This invention concerns a split peg formed of a tubular electrically conductive material having one portion deformable without causing deformation of the remainder of the peg, such peg being usable to form either electrical plugs or sockets or connectors thereby minimizing the number of piece parts required to form such electrical components and thereby facilitating mass production of such components, such invention also concerning electrical components formed with such pegs.
ELECTRICAL PLUG AND SOCKETS AND COMPONENTS

This invention concerns electrical plugs and sockets and components therefor.

In particular, the invention concerns electrical conductive pegs which constitute the electrically conductive pins and socket parts in such plugs and sockets but such invention concerns, additionally, connectors generally referred to as "pogo-hone" connectors.

In existing round pin plug and socket assemblies, for example, the peg forming the plug pin differs in shape and size from the peg constituting its mating socket. This sometimes results in the plug body and the socket body being different in form which thus necessitates duplicity in tooling and in assembly jigs.

One object of the invention is to provide plug and socket connectors which can be manufactured, on a mass production basis, in a more economical manner by reducing the number of different piece parts utilized.

Thus according to one aspect of this invention there is provided, for forming the electrically conductive parts of an electrical plug or socket, a "pogo-hone" connector, a peg formed from an electrically conductive material, such peg comprising a length of tube formed by such conductive material, the wall of such length of tube being provided with a first split extending longitudinally thereof and additionally being provided with a second split which extends transversely of said first split, such second split being of a depth sufficient to allow deformation of a portion of the tube to one side of said second split without corresponding deformation being transmitted to the remainder of the tube lying on the other side of the second split. Exponentially the base of said second split may lie substantially on the behind a diameter of the tube and in embodiments where only one said second split is provided such second split may conveniently be positioned midway along the length of the tube.

In another embodiment, where two or more second splits are provided, such splits may conveniently be disposed symmetrically with respect to the ends of the peg. This symmetrical positioning of the second split or splits facilitates handling of the pegs in mass production in a manner which will be explained hereinafter.

Desirably said second split or splits may lie in a plane at right-angles to the first split.

According to another aspect of this invention there is provided an electrical plug or socket comprising a body provided with at least one tubular peg formed from an electrically conductive material and an insulative body having a bore in which said peg is firmly located, said peg comprising a length of tube being provided with a first split extending longitudinally thereof and additionally being provided with a second split which extends transversely of said first split and is of a depth sufficient to allow deformation of a portion of the tube to one side of the second split without corresponding deformation being transmitted to the remainder of the tube to the other side of said second split, and said bore being dimensioned with respect to the pin and the width of said first split so that at least the portion of said pin lying within such bore is radially compressed to an extent sufficient for the pin to be self-retaining within the bore.

According to another feature of the invention the body and the bore therein may be dimensioned so that only part of the portion of the peg to one side of the second split lies within the bore and so that the remainder of the peg to said one side may protrude from the body and constitute the conductive pin of a plug whereas a part of the portion to the other side of the second split (which does not lie within, and has not passed through, the bore and is therefore not radially compressed) may constitute the conductive part of a socket.

Expediently the cross-sectional dimensions of the peg, that is the interior diameter and the exterior diameter of the peg, are chosen with respect to the width of the first split so that a portion to one side of the split may satisfactorily be radially compressed to an extent where the exterior diameter of the radially compressed portion is substantially equal to the interior diameter of the uncompressed portion. In this way a common pin may be used in bodies constituting two halves of a cooperating plug and socket connector.

In one embodiment of plug or socket body the bore may be provided with a guide region to facilitate introduction of the peg into the bore. This guide region would normally be constituted by a frusto-conical narrowing at the mouth of the bore and such narrowing would constitute an abutment for an end part of the undeformed portion of the peg and in this way, due to co-operation between such end portion and the guide region, the rigid and positive location of the peg in its bore would be enhanced.

While tests have indicated that additional means are not required firmly to locate the peg in the bore it is conceivable that in certain particular instances it may be desirable to provide such additional means.

Thus according to yet another feature of the invention said bore, in addition to being provided with a guide region at one end thereof, may be provided with an abutment region at the opposite end of the bore, the length of the bore and the relative disposition of the guide region and the abutment region being chosen to co-operate with a peg provided with a pair of spaced-apart second splits, the end portions of the peg lying outside the two second splits respectively forming a pin and/or a socket while the intermediary portion of the peg between the two second splits engages the abutment region and retains the part of the peg which lies adjacent the guide region firmly against such region.

It is again conceivable that with the latter arrangement, the width of the first split which traverses the center of the intermediary region between the two second splits may be of a different width to the remainder thereof.

According to a still further feature of the invention the or each bore for corresponding pegs is dimensioned with respect to the or each corresponding peg to be inserted therein so that the amount of radial compression applied to the portion or portions of a peg or pegs which lies in, or has passed through the bore or bores, results in the elastic limit of the material forming the peg or pegs to be marginally exceeded.

It will be understood that with the proposals outlined above common piece parts form both plug and socket assemblies.

It has been explained that the second split(s) are symmetrically disposed with respect to the ends of the pegs. This is desirable in order to expedite automatic assembly as with such symmetrical disposition of the second split(s) in the pegs it is not necessary to introduce the pegs into their bores in one particular orientation and either end of the peg may be introduced into the bore.

In order that the invention may be more readily understood, and further features thereof appreciated, connectors in accordance with this invention will now be described by way of example, and with reference to, accompanying drawings; these connectors utilizing pegs in accordance with the invention for forming the conductive pins and sockets of the connectors. The accompanying drawings comprise:

FIG. 1 which is a sectional view of a plug or socket body component showing, in front and side elevation two conductor pegs to be inserted into the body component;

FIG. 2 which is a plan view of the body component of FIG. 1;

FIG. 3 which is an exploded part cross-sectional view of a plug and a socket formed by two identical body components of the kind shown in FIGS. 1 and 2 with their pegs shown connected to diagrammatic conductive leads;

FIG. 4 which is a cross-section view of a body component part of a second embodiment of a plug or socket with two pegs each of two suitable types shown for introduction into the component part, such pairs of pegs being shown in front and side elevation;

FIG. 5, which is a plan view of a casing for receiving the body component part of FIG. 4;

FIG. 6 which is a section on the line VI—VI of FIG. 5; and
3,659,254

In the exemplified embodiment described above however, the second split is not symmetrically positioned and, furthermore, the end portion to be compressed is chamfered or otherwise appropriately shaped at 11, for example swaged, while the opposite end portions which are not to be compressed may be opened to provide a bell mouth 12. It should be understood, therefore, that symmetrical positioning of the second split 8 is not essential.

In the second embodiment, which constitutes another plug and socket connector, the connector comprises two identical peg carrying molded bodies 20 formed from an electrically insulative synthetic resin material, and located within outer casing members, such outer casing members 21 again being identical but being shaped asymmetrically in a manner which permits the two casing members to be interlocked with one another when one of them is turned 180° with respect to the other.

The outer casing members 21 each comprises a tubular part 22, substantially rectangular in cross-section, one of the open ends of such part 22 being provided with an outwardly directed peripheral flange 23 provided with apertures 24 for locking or mounting bolts. Positioned within each of the casing members 21 is an inwardly directed flange 25 upon which seats one of the peg carrying bodies 20, the seat being provided with one or more apertures 26 through each of which a rivet may pass for firmly securing the insulative body 20 in position in its casing members 21. When each of these casing members 21 are viewed from the end opposite to that carrying the radial flange 23, one half is of smaller dimensions than the other half, this arrangement allowing for the interlocking of the smaller half with the larger half of two casing members 21 when the same are turned 180° with respect to each other.

The bodies 20 contained within the interlocking casing members each comprise a substantially rectangular body of an electrically insulative synthetic resin material and each body is provided with two rows of bores 27 which extend completely through the body.

Each bore comprises two wider end portions 28, 29 with a constricted intermediate portion 30 interposed therebetween the change in diameter of the bore between the wider end portion 28 and the intermediary portion 30 being bridged by a chamfered shoulder 31 constituting a guide region while the opposite end of portion 30 merges with the portion 29 in a single step 32 so that an abutment region is provided.

Pegs 33 similar to the kind described hereinbefore (and designated 6) with first and second splits 34, 35 are driven into the bores 27 through the wider end portion 28 of each bore 27 so that one end portion of each peg becomes located in (a manner as also hereinbefore described) in the body with one end portion 36 radially compressed. The portion of the peg 33 which is radially compressed protrudes outwardly from one end of the bore to provide a pin 36a while the opposite end constitutes a socket 37. Thus each peg carrying body can be coupled to its casing member either to provide a socket 37 or a plug pin 36a, the remainder of the pegs then serving to provide means whereby component terminals or leads may be connected thereto.

In this particular connector the pins 33 are at least partly formed from a noble metal such as for example gold whereas the casing members 21 may conveniently be formed from aluminum or an alloy thereof.

FIG. 4, in addition to showing a pair of pegs 33 also depicts a pair of pegs 33a having a first split 34a and two second splits 35a and 35b. Such pegs 33a would not normally be used in conjunction with pegs 33 but normally would be used separately of pegs 33a. The pegs 33 and 33a have only been shown together in a single connector body for the sake of convenience.

I claim:

1. An electrical connector adaptable as a plug or socket comprising an electrically insulating body, at least one tubular peg initially of uniform cross-section formed from an electrically conductive material carried by said body, said body
3,659,254

5 defining a bore in which said peg is located, said peg defining a first split extending longitudinally thereof and a second split extending transversely of said first split, the second split dividing the tubular peg into two identical portions and being of a depth sufficient to allow deformation of one portion of the tube without said deformation being transmitted to the other tube portion, and said bore being dimensioned with respect to the peg and the width of said first split so that the portion of said peg within such bore is radially compressed to an extent sufficient for the peg to be self-retaining in the bore, said bore being dimensioned so that only a part of the one portion of the peg lies within the bore and the remainder of the one peg portion protrudes from the body and constitutes a conductive pin of a plug whereas a part of the other peg portion constitutes a conductive part of a socket, said connector being adapted to mate with at least one other connector similarly made.

2. An electrical connector according to claim 1 wherein the interior diameter and the exterior diameter of the peg are chosen with respect to the width of the first split so that said one peg portion may be radially compressed to an extent where the exterior diameter of the radially compressed portion is substantially equal to the internal diameter of the uncompressed other portion.

3. An electrical connector according to claim 1 wherein the body bore has a guide region to facilitate introduction of the peg into the bore, this guide region being constituted by a frusto-conical constriction of the bore forming an abutment for an end part of the undeformed other portion of the peg.

4. An electrical connector according to claim 3 wherein said guide region is at one end of the bore and an abutment region is at the opposite end of the bore, the length of the bore and the relative disposition of the guide region and the abutment region being arranged to co-operate with a peg provided with a pair of spaced-apart second splits, the end portions of the peg lying outside the two second splits respectively forming a pin and a socket while the intermediary portion of the peg between the two second splits engages the abutment region and retains the part of the peg which lies adjacent the guide region firmly against said region.

5. An electrical connector according to claim 1, wherein the bore is dimensioned with respect to the peg to be inserted therein so that the amount of radial compression applied to the one portion of the peg results in the elastic limit of the material forming the peg to be marginally exceeded.

6. The connector according to claim 1, wherein said second split has a base lying adjacent the diameter of the tube.

7. The connector according to claim 6, wherein the second split lies in a plane at right-angles to said first split.

8. The connector according to claim 1, including at least one additional split disposed parallel to said second split and further dividing said peg into additional portions.

* * * * *