April 3, 1928. 1,665,166

J. E. GRAHAM

ELECTRICAL CONNECTER

Filed Oct. 21, 1925

Fig. 1.

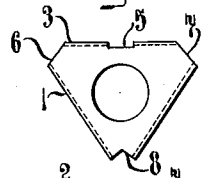


Fig. 2.

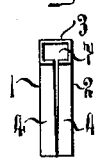


Fig. 4.

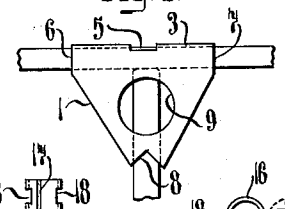


Fig. 3.

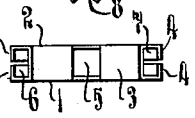


Fig. 13.

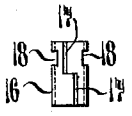


Fig. 14.

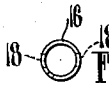


Fig. 6.

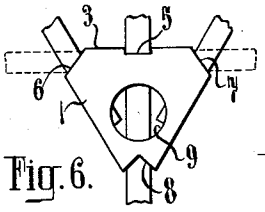


Fig. 8.

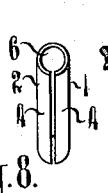


Fig. 7.

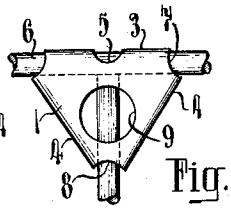


Fig. 5.

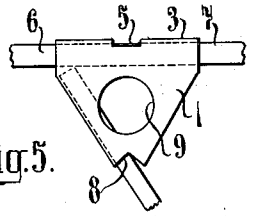


Fig. 9.

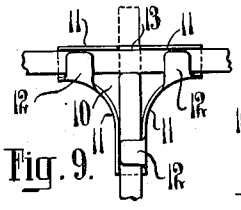


Fig. 10.

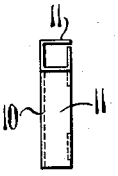


Fig. 11.

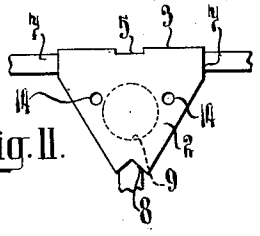
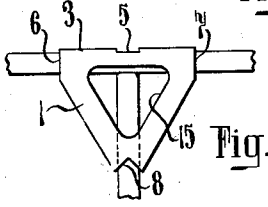


Fig. 12.



Inventor

John Elphinstone Graham

By - B. Singer, Atty.

Patented Apr. 3, 1928. 1,665,166

UNITED STATES PATENT OFFICE.

JOHN ELPHINSTONE GRAHAM, OF LONDON, ENGLAND.

ELECTRICAL CONNECTER.

Application filed October 21, 1925, Serial No. 63,934, and in Great Britain October 31, 1924.

This invention relates to electrical connecters and has for its object to provide such devices in or to which electrical leads may be readily soldered with facility in an efficient and neat manner and in such a way that the said leads may be grouped and electrically united at a junction formed by the device.

In general connecters made according to the invention comprise a body or part which may or may not be of conducting material, having a recess, cavity, depression or the like therein adapted to hold the solder or the like, and having holes, apertures, slits, slots or other openings in the body or part, merging or opening into the said recess or the like. In the holes, apertures or the like, the ends or other parts of the electric leads are inserted to project into or towards the recess or the like and when thus inserted, solder or the like in the recess can be melted by suitable means and when melted spreads or runs in the various parts of the connecter and unites the leads together, direct or through the medium of the connecter, suitable flux, if necessary having been previously applied. A neat soldered joint is thus made uniting the leads either directly or indirectly, and moreover no solder is liable to be dropped or splashed which is a great advantage especially when soldering the connections of "wireless panels".

The connecter can take many forms and can be combined with many devices, for example it may form a terminal nut, or part of an insertable plug and it may be formed from one or more parts which may be solid or of sheet material, which may be stamped out and which may be slid on or slipped around the wire or wires to be joined. Further in some cases the solder or the like may be enclosed in the connecter during manufacture which is made of suitable form to retain it, the hole or holes or the like being suitably disposed to lead to the solder containing part.

And in order that the invention may be better understood, it will now be described with reference to the accompanying drawings in which:—

Figs. 1, 2 and 3 show in front elevation, side elevation and plan one form of sheet metal connecter made according to the invention.

Figs. 4, 5 and 6 show methods of using the connecters with or without slight modifications illustrated in Figs. 1 to 3.

Figs. 7 and 8 show front and side elevations respectively of another connecter made according to the invention.

Figs. 9 and 10 show similar views of another form.

Figs. 11 and 12 show two further modifications.

Figs. 13 and 14 show in elevation and plan another form.

Referring to Figs. 1 to 6, the connecter shown in these figures is stamped and bent up from a thin sheet metal blank and comprises two triangular portions 1 and 2 with their corners removed and with their bases joined by a strip 3. The remaining sides have flanges 4 which meet at the sides as shown. An aperture 5 which may be square is formed at the centre of the strip 3 and other similarly shaped apertures 6, 7 and 8 are constituted by the cut away corners and flanges. In Figs. 1, 3 and 6 the upper corners of the triangles are cut at an obtuse angle to the base where joined by the strip 3, and in Figs. 4 and 5 they are cut at right angles to this base. 9 is an aperture formed in the triangle 1.

In using the connecter it will be seen from Figs. 4, 5 and 6, that two, three or four wires of square or other section can be passed into or through the apertures 5, 6, 7 and 8 and the device held by its own springiness in position, at the same time the connecter forms a support for holding the wires in desired relationship. Granules of solder are now passed through the aperture 9 to be retained in position or a pellet of solder of suitable shape is placed in or supported by the aperture 9. Upon applying heat, for example by a soldering iron the solder unites the wires and connecter together in an extremely neat and uniform manner.

The connecter is preferably given a tinned finish in manufacture and this together with any suitably applied flux facilitates soldering.

The connecter may be placed in position on the wires by sliding it on to and along one wire, or by springing it open and clipping it in position.

The form shown in Figs. 7 and 8 is substantially similar to that already just described except that in place of angular corners in the bends these are rounded and are

especially suitable for wire of circular section.

In Figs. 9 and 10 a somewhat triangular base and plate 10 is provided with flanges 11 having lugs 12 for assisting to retain the wires in position. Between the flanges 11 at the top a gap 13 is left for a wire and the other wires are accommodated in the channels formed between the flanges.

Fig. 11 is a form of connecter similar generally to those shown in Figs. 1 to 8 and shows small apertures 14 in the triangle 2 for the attachment of fine wires, which may be hooked in position or just passed through before soldering, and which after soldering are firmly held in position.

The form shown in Fig. 12 is similar to those already described but the circular aperture is replaced by a triangular one 15. In all cases if required one or more apertures may be formed in the top and bottom plates.

The connecter shown in Figs. 13 and 14, is formed from thin sheet metal and is particularly suitable for attachment to terminal screws, stems and the like and comprises a blank bent into a hollow cylinder 16 with tongues 17 and having a desired number of apertures 18 opening into the interior. In use this form of connecter is sprung on to the end of a screw or the like so that the apertured end projects beyond the end of the screw. The wires are then inserted into or through the apertures 18. The granules of solder are then placed in the projecting portion of the hollow cylinder or a pellet of solder is supported thereby and upon applying heat the connecter wires and stem are united in a neat, firm and efficient soldered joint.

The connecter may comprise a terminal nut having a cylindrical head at one end preferably serrated or knurled on the exterior. The outer end of the head is formed with a circular groove or channel of suitable section and this channel forms the necessary recess. The cylindrical surface of the head has a number say five, of holes disposed at equal angles apart and passing therethrough and opening into the channel, the ends of the holes coming on to the inner side of the channel if desired. Below the head the terminal nut may be reduced in diameter to leave only a comparatively thin wall and at the lower end a flange may be formed.

In use the nut is screwed on or otherwise fastened to a suitable stem or other part of a component and the groove and holes fluxed if required. Small pieces or granules of solder are disposed in the groove and the ends of the electric leads which may have been fluxed passed through the holes into the groove. Upon the application of the necessary heat from a soldering iron or otherwise, the solder melts and runs round the groove and upon cooling the leads are soldered together a neat joint being effected. With some terminal nuts or other parts the holes or passages for the leads may in relation to the recess have a bend or angle which maintains the leads in position pending soldering.

The triangular portions of the sheet metal connecters such as shown in Figs. 1, 4, 6, 7, 9 and 11 and 12 may be replaced by portions of square, rectangular or other regular or irregular shape, with angular corners cut away where required and/or with apertures, slots or the like in suitable position for the passage of wires.

With some forms of the device some of the openings may take the form of saw cuts or the like from the exterior permitting an edge of a sheet or strip to be passed through to communicate with the recess.

The connecter may be mounted upon or form part of a post or of an insertable plug or may have an extension adapted to be connected to a binding post or the like. Sheet metal forms of the device may be stamped out and include a suitable depression or recess, which may be a circular channel and have the holes or the like leading thereto. In one such form the connecter has a circular channel on one side and the outer wall thereof is turned down to form a channel on the other side. In the turned down outermost wall and the outer wall of the first mentioned channel aligned apertures are provided forming the passage for the leads to the channel.

Connecters with self contained solder or the like may comprise two cups or the like of sheet metal forced or spun together to hold the solder or the like therebetween and these cups may have in any desired positions the holes or the like for the leads, which holes may be formed to constitute guides or they may be formed of a block or the like of solder having suitable holes punched through it, such block being plated on the exterior surface thus forming a thin nickel or other cup or shell sufficient to retain the solder when in a molten condition until it again hardens.

It will be seen that a variety of connecters may be constructed according to the invention and that such devices readily lend themselves to joints of different forms, having one or more leads which leads may cross the joints and that in all cases a neat and efficient soldered joint is produced which is considerably strengthened or reinforced by the connecter itself.

The invention is not limited to the forms described nor to the details thereof but may be carried into effect in any manner retaining the principle of a connecter having a support, recess, cavity, depression or the

like adapted to hold solder or the like and having holes, apertures, slits or other openings for the insertion of wires or other conductors merging or opening into the said recess or the like.

What I claim and desire to secure by Letters Patent in the United States of America is:—

1. A sheet material connecter for facilitating the soldering of electric conductors together, said connecter being bent up and shaped from a blank shaped to include two parallel portions of similar formation joined by a strip and having cut away angles where said portions join the strip and other portions along the edges of the first named portions to form flanges adapted to extend towards each other at their free edges, the said bent up blank forming a chamber to hold the solder, and a plurality of openings in communication with said chamber for the passage and retention of electric conductors.

2. A sheet material connecter for facilitating the soldering of electric conductors together, said connecter being bent up and shaped from a blank shaped to include two parallel portions of similar formation joined by a strip and having cut away angles where said portions join the strip and other portions along the edges of the first named portions to form flanges adapted to extend towards each other at their free edges and provided with apertures in at least one of the two portions of similar formation and in the strip joining the said portions, the said bent up blank forming a chamber to hold the solder, and a plurality of openings in communication with said chamber for the passage and retention of electric conductors.

In witness whereof I affix my signature.

JOHN ELPHINSTONE GRAHAM.