plastic material such as compression molded Bakelite. When housing section **21** is moved downwardly along the cylindrical axis relative to housing section **22** the engagement between protrusion **27**, **28** causes deformation of lower housing section **21** sufficient to permit protrusions **28** to move below protrusion **27**. In mounting housing section **21** to housing section **22** the reverse action takes place and as protrusions **28** move above protrusion **27**, the former snap into the positions illustrated to lock members **21**, **22** together.

Housing sections **21**, **22** cooperate to define main chamber **31** in the region between partition **24** and strut **25**. The region of housing section **21** below partition **24** defines a lower chamber **32** while the region of upper housing **22** above strut **25** defines upper chamber **33**, the upper end of which is enclosed by cap **23**. Lower terminal member **35**, mounted to lower housing section **21**, includes female type fuse terminal connector **36** disposed immediately above partition **24** and terminal plug **37** disposed below partition **24**. Terminal member **35** is mounted by passing plug **37** downwardly through slot **38** in partition **24** until tangs **39** fall below the lower surface of partition **24**. Since tangs **39** are resilient, they are initially forced toward one another but once they pass through aperture **38** they move apart to block upward movement of terminal member **35**.

Upper terminal member **40** is mounted to upper housing section **22** and is secured thereto by member **50**. Terminal member **40** includes female type fuse terminal connector **41** extending below strut **25**. Fuse terminal **41** is bifurcated with the two sections thereof being on opposite sides of strut **25**. The portion of member **40** above fuse terminal **41** includes upwardly extending knife-like projection **42** disposed centrally with respect to four other upwardly extending projections **43**. As will be hereinafter explained, projection **42** is provided for the purpose of piercing the insulating covering **55** of accessories cable **59** to engage conductor **56** thereof so as to provide an electrical connection between conductor **56** and fuse terminal **41**. Projections **43** are disposed adjacent the walls of upper housing section **22** defining the passage **57** disposed perpendicular to the cylindrical axis and extending straight through upper chamber **33**.

Member **50** is an elongated element of generally U-shaped cross section having an elongated slot **51** in the web thereof. Piercing projection **42** extends upwardly through slot **51**. Disposed at opposite ends of member **50** are four ears **52** which engage the walls defining through passage **57** and in so doing frictionally secure member **50** to upper housing section **22** and restrict upward movement of upper terminal member **40** so as to retain the latter in operative position.

Fuse **60** is normally disposed within main chamber **31** with the conducting ferrules **61**, **62** at the ends of insulating tubular housing **63** being received by fuse terminals **36**, **41** respectively. The end of insulated conductor **64** remote from accessory **11** is provided with a female type

connector 65 which is insertable into lower chamber 31 for releaseable engagement with terminal plug 37. Cap 23 is provided with a centrally disposed inwardly extending post 23*a* which is positioned in alignment with piercing projection 42.

Fused automatic splicer 20 is utilized in the following manner. With cap 23 removed, accessories cable 59 is inserted into through passage 57. Then cap 23 is threaded on to the upper end of upper housing section 22 with radial wings 22*a*, extending outwardly from upper housing section 22, being hand held to prevent undue strain being placed on cable 59 as cap 23 is screwed into place. As cap 23 moves down the lower edge of downwardly extending threaded skirt portion 23*b* thereof engages insulation 55 moving it downwardly into engagement with or past the serrations 53 at the upper edges of the U-arms forming member 50. This positions a portions of conductor 56 directly over piercing projection 42. As the downward movement of cap 23 continues, post 23*a* thereof engages the portion of insulation 55 aligned with piercing projection 42 through insulation 55 into firm electrical contact with conductor 56. Although not illustrated, in the case of larger diameter cable, serrations 53 firmly engage the cable insulation to stabilize the cable in centered position over projection 42 while cap 23 is being screwed into position, and to form a good mechanical connection between splicer 20 and the cable.

Thus, this invention provides novel splicer for conveniently tapping power from an insulation covered wire at a point remote from both ends of the wire. While the splicer of the instant invention has been described as being a fused device it should now be apparent to those skilled in the art that splicer construction may be modified by eliminating the fuse while retaining the features for positioning the cable and piercing the insulation thereof to make electrical connection to the cable conductor.

Although there has been described a preferred embodiment of this novel invention many variations and modifications will now be aparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows.

I claim:

1. Automatic splicing apparatus including housing means having a portion defining a chamber with a through passage for receiving an insulation covered conductor, electrical conducting means including a first section having a piercing means extending into said through passage, means securing said first section to said housing means, first means mounted to said housing and extending into said chamber, second means operable to move said first means toward said piercing means and in so doing cause piercing means to electrically engage an insulation covered wire positioned in and extending beyond both ends of said through passage; said portion including a threadably mounted cap to which said second means is mounted; third means having an aperture through which said piercing means extends; said third means disposed within said chamber and positioned to engage insulation covering of different sizes of wire to maintain such wire aligned with said piercing means as said first means moves toward said piercing means; said third means including spaced arms extending toward said cap with each of said arms having a free edge with multiple projections of varying height.

2. Automatic splicing apparatus including housing means having a portion defining a chamber with a through passage for receiving an insulation covered conductor, said portion including a cap and a part having second means threadably engaged with said cap, electrical conducting means including a first section having a piercing means extending into said through passage means securing said first section to said housing means, first means mounted to said cap and extending into said chamber, said second means operable to move said first means toward said piercing means and in so doing cause said piercing means to electrically engage an insulation covered conductor positioned in and extending beyond both ends of said through passage, said housing means including another portion defining another chamber, said conducting means also including a fuse disposed in said another chamber and having a first and a second terminal, said first section including a first terminal means in releasable engagement with said first terminal, said conducting means further including a second section including second terminal means in releasable engagement with said second terminal, an elongated member of generally U-shaped cross-section disposed in said passage, said member having an aperture in the web thereof, said piercing means extending through said aperture, said member having a plurality of protrusions along the free edges of each of its U-arms positioned for engagement with insulation covering a conductor extending through said passage without piercing this insulation and engaging a conductor covered thereby, said protrusions acting to maintain such conductor aligned with said piercing means as said cap is threaded on to said part.

3. Apparatus as set forth in claim 2 in which the protrusions of each of said U-arms are of varying height.

4. Automatic splicing apparatus including housing means having a portion defining a chamber with a through passage for receiving an insulation covered conductor, said portion including a cap and a part having second means threadably engaged with said cap, electrical conducting means including a first section having a piercing means extending into said through passage, first means mounted to said cap and extending into said chamber said second means operable to move said first means toward said piercing means and in so doing cause said piercing means to electrically engage an insulation covered conductor positioned in and extending beyond both ends of said through passage, said housing means including another portion defining another chamber, said conducting means also including a fuse disposed in said another chamber and having a first and a second terminal, said first section including a first terminal means in releasable engagement with said first terminal, said conducting means further including a second section including second terminal means in releasable engagement with said second terminal, said housing means further including a transverse partition separating said chamber and said another chamber, said first terminal means integrally formed with said piercing means, third means having an aperture through which said piercing means extends, said third means disposed within said chamber and positioned to engage insulation covering of different sizes of wire to maintain such wire aligned with said piercing means as said first means moves toward said piercing means, said third means including retaining means frictionally engaging said housing means, said third means positioned to retain said first section of said electrical conducting means mounted to said housing means.

5. Automatic splicing apparatus including housing means having a portion defining a chamber with a through passage for receiving an insulation covered conductor, electrical conducting means including a first section having a piercing means extending into said through passage, first means mounted to said housing and extending into said chamber, second means operable to move said first means toward said piercing means and in so doing cause said piercing means to electrically engage an insulation covered wire positioned in and extending beyond both ends of said through passage; said portion including a threadably mounted cap to which said second means is mounted; third means having an aperture through which said piercing means extends; said third means disposed

within said chamber and positioned to engage insulation covering of different sizes of wire to maintain such wire aligned with said piercing means as said first means moves toward said piercing means; said third means including retaining means frictionally engaging said housing means, said third means positioned to retain said first section of said electrical conducting means mounted to said housing means.

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