This invention relates to an assembly including a relatively rigid conducting part and an associated flexible electrical connector.

In the past, movable contact fingers carrying the movable contact of an electrical device have been electrically connected to fixed parts by flexible, stranded electrical conductors, frequently referred to as "pigtailed," these flexible leads being connected to the fixed and movable members by means of welding, brazing, riveting, or the like.

It has been found that such prior mechanisms are frequently unsatisfactory in that the movement of the movable contact finger causes a loosening and eventual rupturing of the point of connection of the flexible lead. In addition, the prior means of connection to which reference has been made above were more expensive than would be desired.

Furthermore, in other assemblies comprising relatively rigid conducting parts and associated flexible electrical connectors the above, and other, difficulties were encountered. It is, therefore, one object of the present invention to provide an assembly comprising a flexible conductor and an associated conducting part of improved design which is inexpensive to fabricate.

Another object of the present invention is a device in accordance with the preceding object in which the mechanical and electrical connection between the flexible lead and its associated parts is of improved character.

Other objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawings illustrating certain preferred embodiments in which:

Figure 1 is a bottom view of a contact finger and lug assembly in accordance with the present invention.

Figure 2 is a side view of the device of Figure 1. Figure 3 is a plan view of the contact finger and lug of Figures 1 and 2 prior to assembly.

A specific embodiment of the present invention comprises a contact finger 1 of copper, bronze, or other suitable material familiar in the electrical art having electrical contacts 2 mounted upon one end portion thereof by means of nuts 3 or other suitable fastening means. The opposite end portion of the contact finger 1 is provided with apertures 4 through which extend end portions of stranded, flexible electrical conductors, or pigtailed, leads 5.

The opposite end portions of the conductors 5 extend through suitable apertures 6 in a lug 7. As may be seen from Figure 1, the surfaces forming the apertures 4 and 6 tightly engage the associated end portions of the flexible leads 5 whereby an excellent mechanical and electrical connection is effected between these flexible leads and the associated structure.

Prior to the assembly of the various parts, the contact finger 1 and the lug 7 have the form indicated in Figure 3. End portions of the flexible leads 5 are then inserted through the apertures 4 and the sides of the contact finger 1 are compressed in a swaging die or other suitable device until the parts assume the shape indicated in Figure 1. Similarly, the opposite end portions of leads 5 are inserted through apertures 6 and the sides of lug 7 are suitably compressed. It will be obvious that an excellent electrical and mechanical connection between leads 5 and the associated parts is thus effected.

As will readily appear, the present invention provides a simple and economical contact finger and lug assembly in which the flexible leads are connected to both the fixed lug 7 and the movable contact finger 1 with a connection which is excellent both electrically and mechanically.

It will be obvious that the lug 7 may be composed of copper, brass or other similar conducting material, and it will further readily appear that the amount which the flexible leads extend through the various parts with which they are associated, and the degree to which the apertures are compressed to hold the ends of the flexible leads firmly in place, may be appropriately varied to fit the demands of any particular application.

While a certain preferred embodiment of the invention has been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims:

What is claimed is:

1. A contact finger assembly comprising a contact finger of substantially rigid and conducting material having an aperture extending through said contact finger, a flexible electrical connector having one end portion extending through said aperture with the surfaces of said contact finger which form said aperture deformed at least in part to tightly engage said end portion of said flexible electrical connector whereby said flexible electrical connector is electrically and mechanically connected to said contact finger, a lug of substantially rigid and conducting material with an aperture extending through said lug, the opposite end portion of said flexible electrical connector extending through said aperture with the surfaces of said lug which form said lug aperture tightly engaging said opposite end portion of said flexible electrical connector whereby said flexible electrical connector is electrically and mechanically connected to said lug and said contact finger and lug are interconnected.

2. A contact finger assembly comprising a contact finger of substantially rigid and conducting material having a plurality of apertures extending through said contact finger, a plurality of flexible electrical connectors having end portions extending through said apertures with the surfaces of said contact finger which form said apertures deformed at least in part to tightly engage said end portions of said flexible electrical connectors whereby said flexible electrical connectors are electrically and mechanically connected to said contact finger, a lug a substantially rigid and conducting material having a plurality of apertures extending through said lug, the opposite end portions of said flexible electrical connectors extending through said lug apertures with the surfaces of said lug which form said lug apertures similarly deformed to tightly engage said opposite end portions of said flexible electrical connectors whereby said flexible electrical connectors are electrically and mechanically connected to said lug and said contact finger are interconnected, and at least one electrical contact mounted to said contact finger at a point spaced from the point of connection of said contact finger to said flexible electrical connectors.

3. The method of electrically and mechanically connecting a flexible electrical connector to a substantially rigid conducting part comprising forming an aperture through said conducting part with an axis perpendicular
to a major surface of the part and with the aperture adjacent a side edge of the part, inserting in said aperture the end of a flexible connector of a cross-sectional area less than the cross-sectional area of the aperture, and deforming the material of the part between the aperture and said side edge to decrease the cross-sectional area of the aperture and compress the connector therein.

4. The method of electrically and mechanically connecting a flexible electrical connector to a substantially rigid conducting part comprising piercing an aperture through said conducting part adjacent to a side edge thereof and substantially normally to a major surface of said part, inserting through said aperture an end portion of a flexible connector having a cross-sectional area less than that of the aperture, and forcing the side edge of said conducting part adjacent said aperture inwardly a sufficient amount to decrease the cross-sectional area of said aperture and tightly compress the end portion of said connector inserted therethrough.

5. The method of electrically and mechanically connecting a flexible electrical connector to a substantially rigid conducting part comprising piercing an aperture through said conducting part adjacent to a side edge thereof and substantially normally to a major surface of said part, inserting through said aperture an end portion of a flexible connector having a cross-sectional area less than that of the aperture, and swaging said conducting part to deform the material thereof between the aperture and said side edge sufficiently to decrease the cross-sectional area of said aperture and tightly compress the end portion of said connector inserted therethrough whereby the electrical and mechanical connection of said flexible connector to said conducting part is effected.

6. An assembly comprising means of substantially rigid and conducting material having an aperture transverse to a major plane thereof and extending therethrough adjacent an edge thereof so that the length of the aperture is substantially the same as the thickness of said material, a flexible electrical connector having one end portion extending through said aperture, the edge of said means being pressed inwardly adjacent to the aperture to deform at least in part the surfaces which form the aperture to tightly engage said end portion of said flexible electrical connector whereby said flexible electrical connector is electrically and mechanically connected to said means.

7. An assembly comprising means of substantially rigid and conducting material having an aperture extending therethrough which is substantially perpendicular to a major surface of said means and disposed adjacent to an edge thereof, a flexible electrical connector having one end portion extending through said aperture, the edge of said means adjacent to said aperture being pressed inwardly to deform at least in part the surfaces which form said aperture to tightly engage said end portion of said flexible electrical connector whereby said flexible electrical connector is electrically and mechanically connected to said means.

References Cited in the file of this patent
UNITED STATES PATENTS

2,555,075 Bergan May 29, 1951