July 14, 1964 P. P. DANESI 3,140,909

ELECTRICAL TERMINAL CONNECTOR

Filed June 12, 1962 2 Sheets-Sheet 1

Fig. 1

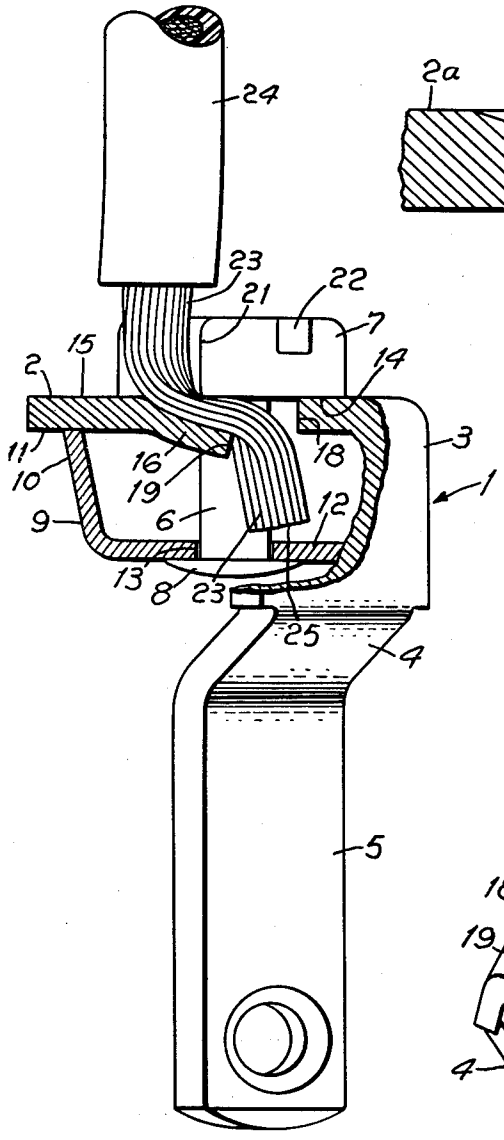


Fig. 1B

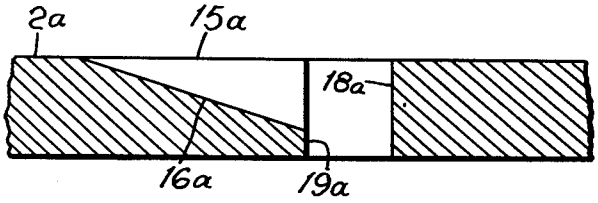
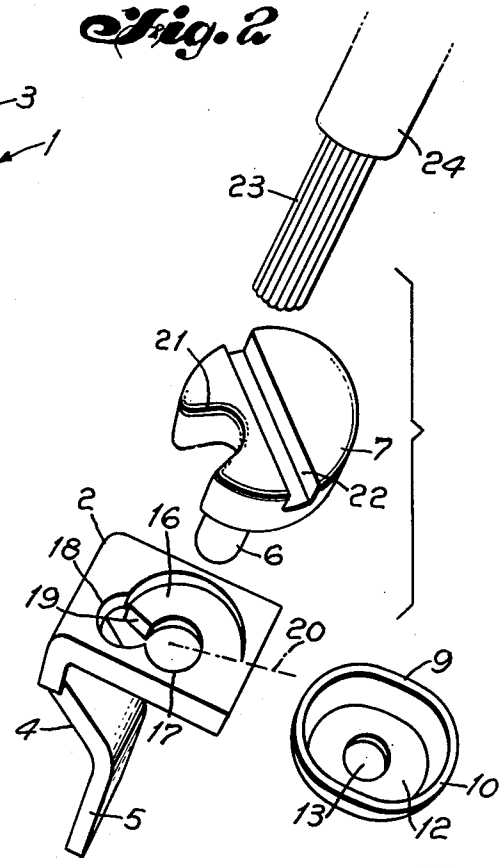


Fig. 2



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Fig. 3

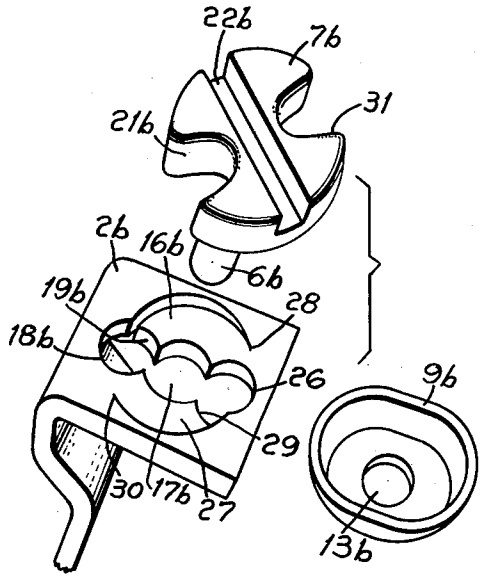


Fig. 4

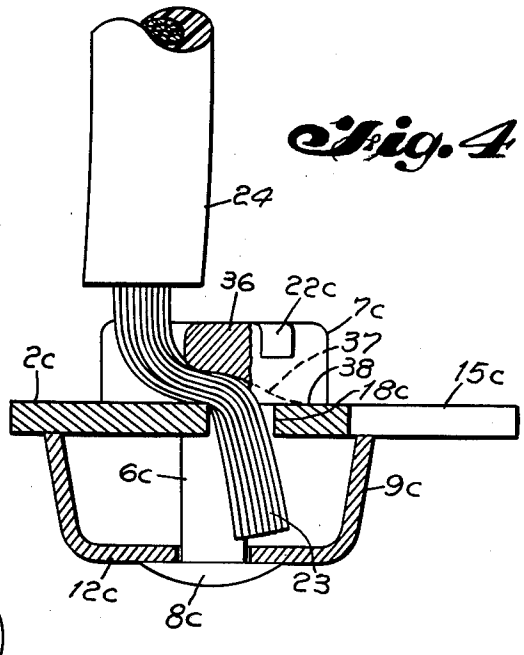
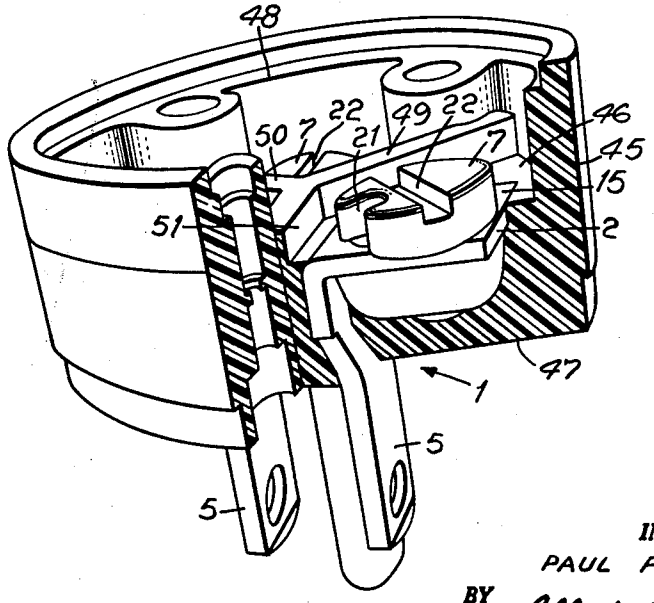


Fig. 5



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3,140,909

ELECTRICAL TERMINAL CONNECTOR

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2 Claims. (Cl. 339—249)

This invention relates to an electrical terminal connector and more particularly to an electrical terminal connector utilizing an improved clamping action to secure a wire to an electrical terminal.

Conventional terminal connectors employed in terminal boards, terminal strips, plugs, receptacles, switches and other devices for the termination of a wire conductor utilize binding post screws which necessitate winding the stripped ends of the wires to be connected about the shanks of the screws prior to tightening them up for the securing operation. The use of conventional binding post screws has several disadvantages. A considerable amount of angular rotation of the binding screw is necessary to physically and electrically secure the wire. In addition, when the wire being secured is stranded, the stripped ends of the wire have a tendency to squeeze out from under the head of the screw. In addition, if there are several terminal connectors in one termination device it becomes extremely difficult to wrap the stripped ends of wire about the binding post screws due to the small amount of space available and the location of two or three binding posts within the one small termination device.

A number of prior art terminal connectors have been made which attempt to overcome some of the disadvantages of the conventional binding post screw. One prior are device provides an axial keyway in the bolt head and a serrated edge on the underside of the bolt head. This device somewhat improves the slippage of the wire with respect to the bolt head and improves the squeezing out of the wire but it is complicated to manufacture. It still requires an excessive angular rotation before the wire is securely clamped. Another prior art terminal connector provides a wedge-like member disposed at right angles to an adjacent hole into which the wire is inserted. The wedge-like member is then rotated to press the wire against the sides of the hole. Such a terminal connector has several serious drawbacks. First, it is relatively complicated to manufacture and requires a considerable number of parts. In addition, such a connector can only be used where the wire to be connected is inserted into one side of the termination device and the tightening tool, such as a screwdriver, is inserted into the termination device from the opposite or backside thereof. This is a serious disadvantage in that both sides of the termination device must be accessible: one side to insert the wire and the other side to insert the tightening tool. This requires that the termination device itself provide apertures for each terminal for the insertion of the tighening tool, thus, greatly complicating the manufacture of termination devices utilizing such a terminal connector.

Thus, an object of the present invention is the provision of an improved terminal connector of simplified construction overcoming the above-mentioned disadvantages of the prior art connectors.

Another object of this invention is to provide a terminal connector which may be securely clamped to a wire with a minimum of angular rotation of the tightening tool.

An additional object of the invention is the provision of a terminal connector which automatically gauges the length of the wire to be connected thereto.

A further object of this invention is the provision of a

terminal connector to permit easy connection of a plurality of conductors to a single terminal thereof.

A feature of the present invention is to provide a terminal plate having at least a first aperture therethrough and a member mounted for rotation with respect to the plate having a second aperture therethrough which is alignable with the first aperture. The first and second apertures are adapted to receive the wire to be connected to the terminal connector. A clamping surface, against which the wire is clamped upon rotation of the member, is disposed between the plate and the member and carried by at least one of the plates and the member.

Another feature of the present invention is to provide a smooth rod with flanges at both ends mounted for rotation in a terminal plate. The head flange adjacent to the terminal plate and the terminal plate itself are provided with alignable wire receiving apertures. The terminal plate is shaped in the form of a spiral inclined plane to form a clamping surface adjacent to the head flange. The wire inserted through the receiving apertures is firmly gripped between the head flange and terminal plate and pressed against the clamping surface when the bolt is rotated to the locked position by applying a small degree of rotation to the rod.

Still another feature of the invention is to provide a smooth rod with flanges at both ends mounted for rotation in a terminal plate. The head flange of the rod adjacent to the terminal plate is provided with a spiral inclined plane to form a clamping surface. The head flange and the terminal plate are provided with alignable wire receiving apertures. A wire inserted through these apertures is firmly gripped between the head flange and the terminal plate and wedged securely against the clamping surface when a small degree of rotation is applied to the rod.

A further feature of the invention is to provide a wire gauge or wire stop in the form of a cup-shaped member having an aperture through the bottom portion thereof. A smooth rod with flanges at both ends is mounted for rotation in a terminal plate and extends to engage the aperture included in the bottom portion of the cup-shaped member. The cup-shaped member is thereby disposed between the bottom of the terminal plate and one flange of the rod and serves to hold the rod firmly in position and to prevent longitudinal motion of the rod. The other flange of the rod adjacent to the terminal plate and the terminal plate itself are provided with alignable wire receiving apertures. A wire inserted into these apertures is appropriately gauged in length by coming in contact with the bottom portion of the cup-shaped member. The length of the wire so determined is appropriate for connection to the terminal connector.

Still a further feature of the present invention is to provide a smooth rod with flanges at both ends mounted for rotation in a terminal plate. The head flange of the rod adjacent to the terminal plate is provided with two wire receiving apertures. The terminal plate is also provided with two wire receiving apertures alignable with the receiving apertures of the head flange. Two spiral inclined planes are disposed between the plate and the head flange adjacent to the receiving apertures and carried by at least one of the plate and the flange to provide two clamping surfaces. Two separate wires inserted through the two receiving apertures in the head flange and the terminal plate are firmly gripped between the flange and the terminal plate and pressed securely against the respective clamping surface when the rod is rotated to the locked position.

The above mentioned and other features and objects of this invention will become more apparent by reference

to the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a cross-sectional view of an embodiment of a terminal connector in accordance with the principles of the invention with the wire connected thereto.

FIG. 1B is a cross-sectional view showing a modified portion of FIG. 1.

FIG. 2 is an exploded perspective view of the embodiment of FIG. 1 showing the details of construction.

FIG. 3 is an exploded perspective view of another embodiment of this invention.

FIG. 4 is a cross-sectional view of still another embodiment of this invention.

FIG. 5 is a perspective cross-sectional view of a typical termination device employing three terminal connectors according to the present invention.

Referring to FIGS. 1 and 2, there is shown a terminal connector generally designated as **1** having a plate **2** with a wire receiving aperture **18** therethrough. A clamping surface **16** in the form of a spiral inclined plane is shown disposed adjacent to aperture **18**. A member, such as rod **6** is mounted for rotation in plate **2**. Rod **6** has flange **7** at one end thereof with a wire receiving aperture **21** in the flange **7**. The apertures **21** and **18** may be aligned by rotation of the member **6**. A cup-shaped member **9** acts as a wire gauge.

The terminal plate **2** has a wire receiving aperture **18** therethrough. Adjacent to the aperture **18** in the terminal plate **2** is a second aperture **17**. The aperture **17** is for the reception of the rod **6** and is of a diameter to fit snugly around rod **6**. The two apertures **17** and **18** may be entirely separate and distinct or as shown in FIG. 2 the aperture **18** may intersect and connect with the aperture **17**. The terminal plate **2** is formed so as to have a spiral inclined plane **16** which spirals upward around the aperture **17**. The inclined plane or spiral **16** will be seen to start at the wall **19** of the wire receiving aperture **18**. The top of the edge of the wall **19** will be seen to be depressed from the flat top surface **15** of the terminal plate **2**. The inclined spiral plane **16** occupies somewhat less than 180°, perhaps 150° of mechanical rotation about the aperture **17**. The inclined plane **16** gradually merges smoothly into a surface flush with the top **15** of the terminal plate **2**. The point of merger of the inclined plane **16** with the surface **15** is indicated by the dotted line **20**. The inclined plane **16** may be formed in the terminal plate **2** by depressing an approximately semi-circular portion of the terminal plate **2**, such as by a stamping operation or by a machining operation. The depressed form of the terminal plate **2** is indicated at **16** and **19** in FIG. 1.

Terminal plate **2** may be secured to a vertical portion **3**, a connecting portion **4**, and a contact blade portion **5**. The portions **3**, **4**, and **5** provide a convenient illustration of one form of terminal connector **1**, a contact blade for insertion into a receptacle, which embodies the present invention. Thus, portions **3**, **4**, and **5** are not essential to the present invention. When the terminal connector **1** is employed in other electrical devices, such as terminal boards, terminal strips, plugs, receptacles, switches, etc. the terminal plate **2** will be secured to different shaped portions depending upon the particular application in which it is desired to use the present invention. The essential features of the terminal connector of this invention is the inclined spiral plane, such as **16** and the wire receiving aperture, such as **18**, and the aperture **17**.

The rod **6** has a head flange **7**. The head flange **7** is disposed adjacent to the terminal plate **2**. At its other end the rod **6** has a foot flange **8**. The rod **6** fits through and is mounted for rotation in the aperture **17** in plate **2**. The flange **7** has a wire receiving aperture or niche **21** to receive and engage a wire to be connected to the terminal connector **1**. The niche **21** may be circular to provide a completely closed aperture or semi-circular providing an opened side as indicated in FIG. 2. Flange **7** has a radius which is equal to or somewhat greater than the radius from the center of hole **17** to the outer circumference of the aperture **18**. The center of the niche **21** is located at the same radial distance from the center of the rod **6** as the center of the aperture **18** is located from the center of the aperture **17**. In other words, the niche **21** may be aligned and disposed over the aperture **18** by rotating the flange **7** to the proper position. The flange **7** has a transverse groove or channel **22** to receive the bit of a screwdriver or a similar tool for turning the rod **6** in aperture **17**.

Disposed around the rod **6** is a cup-shaped member **9**. The cup **9** is closed by a wall **12** which has a circular aperture **13**. The aperture **13** in the wall **12** of the cup **9** is of a diameter to fit snugly around the rod **6**. The rod **6** passes through the aperture **17** in terminal plate **2** and through the aperture **13** in cup **9** where it emerges into the foot flange **8**. The foot flange **8** of the rod **6** presses firmly against the bottom wall **12** of the cup **9** and presses the cup **9** firmly into contact with the underside **11** of the terminal plate **2**. The underside of the flange **7** may be flat and rest in firm contact with the top **15** of the terminal plate **2**. There is thus no longitudinal play between flange **7** and plate **2**. The diameter of the cup **9** should be somewhat larger than the radial distance from the center of the aperture **17** to the outer circumference of the aperture **18**, and the diameter of the cup **9** can be chosen largely by convenience once this requirement has been met. Likewise the depth of the cup **9** from the edge of the wall **10** to the flat portion **12** may be picked by convenience depending on the wire gauge of conductor to be accommodated and depending upon the size and radial location of the aperture **18**.

To utilize the terminal connector **1** shown in FIGS. 1 and 2 it is merely necessary to rotate the flange **7** until the niche **21** is aligned with the wire receiving aperture **18**. Then the stripped ends **23** of the wire **24** are inserted into the niche **21** and through the aperture **18** until the ends **25** of the wire **24** contacts the bottom **12** of the cup **9**. Thus, the cup **9** forms a wire gauge to permit only a given length of the stripped ends **23** of wire **24** to enter into the terminal connector **1**. As soon as the stripped ends **23** have been inserted into the niche **21** and aperture **18** a screwdriver or similar tool inserted into the channel **22** is utilized to turn the flange **7** and rod **6** a sufficient amount clockwise to lock securely. By turning the flange **7** and rod **6** in the clockwise direction the stripped ends **23** are tightly and securely wedged against the inclined spiral plane **16** of the terminal plate **2** and forced and held in position by the undersurface **14** of the flange **7**. FIG. 1 shows the wire **24** in the firmly attached position of the flange **7**. When the flange **7** and rod **6** are turned clockwise, the end **25** of the conductor **23** will be lifted up slightly off the bottom of the cup **9** as indicated at **25**. This is due to the pulling and wedging action of the flange **7** compressing the stripped ends **23** against the inclined plane **16**.

It should be noted that the wire such as **24** is inserted into the terminal connector **1** from the same side that the tool is inserted into the channel **22** to tighten the terminal connector **1** and there is no need for any access to the underside, such as **8**, of the terminal connector. It may also be noted that when the flange **7** is rotated clockwise the stripped ends **23** will also tend to be partially wrapped around the rod **6**, at the same time being tightly wedged into position between the inclined plane **16** and the undersurface **14** of the flange **7**, thus providing an electrically and mechanically secure connection. The coefficient of friction between the wire **23** and the inclined plane **16** and between the wire **23** and the flange **7** is sufficient to prevent any rotation of the flange **7** from the locked position. Also, the tensile strain or pressure induced by the clamping action

lies along the axis of the rod **6** and does not tend to rotate the flange **7** but merely applies a pressure upward against the flange **7** and downwards against the inclined plane **16**.

It may also be noted that it is desirable to provide a relatively small amount of play along the axis of the rod **6** between the under surface **14** of the flange **7** and the top surface **15** of the terminal plate **2** and, likewise, there should be relatively little play between the foot flange **8** and the bottom wall **12** of the cup **9**. The length of the bolt **6** should be such that the bolt **6**, and the cup **9** are held firmly in place whether there is a conductor **24** present or not. There should be just enough play between the flange **7** and the terminal plate **2** to allow easy rotation of the flange **7** at the time that a conductor is desired to be secured.

It will also be obvious to those skilled in the art that by running the inclined plane **16** in the counter clockwise direction from the opposite side of the aperture **18** the device could be made to go into the locked position by a counter clockwise rotation of the flange **7**. The only change in construction being that the spiral inclined plane **16** would spiral upward in the counter clockwise direction rather than in the clockwise direction as shown in FIGS. 1 and 2. Thus, the device can be manufactured in two forms so as to go into the locked position with either a clockwise twist or a counter clockwise twist of the flange **7** depending on the particular application desired.

It will also be appreciated with reference to all the drawings that the terminal connector **1** will in general accommodate any number of different sizes of wires up to the largest size wire which will fit through the apertures **21** and **18**. The fact that the stripped ends, such as **23**, of a particular conductor may be smaller than the apertures **21** and **18** in no way hinders the operation of the device, it merely being necessary to rotate the flange **7** a few more mechanical degrees to secure the clamping action desired.

Refer now to FIG. 1B which shows a modified construction for the terminal plate **2**. The spiral inclined plane **16***a* is cut directly out of the material of the terminal plate **2***a*. As before there is an aperture **18***a* to receive a wire for connection and there is a shoulder of aperture **18***a* formed at **19***a* at the beginning edge of the inclined plane **16***a*. The construction shown in FIG. 1*b* may be preferable when there is no objection to using a somewhat thicker terminal plate **2***a*. It will also be appreciated that with the construction of the terminal plate **2***a* as shown in FIG. 1*b* the cup **9** may be dispensed with if desired, since the foot flange **8** of the rod **6** may rest firmly against the flat underside of the terminal plate **2***a*. The construction shown in FIG. 1*b* would be particularly suitable for use in devices such as terminal boards.

FIG. 3 shows another embodiment which is a modification of the device shown in FIGS. 1 and 2. FIG. 3 has been adapted to allow two separate wires to be connected to the same terminal plate **2***b*. Similar reference numerals have been used as in FIGS. 1 and 2 with the letter *b* indicating that it is a part of FIG. 3. Thus, terminal plate **2***b* includes a central aperture **17***b* to accept the bolt **6***b*, an aperture **18***b* for passage of the stripped ends of wire into the cup **9***b*, and a first inclined spiral plane **16***b*. However, at the opposite end of the diameter drawn through the centers of the apertures **17***b* and **18***b* is a second aperture **26**. The aperture **26** is for the passage of a second wire which is to be simultaneously connected to the terminal plate **2***b* along with the wire passing through the aperture **18***b*. There is thus provided a second spiral inclined plane **27** which is disposed over the opposite side of the circumference of a circle having its center at the center of the aperture **17***b*. The deepest portion of the inclined plane **16***b* is at its beginning at the shoulder **19***b*. The first inclined plane **16***b* runs from its deepest portion **19***b* tapering up to the point where it is flush with the top of the terminal plate **2***b* at **28**. Likewise, the second inclined plane **27** has its deepest portion adjacent to the second aperture **26** as indicated at **29**. The second inclined plane **27** runs from the shoulder **29** up to the point **30** where it becomes flush with the top of the terminal plate **2***b*. Accordingly, the flange **7***b* is provided with two apertures, or niches **21***b* and **31** which are disposed on opposite ends of a diameter of the flange **7***b*. The aperture **21***b* receives the first wire to be connected to the terminal plate **2***b* and the aperture **31** receives the second wire to be connected to the terminal plate **2***b*. There is also provided a transverse groove or channel **22***b* to receive the bit of a screwdriver or similar tool for rotating the flange **7***b* into the locked position. In operation of FIG. 3 the first wire may be inserted through either aperture **21***b* (or **31**) into the aperture **18***b* (or **26**). The second wire to be secured may be inserted through the aperture **31** (or **21***b*) and through the aperture **26** (or **18***b*). As in FIGS. 1 and 2 the cup **9***b* acts as a wire gauge to allow only an appropriate length of wire to be inserted into the apertures **18***b* and **26**. Once the stripped ends of the two wires have been inserted into the apertures **18***b* and **26** the rod **6***b* and flange **7***b* are rotated somewhat less than 180 mechanical degrees to place the terminal connector in the locked position. When the bolt **6***b* and flange **7***b* are rotated clockwise, both the wire in the aperture **18***b* and the wire in the aperture **26** will be tightly wedged against their respective inclined planes **16***b* and **27**, securely holding both wires in place.

It should also be pointed out in connection with FIGURES 1, 2 and 3 that the stripped ends of two conductors may be conveniently twisted around each other and then inserted into a single aperture, such as **18** in FIG. 1, and locked in place by turning the flange **7** clockwise. Thus, the terminal connector of this invention allows considerable flexibility in the number of connections that may be made to one terminal connector.

It may also be noted that by running the two inclined planes from the opposite edges of the holes **18***b* and **26** and by spiralling the two inclined planes in the counter clockwise direction the embodiment in FIG. 3 may be manufactured in a form so as to go into the locked position by a counter clockwise twist of the flange **7***b*.

FIG. 4 shows another embodiment of the invention. Similar reference numerals are used again to indicate similar parts with the letter C indicating it is part of FIG. 4. In FIG. 4 a terminal plate **2***c* includes an aperture **18***c* for the reception of the stripped ends of wire, such as **23** and a central aperture, such as **17** of FIG. 2 (not shown in FIG. 4), through which the rod **6***c* passes. The rod **6***c* has a foot flange **8***c* which presses against the bottom wall **12***c* of a cup **9***c*, and a head flange **7***c* which has a niche **36** to accept the passage of the wire to be connected. The difference between the embodiments of FIGS. 1, 2, and 3 and the embodiment of FIG. 4 is that the head flange of rod **6** carries the clamping surfaces rather than plate **2**. Thus, the underside of the flange **7***c* has a spiral inclined plane **37** which starts at the edge of the aperture **36** and runs in a spiral fashion around the underside **38** of the flange **7***c*. The inclined spiral surface **37** has its deepest portion at the edge of the wall of the aperture **36** which is thus correspondingly cut away. The inclined plane **37** gradually spirals down until it is flush with the underside **38** of the flange **7***c* and flush with the top surface **15***c* of the terminal plate **40**. Thus, the inclined plane **37** provides a spiral wedge shaped space on the undersurface of the flange **7***c*. It may be seen that the terminal plate **2***c* is of completely flat shape and only has the aperture **18***c* therethrough for the passage of the stripped ends of wire, such as **23** and a central aperture for rod **6***c*.

In operation the stripped ends **23** of the conductor **24** are inserted through the aperture **36** in the flange **7***c* and through the aperture **18***c* in the terminal plate **2***c*. As before, the cup **9***c* provides a stop gauge to gauge the

length of wire which is inserted into the terminal connector. After the stripped ends of the wire have been inserted through the apertures **36** and **18***c* the flange **7***c* is turned clockwise by the insertion of a screwdriver or similar tool into channel **22***c*. This securely and firmly wedges the stripped ends of conductor **23** inbetween the flat terminal plate **2***c* and the spiral inclined plane **37** of the flange **7***c*. As before the coefficient of friction between the flange **7***c* and the wire **23** and between the plate **2***c* and the wire **23** prevents any rotation of the flange **7***c* in a direction to unlock the device. The operation is otherwise similar to that explained in FIGS. 1, 2 and 3.

The embodiment of FIG. 4, however, has one particular advantage which is noteworthy. The fact the terminal plate **2***c* is simply flat with only two apertures therethrough means that the cup **9***c* may be dispensed with and the foot flange **8***c* may simply be riveted over the underside of the terminal plate **2***c*. When the wire is inserted through the apertures **36** and **18***c* the ends of the conductor **23** would simply protrude outwards underneath the surface of the terminal plate **40** and there would be no stop gauge action by the cup **9**. But there is the advantage of greater simplicity by dispensing with the cup **9**.

Likewise, the inclined plane **37** may be made in either a right-hand or a left-hand spiral to obtain respectively clockwise locking action or counterclockwise locking action as the particular application may indicate.

The embodiment of FIG. 3 may be made utilizing the construction shown in FIG. 4. That is, the inclined planes **16***b* and **27** could be formed in flange **7***b*.

FIG. 5 shows an attachment plug cap which utilizes three of the terminal connectors **1** shown in FIGS. 1 and 2. The body of the attachment plug cap is shown at **45** and may be made of molded plastic insulating material for example. Molded within a portion of the plug cap **45** is a terminal connector **1**. The cup **9** and the terminal plate **2** are imbedded in the plastic material **45**, however, the top surface **15** of the terminal plate **2** is flush with the inner surface **46** of the plug cap **45**. This allows the flange **7** to be freely rotated. The contact blades **5** of the terminal connectors **1** extend through the front wall **47** of the plug cap **45** and the device shown in FIG. 5 is such as is generally utilized to plug into wall receptacles and the like. FIG. 5 shows three terminal connectors, such as **1**, which are approximately equidistantly spaced around the circumference of a circle within the circular plug cap **45**. The contact blades, such as **5**, may have a peculiar shape, such as being round or square for example, to code the position of the plug when it is inserted into the receptacle. The stripped ends of the wire are inserted from the upper side **48** of the plug cap **45** into the apertures such as **21** of the flange **7**. Then once the stripped ends have been inserted into the apertures **21** a screwdriver or similar tool is utilized to turn the flange **7** clockwise to lock the wires in place. This securely locks the wires in place in contact with the terminal plates **2** and in connection with the contact blades **5**. The plug cap **45** may be provided with insulation barrier strips such as **49**, **50**, **51**, etc. to separate the three terminal connectors **1**, and other conventional provisions of such plug caps may be provided as will be obvious to those skilled in the art. It may be noted that in the process of molding the terminal connectors **1** in place in the body of an insulating plug cap, such as **45**, it may be desirable to rotate the flange **7** until the aperture **21** is misaligned with the apertures **18** and the apertures **18** are covered by the flange **7**. This will prevent any plastic "flash" material from entering into the cup **9**. After the molding operation is complete the plug cap attachment **45** is then ready for use. It will also be obvious to those skilled in the art that two of the terminal connectors **1** could have been used or any convenient number. Likewise, as mentioned before the terminal connector of this invention may be used when terminal plate **2** is simply a flat plate so long as provision is made for providing the inclined spiral plane clamping surface such as **16** or **37**.

While I have described above the principles of my invention in connection with specific apparatus, it is clearly to be understood that this description is made only by way of example and not as a limitation to the scope of my invention as set forth in the objects thereof and the accompanying claims.

I claim:

1. A terminal connector for an electric wire comprising:
   - a plate;
   - a smooth rod of predetermined length having a head flange and a foot flange and freely mounted for rotation in said plate;
   - said head flange and said plate having alignable apertures therein;
   - a clamping surface in the form of a spiral inclined plane disposed between said plate and said head flange and carried by at least one of said plate and said head flange;
   - said head flange being adapted to receive a tool for rotating it; and
   - a cup-shaped member axially mounted on said rod with its open end contacting said plate and its closed end contacting said foot flange, whereby a wire inserted through said alignable apertures is gauged and stopped by said cup, and firmly secured between said plate and said head flange upon rotation of said rod.

2. A terminal connector for an electrical wire comprising:
   - a terminal plate, said terminal plate having a first plane surface, a first opening therein for receiving said wire and a camming surface inclined from said plane surface disposed adjacent said opening,
   - a wire engaging member pivoted for rotation in said terminal plate and comprising a first flange having a second plane surface parallel to said first plane surface and a second opening therein alignable with said first opening and adapted to receive a tool for rotating said wire engaging member, a second flange opposite said first flange and a pivot rod connecting said first and second flanges,
   - a cup-shaped member mounted on said pivot rod below said terminal plate with the closed end contacting said second flange whereby a wire inserted through said alignable apertures is gauged and stopped by said cup-shaped member and said wire is securely held by said wire engaging member against said camming surface when said wire engaging member is turned.

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