United States Patent

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[54] **ELECTRICAL CONNECTOR**
16 Claims, 19 Drawing Figs.

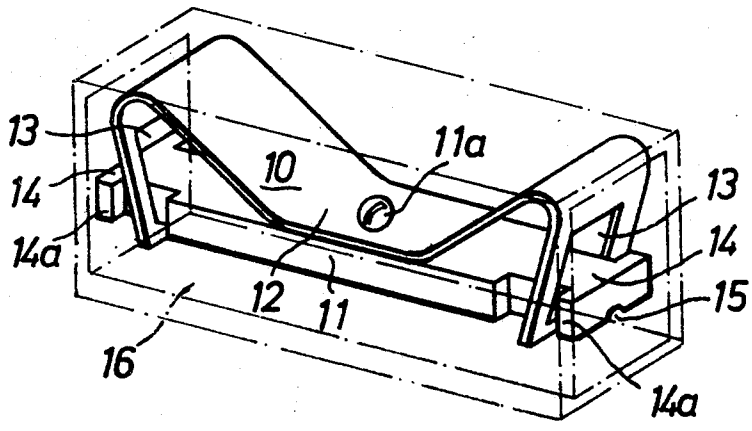
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[51] **Int. Cl.** **H01r 13/4B**
[50] **Field of Search** ..... 339/59-—61, 95, 260, 261, 248; 24/115, 129, 255, 257, 259, 81; 287/64

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Primary Examiner—James A. Leppink
Assistant Examiner—Joseph H. McGlynn
Attorneys—McGlew and Toren

ABSTRACT: A screwless connecting terminal for electric leads comprising at least one bent clamping spring defining an aperture at one end, a terminal housing in which said clamping spring is located, and a contact plate associated with said clamping spring, characterized by the feature that said clamping spring engages by said aperture round a reduced part of said contact plate and is kept under tension thereby.



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Fig.1

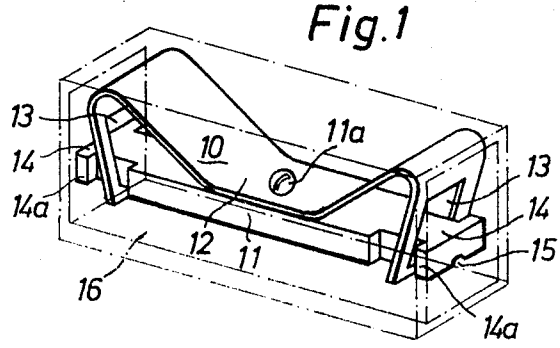


Fig.2

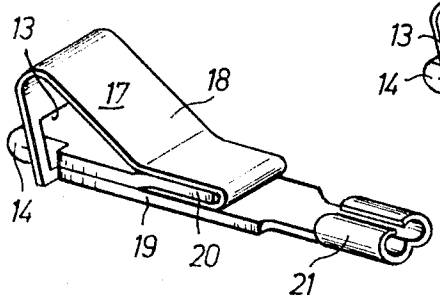


Fig.3

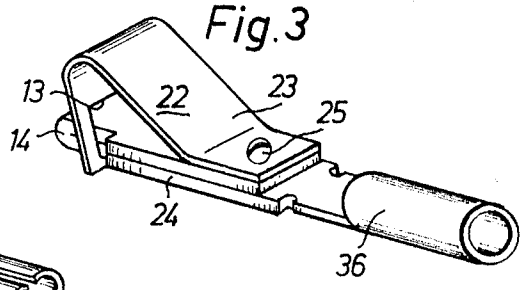


Fig.4

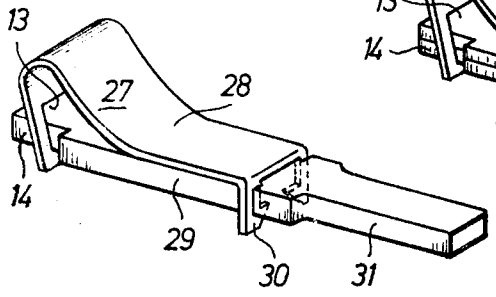
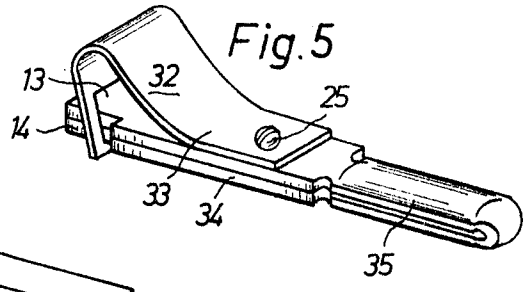
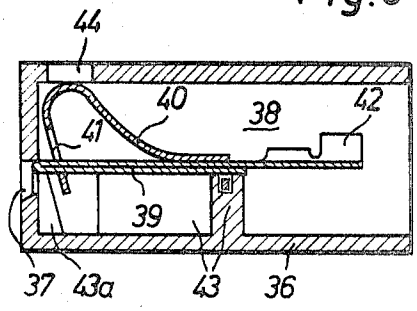


Fig.5



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Fig.6



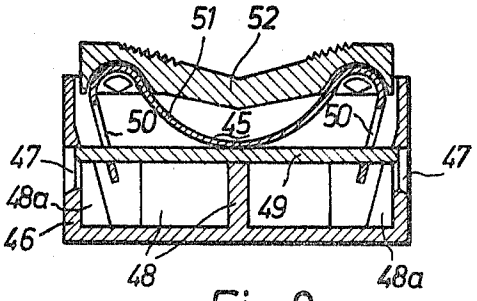
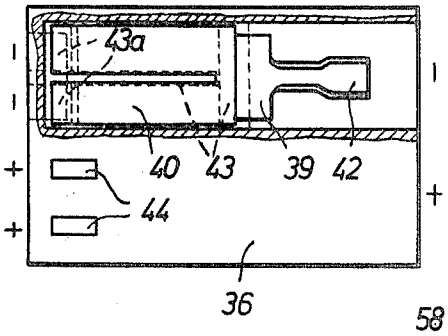


Fig.9

Fig.7



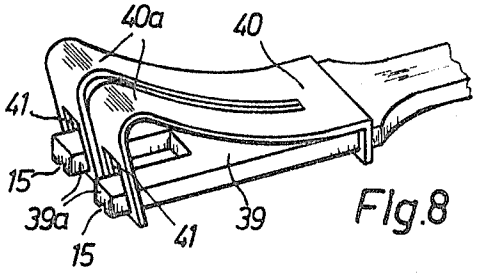


Fig.8

Fig.11

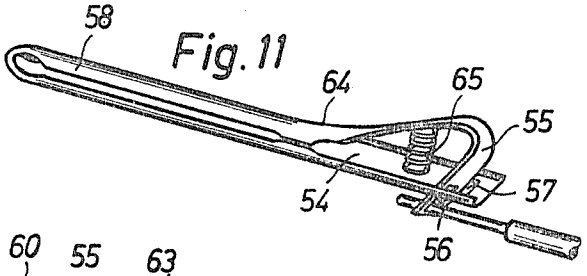
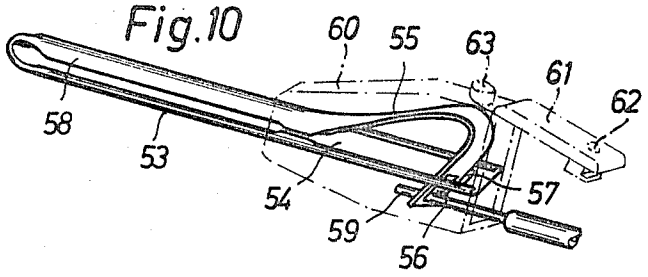


Fig.10



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Fig.12

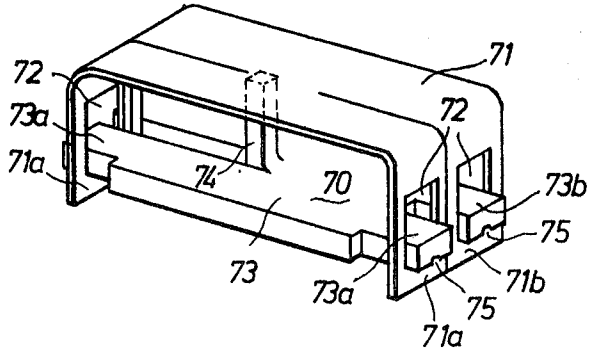


Fig.13

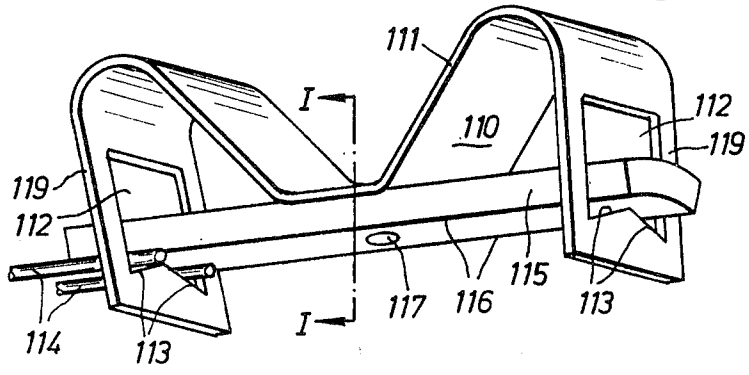


Fig.14
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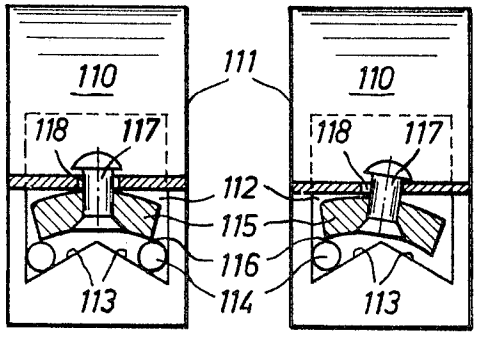


Fig.15

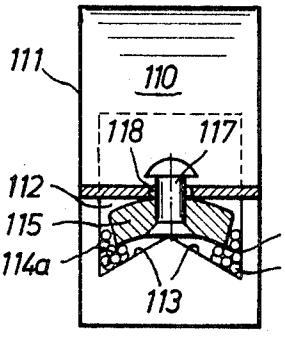


Fig.16

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Fig. 17

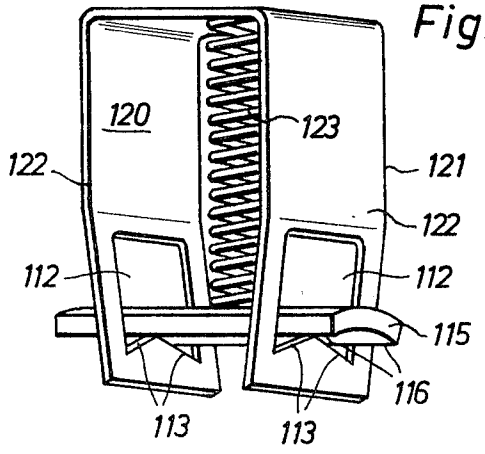


Fig. 18

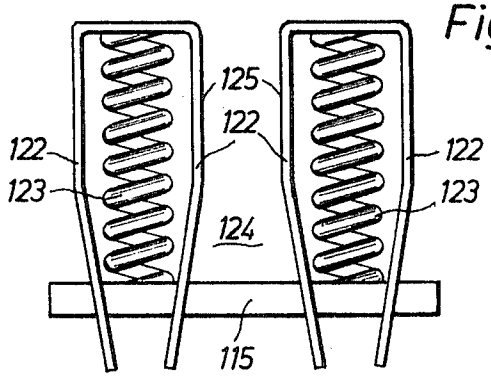
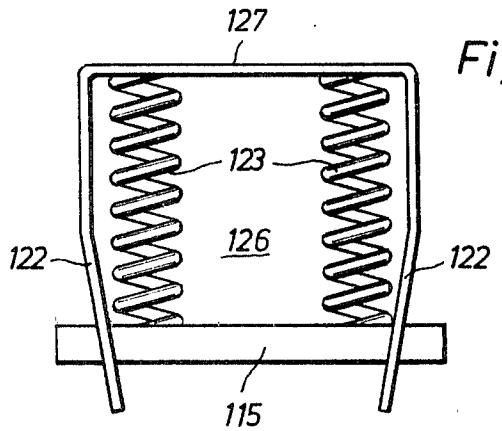


Fig. 19



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ELECTRICAL CONNECTOR

This invention concerns a screwless connecting terminal or connector to which the ends of electric leads are connectable without screws.

Conventional connecting terminals have a terminal housing in which a contact plate is mounted. The bent ends of a clamping spring are supported on this contact plate and are in engagement with the walls of the housing under the force of the spring.

The ends of the leads to be connected are inserted between the bent clamping spring ends and the contact plate by raising the clamping spring ends from the contact plate. With the use of these connecting terminals a disadvantage is that the contact pressure is received with or without clamped conductors by the terminal housing, since the clamping springs are in contact with the terminal housing under pressure.

Furthermore, such connecting terminals are expensive on account of their complicated construction and manufacture and when carrying large currents have a high contact resistance.

It is the object of the present invention to provide a screwless connecting terminal or connector for joining electric leads which avoids the present disadvantages and, due to its simple construction, easy manufacture and reliable efficiency, is economical, has low contact resistance when carrying large currents, and automatically maintains its contact pressure.

In accordance with the present invention, a screwless connecting terminal or connector for joining electric leads having at least one bent clamping spring provided in a terminal housing and in forced engagement with a contact plate, is characterized in that the clamping spring encloses the contact plate, serving as abutment, at its bent end, and is kept under tension by said contact plate.

In a preferred embodiment, the clamping spring, together with the contact plate, is constructed as a self-contained unit; and the end region of the contact plate is located in an opening with play.

The contact plate may also be formed as a double-walled plate from a strip of material, and the clamping spring may be secured by a screw, rivet or the like or by a clip or locking connection, to the contact plate.

One end region of the contact plate may be constructed as a connecting member, such as a plug, contact sleeve, pinch connection, solder lug or the like, and the terminal connection may be arranged in a housing which is at least partially flexible or resilient, or in a housing provided with an actuating pressure member for the clamping spring.

In another embodiment of the invention, the connecting terminal or connector is formed as banana plug and its contact plate with the clamping spring is bent out of a strip of material, the clamping spring with the plug opening being secured under spring tension in an opening in the contact plate or the end region of the contact plate.

The clamping spring may be arranged with the contact plate at the contact end of a housing and the terminal member extending out of the housing may be formed as a plug.

The screwless connecting terminal or connector of the present invention is simple in design, easy to manufacture and reliable in operation. The connecting terminal or connector is preferably constructed as a self-contained unit so that the contact pressure is maintained with or without clamped conductors at the connecting terminal itself, and is not transmitted to the terminal housing.

In addition, this connecting terminal or connector has the required low contact resistance when carrying large currents, and is very economical.

Furthermore, the connecting terminal or connector of the present invention can be readily and rapidly assembled; it is manufactured from material of high conductivity and represents the best possible type of connection and connecting device for electric leads.

Embodiments of the present invention will be described hereinafter with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of a screwless connecting terminal or connector for electric leads, formed of a contact plate and clamping spring and arranged in an insulating terminal housing,

FIGS. 2—5 are perspective views of other embodiments of screwless connecting terminals or connectors,

FIG. 6 is a longitudinal section through a terminal housing with inserted connecting terminals,

FIG. 7 is a plan view of the same terminal housing comprising connecting terminals, shown partly in section,

FIG. 8 is a perspective view of the same connecting terminal split at the clamping spring end,

FIG. 9 is a longitudinal section through a modified terminal housing with inserted connecting terminal,

FIG. 10 is a perspective view of a connecting terminal formed as a banana-shaped or split plug,

FIG. 11 is a perspective view of a modified terminal connector formed as a banana-shaped or split plug,

FIG. 12 is a perspective view of a modified doubled connecting terminal or connector,

FIG. 13 is a perspective view of a modified screwless connecting terminal or connector comprising a contact plate displaceably secured under tension in W-shaped recesses of a terminal member,

FIG. 14 is a cross section through the same connecting terminal or connector taken on the line I–I of FIG. 13 with two clamped leads,

FIG. 15 is a cross section through the same connecting terminal or connector with one clamped lead,

FIG. 16 is a cross section through the same connecting terminal or connector provided with several separately pinched conductors of two cables,

FIG. 17 is a perspective view of a modified embodiment of connecting terminal or connector,

FIGS. 18 and 19 show front views of other constructions of connecting terminals or conductors.

The connecting terminal or connector **10** of the present invention for the screwless connection of electric leads or the like has a plane striplike contact plate **11**, in the center area of which a clamping spring **12** is secured by means of a screw, rivet or the like **11***a*. This clamping spring **12** is bent at both ends and encloses the end portions of the contact plate **11**, said contact plate **11** serving as abutment, keeping the clamping spring **12** under tension. The bent ends of the clamping spring **12** are each provided with an opening **13** positioned in each case round the end **14** of the plate which is reduced at the ends. The opening **13** of the clamping spring **12** is larger than the cross section of the reduced plate ends **14** so that the clamping spring **12** displaceably encloses the ends of the contact plate **11**.

The openings **13** in the clamping spring **12** and the contact plate **11** are provided in the lower contact region with at least one recess **15**, such as a channel, notch or the like determining the position of an inserted electric lead.

This connecting terminal or connector **10** is arranged in an insulating terminal housing **16**, the contact plate **11** being secured to the housing **16**. Said terminal housing **16** may be made from a flexible or resilient material so that the ends of the clamping springs for receiving a current conductor can be effected by deforming the housing. At least the upper side of the housing is made resilient, since the movement of the clamping spring **12** for the insertion of the lead between the clamping spring and contact plate **11** must be effected from the top.

FIG. 2 of the drawings shows a modified construction of a connecting terminal or connector **17**. A clamping spring **18** bent at one end engages through its opening **13** the reduced end **14** of a contact plate **19**. Said contact plate **19** is formed of a strip of material bent at the reduced end **14** and resembles a plane double-walled plate. The end **20** of the clamping spring **18** opposed to the bends extends downwardly with a certain

space parallel to the free end of the clamping spring, and is clamped between the doubled contact plate **19**, so that the clamping spring **18** is firmly connected to the contact plate **19** and represents a self-contained unit. The free end of the contact plate **19** is formed as a terminal member **21**, such as a contact sleeve for receiving electric leads.

A screwless connecting terminal or connector **22** is shown in FIG. **3** as another modified embodiment. The clamping spring **23** and the contact plate **24** correspond to the connecting terminal or connector **17**; the change is in the type of connection of the clamping spring **23** with the contact plate **24** which, at its end opposed to the bend, is firmly connected to the contact plate **24** by a screw or rivet **25**, the two parts forming an independent unit. The end of the contact plate **24** is formed as a terminal member **26**.

Another modified screwless connecting terminal or connector **27** is shown in FIG. **4** of the drawings. The opening **13** in a clamping spring **28**, bent at one end, applies pressure to the reduced end **14** of a contact plate **29**. The end of the clamping spring **28** opposed to the bend is formed as a downwardly bent supporting member **30** by means of which the clamping spring **28** is locked to the contact plate **29**, in that the clamping spring **28** with its supporting member **30** partly engages and locks in the contact plate **29**; the clamping spring **28** and contact plate **29** are also an independent unit.

The free end of the contact plate **29** is formed as a terminal member **31**.

FIG. **5** of the drawings shows another embodiment of a screwless connecting terminal or connector **32**. A clamping spring **33** bent at one end engages by its opening **13** round the reduced end **14** of a contact plate **34**. Said contact plate **34** is formed as a double-walled plate of a strip of material bent at the end of the plate opposite to the reduced end **14**, and keeps the clamping spring **23** under tension by means of a screw or rivet. The doubled contact plate **34** is flat in the region of the clamping spring **33** and at the free end is shaped into a terminal member **35**.

The above described connecting terminal or connector **17**, **22**, **27** and **32** may be provided on the lower contact area between the spring opening **13** and reduced contact plate end **14**, with at least one recess **15** such as a channel or notch, so that the electric lead inserted under the contact plate **19**, **24**, **29** and **31** in the opening **13** of the clamping spring **18**, **23**, **28** and **33** may be secured in a predetermined position. The clamping spring **12**, **18**, **23**, **28**, **33** kept under tension by the contact plate **11**, **19**, **24**, **29** and **34** ensures a reliable clamped position and good contact for the inserted electric lead.

The connecting terminals or connectors **17**, **22**, **27** and **32** may be fitted, as shown in the connecting terminal or connector **10**, in a completely or partially resilient or flexible terminal housing **16** or in the terminal housing **36** shown in FIGS. **6** and **7**.

The terminal housing **36** has a box-shaped body open at one end, and is provided at the other end with one or more insertion openings **27** for the electric leads. One or more adjacent but separated connecting terminals or connectors may be inserted in said terminal housing **36**.

The connecting terminal or connector **38** inserted in the terminal housing **36** (see FIG. **8**) is provided with a double contact plate **39**, to which a split clamping spring **40**, bent at one end, is secured under tension, and forms an independent unit with the contact plate **39**. At the connecting end of the clamping spring **40**, said contact plate **39** has two adjacent plate members **39***a* round which a clamping spring member **40***a* of the split clamping spring **40** engages at an opening **41**. The two adjacently provided clamping spring members **40***a*, each in contact under tension with the contact plate members **39***a*, afford two possible connections for this connecting terminal **38** at one end. The other end of the contact plate **39** is formed at a terminal member **42**. An electric lead may be connected to the connecting terminal **38** in the region of the member **42**, and two electric leads are clamped near the clamping spring members **40***a*.

The contact plate **39** is supported on a tongue **43** and is secured thereto by the clamping spring **40**. In the region of the curved parts **40***a* of the clamping spring the tongue **43** is recessed for the movement of the clamping spring **40**. The part of the tongue in contact with the housing wall in the insertion region is provided as a stop **43***a*, the surface of which, adjacent to the clamping spring **40**, is slanted. This stop **43***a* with its inclined surface serves as an abutment for the lower portions of the clamping spring and prevents twisting of the clamping spring members **40***a* when the electric terminal leads are pulled out.

The clamping spring **40** can also be fitted with more than two clamping spring members **40***a* so that several leads can be clamped together.

The members **39***a* of the contact plate **39** at the connecting end partly project into the insertion openings **37** of the housing **36** and come into contact with an upper abutment. Two recesses **44** are provided on the top of the housing **36**, near the bend of each clamping spring **40**, through which a screwdriver or the like can be inserted for moving the clamping spring **40** downwardly when inserting the electric leads.

Such a terminal housing **36** provided with a connecting terminal or connector **38** represents a terminal body which can be used for the connection of several, for example, four electric leads (two on each side). In addition, a lead can be connected in this terminal body to the connecting member **42** of each connecting terminal **38**, and two leads may extend in the region of the clamping spring **40**. The modified terminal housing **45** shown in FIG. **9** of the drawings, has a boxlike base member **46** in the two ends of which insertion openings **47** are formed. A contact plate **49** supported by members **48** is secured by its ends in the insertion openings **47** acting as abutments at the top. A clamping spring **51**, bent at both ends and supported in the center area with a bend on the contact plate and held with tension on the contact plate **49** owing to its curved (W-shaped) formation, forming an independent unit with the contact plate **49**, engages round both ends of the contact plate. An actuating pressure member **52** covering the top of the terminal housing **45** is secured to the clamping spring **51**, said pressure member **52** being movable into the base member **46** for moving the clamping spring **51**. With this actuating pressure member **52**, when one end is pressed, said member moves the bent end of the clamp spring **51** downwardly for the insertion of electric leads, about the center bend of the clamp spring **51**.

The other bent end of the clamp spring **51** may also be raised from the contact plate **49** by moving the other end of the actuating presser **52** downwardly for the insertion and clamping of the electric lead. The parts of the members **48** at the insertion end also serve as stops **48***a* and prevent twisting of the lower parts of the clamping spring when the electric leads are drawn out of the opening **50** in said clamping spring.

A screwless connecting terminal or connector **53** is shown in FIG. **10** of the drawings as a banana-shaped or split plug and formed from a strip of material into a contact plate **54** and a clamp spring **55**. The bent clamp spring **55** has an opening **56** at one end and extends through an opening **57** at the end of the contact plate **54**. The contact plate **54** and the clamp spring **55** are shaped as a cylindrical plug **58** at one end so that the connecting terminal **53** is insertable by this pluglike connecting member **58** into a socket. An electric lead **59** may be inserted and clamped in the opening **56** in the clamping spring **55** below the contact plate **58**. The clamp spring **55** may be enclosed at the connecting end together with the contact plate **54**, by a terminal housing **60** consisting of flexible or elastic material, said terminal housing **60** being provided at the connecting end with a hinged cover **61** with passage openings **62** for the electric lead **59** and for receiving the banana-shaped plug **53**. A presser **63** may be arranged on the housing **60** for actuating the clamp spring **55** during insertion of the lead.

The connecting terminal or connector **64** shown in FIG. **11** of the drawings is also formed as a banana-shaped plug and corresponds in its design to the connecting terminal **53**. The

modification resides in the arrangement of a spring **65**, which assists in holding the clamp spring **55** in clamping tension relative to the contact plate **54**.

The connecting terminals or connectors **53** and **64** formed as banana-shaped plugs may also be provided with a clamp spring **55** which engages round the contact plate with tension through an opening, and they are designed according to the connecting terminals or contactors according to FIGS. **1—6**.

Another embodiment of a screwless connecting terminal **70** shown in FIG. **12** of the drawings has a clamping spring **71** having at least two separately movable clamping spring members **71***a*, **71***b*, at both ends; each clamping spring member **71***a*, **71***b* of the clamp spring **71** extends through an aperture **72** across stems **73***a*, **73***b* at the end of a contact plate **73**. The clamp spring **71** is U-shaped, and the angled shanks thereon are represented by the clamp spring members **71***a*, **71***b*. The clamp spring **71** is held with tension against the contact plate **73** by means of a support **74** and forms an independent unit therewith. The support **74** is located in the center area of the clamp spring. It is preferable to bend the center support **74** out of the contact plate **73** to form a clamp spring support. Additional supports **74** may also be bent out of the sides of the contact plate **73**.

It is within the scope of the present invention to provide the center and/or the sides of the contact plate with supports **74** which can be made from the contact plate **73** by the stamping and bending process or secured to the contact plate **73** in any different manner. The two clamp spring members **71***a*, **71***b* at each end of the clamp spring **71** are formed by longitudinally splitting said spring and springing the end over their respective contact plate independently of each other.

The other sides of each contact plate member **73***a*, **73***b* and the edge of the opening **72** of each clamp spring member **71***a*, **71***b* in contact with the members **73***a*, **73***b* are provided with recesses **75**, which secure the inserted electric leads in the correct position.

The contact plate members **73***a*, **73***b* may be reduced so that the opening **72** of each clamp spring member **71***a*, **71***b* is greater than the cross section of the contact plate members. In the case of such a connecting terminal or connector **70** several electric leads may be inserted, since this terminal **70** is constructed as a double or multiple terminal. Each clamp spring member **71***a*, **71***b* may be moved independently of the adjacent or opposing clamp spring member **71***a*, **71***b* for the insertion or removal of the electric lead.

Such a clamp **70** may be arranged in a casing, and its clamp spring members **71***a*, **71***b* may be moved by a pin insertable through recesses in the casing, or by an actuating presser.

The above-described connecting terminal or contactor **70** although of simple construction, makes it possible to interconnect several electric leads.

The special advantage of the connectors described is that the contact plates serve as abutments and the clamp spring or springs are held under tension. Together with the clamp spring, the contact plate forms an independent unit, through which the contact pressure, with or without clamped electric leads, is not transmitted to the insulating casing.

The connecting terminal or contactor of the present invention may be used in switches, plug sockets, and plug devices; such terminals may also be used as a connection on electric leads, or for connecting such leads together.

A screwless connecting terminal and contactor **110** in another embodiment according to FIGS. **13—16** has a clamp member **111** which is provided with two oppositely disposed apertures **112**; said apertures each have clamping surfaces **113** slanted with respect to each other, dividing each aperture **112** into two clamping regions. A contact plate **115** clamping individual leads **114***a* of a cable extends between the opposed apertures **112** of the clamping member **111**.

The leads **114** are secured by clamping at three points with line contact by the clamping member **111**, and the contact plate **115** and the individual conductors **114***a* of the cable lead are compressed in the clamping regions of the recesses **112** with line contact by the contact plate **115**.

The apertures **112** of the clamping member **111** are W- or M-shaped. The contact plate **115** is tiltable about an abutment of the clamping member **111** and provided at the clamping ends with straight clamping edges **116**.

The contact plate **115** is formed with an angular or arcuate cross section and to provide the corner edges on the concave side as clamping edges **116**, the convex side surface of the contact plate **115** is tiltably supported on the abutment of the clamping member **111**.

The spring clamping member **111** is shaped as a curved clamping spring with a W- or M-shaped basic form (see FIGS. **13—16**). The contact plate **115** is mounted in the center area of the clamp on the clamping member **111** by a rivet **117**.

The rivet **117** is disposed in a bore **118** of the clamping member **111** and can be displaced (tilted) with the contact plate **115** relatively to the clamping member **111**; at the same time, the center area of the clamping member serves as an abutment for the contact plate **115** and apertures **112** are formed in the turned down ends **119** of the clamping member **111**.

In the embodiment shown in FIG. **17** a screwless connecting terminal or connector **120** has a U-shaped yoke as clamping member **121**, in both shanks **122** of which an aperture **112** is formed. The contact plate **115** is displaceably mounted in the apertures **112** and has a compression spring **123**. It is held by this compression spring **123** tiltably in the apertures **112**; the compression spring **123** is arranged between the crosspiece of the stirrup and contact plate **115**.

A screwless connecting terminal and contactor **124** according to another embodiment of FIG. **18** has two U-shaped yokes adjacent to each other as clamping members **125**, which jointly engage the contact plate by the apertures **112** formed in the shanks. With each yoke there is associated a compression spring **123** which extends between the contact plate **115** and the yoke crosspiece to keep the contact plate **115** displaceably with tension in the apertures **112** of the clamping member **125**.

FIG. **19** shows another embodiment of a screwless connecting terminal and contactor **126** which has a U-shaped yoke as a clamping member **127**, in the side recesses **112** of which the contact plate **115** is kept under tension by means of two compression springs provided between contact plate **115** and yoke crosspiece. The apertures **112** of all the above described embodiments are each formed in the shanks **119** and **122** of the clamping members **111**, **121**, **125**, **127** in the free ends of the shanks opposite the crosspiece and are of similar form; the shanks **119**, **122** of the clamping members **111**, **121**, **125**, **127** are disposed by the portion receiving the apertures **112** at an angle relative to each other, so that the leads **114** clamped between the shanks **119**, **122** and contact plate **115** in the apertures **112** are retained reliably, since, due to the inclined formation of the clamps, a cone effect is obtained preventing extraction of the leads **114** or **114***a*.

Since the contact plate **115** of the screwless connecting terminal or contactor **110**, **120**, **124**, **126** is mounted displaceably in the recesses of the clamping members **111**, **121**, **125**, **127** a good clamping action is obtained; the contact plate **115** automatically swivels to accommodate the inserted leads **114** or **114***a*, and has a strong pressure action due to the supporting or mounting on an abutment **111**, **122**.

The leads **114** are always clamped with three point mounting by means of linear contact and the leads **114***a* are compressed in a bunch and also prevented from slipping out of the sides by the shape of the aperture, whereby a high contact pressure is ensured.

Since the contact plate is tiltable about its longitudinal axis, either one or two leads may be inserted into the apertures; in the case of two inserted leads the contact plate exerts an approximately uniform pressure on both leads.

If diagonally opposed leads are used, a sufficient contact pressure is achieved. The naturally resilient formation of the clamping spring as a clamping member and the compression springs of the yokes formed as clamping members, give the contact plate a strong pressure action so that adequate contact pressure is ensured in each method of clamping.

The leads can be easily inserted into the apertures between clamping member and contact plate.

At the same time it is a great advantage for several electrical leads to be connected together in the smallest space.

It is possible to manufacture such screwless connecting terminals and connectors in other forms and to make the shapes and sizes of the clamping parts different. For example, it is within the scope of the present invention to provide the screwless connecting terminal and connector **110**, as shown in FIGS. **13—16**, as a one-sided embodiment; the clamping member **111** is constructed as a bent clamping spring with only one aperture **112** provided with two clamping surfaces **113** opposed to each other at an angle, said aperture being divided by the clamping surfaces **113** into two clamping regions.

A contact plate **115** is applied with tension on this clamping member **111** and the contact plate **115** extends into the aperture **112** for securing the leads **114** to be electrically connected. In this embodiment it is preferable to secure one end of the contact plate **115** to the clamping member **111** so that the other end of the clamping plate **115**, disposed in the aperture **112**, is in pressure contact with the clamping member **111**.

I claim:

1. A screwless connecting terminal for electric leads includes a terminal housing, a contact plate positioned within said terminal housing and having a first face and an oppositely disposed second face, a clamping spring positioned within said terminal housing and supported on said contact plate, wherein the improvement comprises said clamping spring extending along said clamping plate and having a first part supported on said contact plate, a second part extending from said first part and disposed in outwardly spaced relationship from the first face of said contact plate, and a third part bent from the second part toward said contact plate and having its end remote from the second part spaced outwardly from the second face of said contact plate, the third part of said clamping spring having an opening therein through which said contact plate extends and the edge of the opening facing the second face of said contact plate being biased into engagement with said contact plate for securing one or more electric leads therebetween, and said second and third parts of said clamping spring being displaceable relative to said contact plate for spacing the contacting edge of the opening therein from the second face of said contact plate for inserting one or more electric leads therebetween.

2. A connecting terminal, as set forth in claim **1**, wherein the edge surface of the opening in the third part of said clamping spring which is biased into engagement with the second face of said contact plate is located in a plane disposed angularly to the plane of said contact plate when an electric lead is secured therebetween for effecting a wedgelike gripping action on the lead.

3. A connecting terminal, as set forth in claim **1**, wherein a groove is provided in the second face of said contact plate and extends therealong transversely of the third part of said clamping spring for forming a recess for receiving an electric lead to be held between said contact plate and clamping spring.

4. A connecting terminal, as set forth in claim **1**, wherein said clamping spring has a second part and third part extending from each of two opposite sides of said first part and each of said third parts has an opening therethrough through which said contact plate extends for forming points of engagement at the opposite ends of said contact plate for one or more electric leads.

5. A connecting terminal, as set forth in claim **1**, wherein the first part of said clamping spring is fixed to said contact plate by the first face thereof at the end of said contact plate opposite the end which extends through the opening in said clamping spring.

6. A connecting terminal, as set forth in claim **1**, wherein said contact plate has recesses in the sides thereof extending between the first and second faces at a position intermediate its ends, and the first part of said clamping spring secured within the recesses in said contact plate whereby the first part of said clamping spring secured to said contact plate is in engagement with the first and second faces of said contact plate.

7. A connecting terminal, as set forth in claim **1**, wherein a slot is formed in said clamping spring extending through at least the second and third parts thereof for splitting said clamping spring into a pair of similar clamping spring members each having an opening therethrough, and the end of said contact plate having a forked configuration providing individual contact plate sections arranged to pass through the separate openings in said clamping spring members.

8. A connecting terminal, as set forth in claim **1**, wherein said contact plate is elongated and has reduced cross-sectional portions at each end thereof, and the first part of said clamping plate is secured to said contact plate at a position intermediate the ends of said contact plate and said clamping spring has two second parts and third parts each extending from one side of said first part toward the opposite ends of said contact plate, the third parts of said clamping spring each having an opening therethrough arranged to receive the reduced cross section portion of said contact plate.

9. A connecting terminal, as set forth in claim **1**, wherein the edge of the opening in said clamping spring has a point intermediate its ends arranged to contact the second face of said contact plate at least when the electric leads are not disposed between the edge and said contact plate, and the surfaces of said edge extending from the intermediate point to the ends thereof arranged in diverging relationship from the second face of said contact plate so that two separate clamping regions are provided between the edge of the opening and the second face of said contact plate, and means for securing said contact plate to said clamping spring so that said contact plate can be pivoted laterally about an axis extending from its point of support on said contact plate through the opening in said clamping spring and also so that the contact plate can be pivoted relative to said clamping spring.

10. A connecting terminal, as set forth in claim **1**, wherein said clamping spring is U-shaped having a bight portion and a pair of legs each extending outwardly from one end of said bight portion, the bight portion of said U-shaped clamping spring forming the first part thereof intermediate its ends and the second part of said clamping spring extending from the intermediate first part to the ends of said bight portion, and each leg of said U-shaped clamping spring forming the third part thereof and having an opening therethrough arranged to receive one end of said contact plate.

11. A connecting terminal, as set forth in claim **1**, wherein at least the portion of said terminal housing disposed opposite the first face of said contact plate and located adjacent to the second part of said clamping spring being formed of a flexible material so that the second part of said clamping spring can be displaced toward the first face of said contact plate whereby the contacting edge surface of the opening in the third part of said clamping spring is displaced away from the second face of said contact plate for inserting electric leads therebetween.

12. A connecting terminal, as set forth in claim **1**, wherein a tongue extends inwardly from the walls of said terminal housing and forms a support for said contact plate intermediate the ends thereof, and the opposite ends of said terminal housing having openings therein into which the opposite ends of said contact plate extend.

13. A connecting terminal, as set forth in claim **1**, wherein the third part of said clamping spring forms an obtuse angle with the portion of the second face of said contact plate which extends through the opening in the third part and the second part of said clamping spring is disposed at an acute angle with the first face of said contact plate.

14. A connecting terminal, as set forth in claim **13**, wherein the cross-sectional area of said contact plate which extends through the opening in said clamping spring has a smaller cross-sectional area than the portion of said contacting plate which extends between the opening and the point at which the first part of said clamping spring is supported on said contact plate.

15. A connecting terminal, as set forth in claim 1, wherein said contact plate is formed of an elongated metal strip bent over upon itself for at least a portion of its length, and said contact plate formed of said bent over metal strip having a first end for engagement within the opening in said clamping spring and a second end forming a connecting part such as a socket pin and the like.

16. A connecting terminal, as set forth in claim 15, wherein the bent over portion of said contact plate terminates at a point intermediate the ends thereof, and the first part of said clamping spring is inserted between and is held by the end of said bent over portion and the oppositely disposed intermediate part of said contact plate.