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(54) **Moulded components with electrical inserts**

(57) The process permits the obtaining by moulding of wire connections coupled to a component 1 e.g. a faceplate closing a relay housing and providing output wiper contacts 6,8,11,13 disposed in line.

Before moulding, the connections 5,7 and 10,12 inter connected by couplings 14 and 15 between their output wiper contacts 6,8, and 11,13 are placed within a mould and the component 1 moulded thereto.

After moulding, the connections are electrically separated by cutting the wire along plane P and removing the couplings 14 and 15.

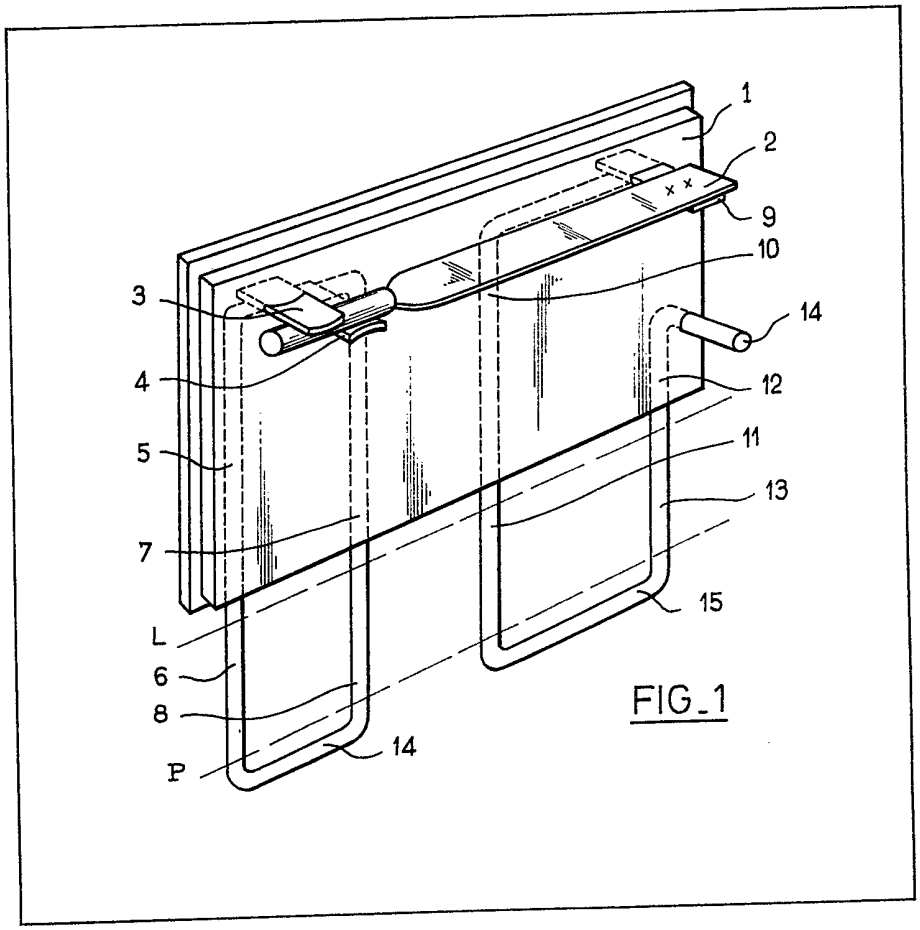

FIG_1

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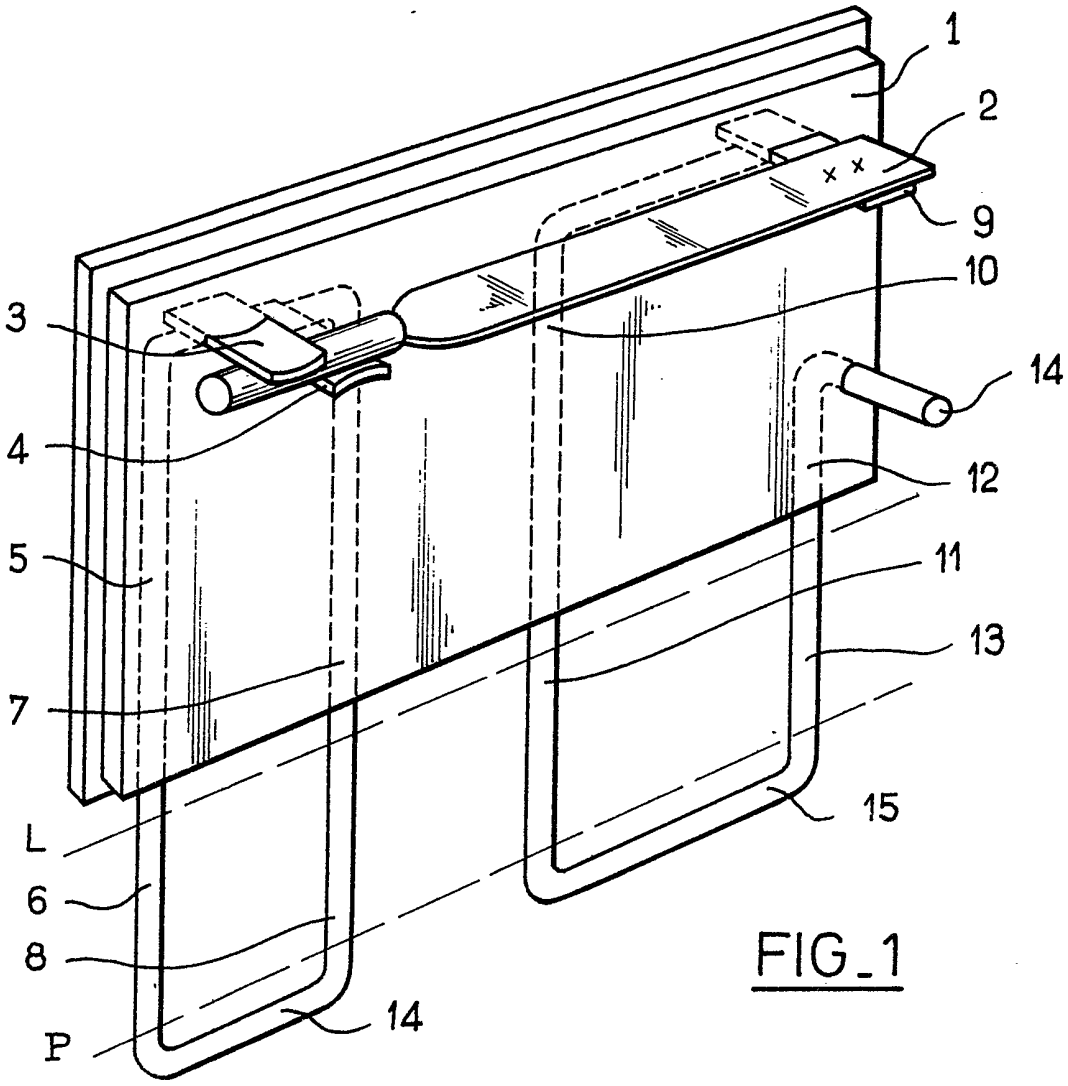

FIG_1

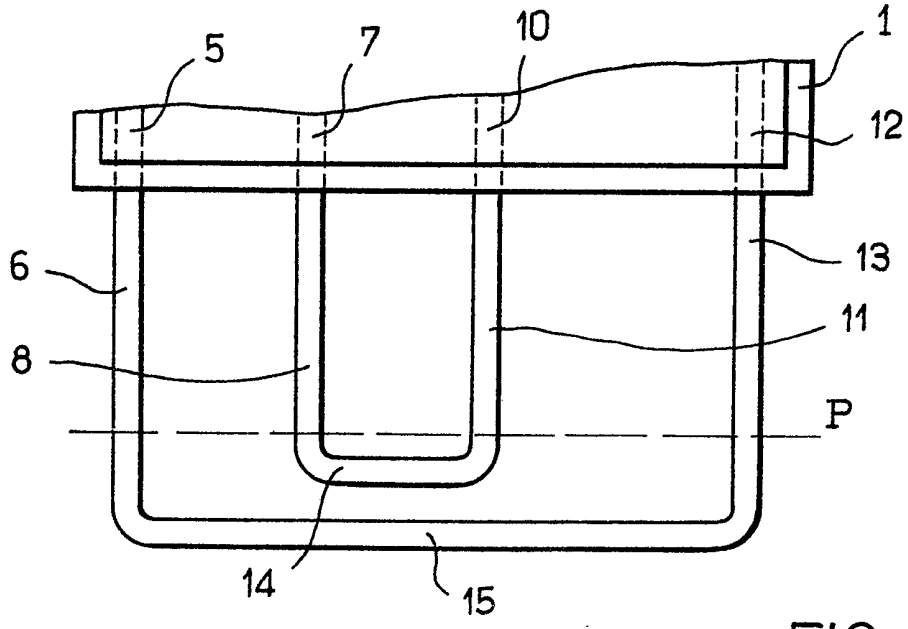

FIG_2

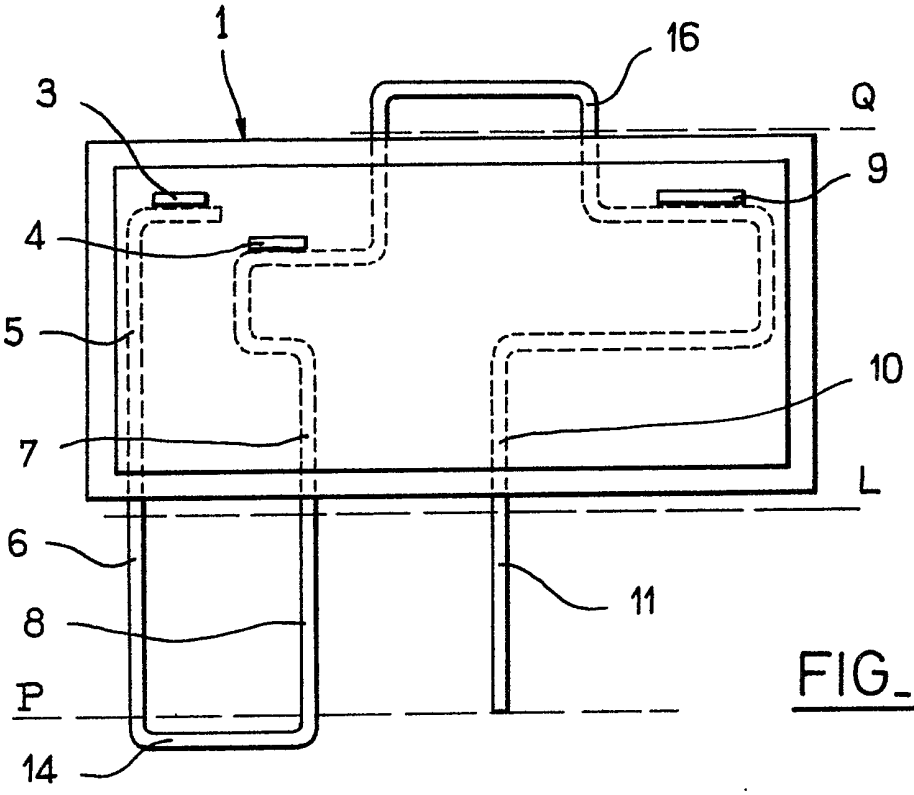

FIG_3

SPECIFICATION

Moulded components with electrical inserts

The present invention relates to a process permitting the obtaining by moulding of electrical connections coupled to a component, and serving as output wiper contacts for the said component, the said output wiper contacts being perpendicular to a connection face of the component and being disposed along at least one line.

From the French Patent filed 15th December 1978 under No. 78.36378 by the same applicant, there is known a relay in which the connections are moulded into a faceplate of plastics material to form, at one end, aligned output wiper contacts, and at the other end, contacts or supports for contacts. These connections can be obtained starting from a metal comb the blades of which are insulated after moulding by means of a covering.

However, this arrangment has the following inconveniences:

-the faceplate must be thick enough so that the blades so not approach the external surfaces of the faceplate, taking into account the pressure of the injection moulded material.

-the volume of metal of the comb is large, for a small part used.

-the tools for cutting off and for putting in place of the comb are large.

-the outlets in rectangular bars are more fragile than the outlets in wire provided for printed cicuit holes of the same diameter as those provided for rectangular bars.

There are also known components having outlets made of wire, as for example in French Patent No. 1504501. But the wire connections must then be individually put in place, whilst observing precise orientation.

The present invention has for its object the provision of process permitting the moulding in of wire connections serving as output wiper contacts for a component having at least one line of output wiper contacts, without presenting the inconveniences set out above.

According to the invention, before moulding, at least two connections are coupled together by the extension of the wire between the ends of their output wiper contacts, in such a manner as to form a "U", and after moulding the said two connections are separated by cutting the wire at the base of the "U" in such a manner as to give rise to the free ends of the output wiper contacts.

Preferably, two connections coupled together before moulding have their neighbouring output wiper contacts on a same line of output wiper contacts, and they can be enclosed by two other connections coupled together by a "U" surrounding the "U" of the two neighbouring connections.

It is likewise possible to join a group of two connections coupled together to another connection by extension of the wire between the ends of the connections situated remote from the output wiper contacts, the said other connection being separated from the group of two connections after moulding by cutting the connecting wire remote from the output wiper contacts.

These arrangements are economical and simple to put to work.

An embodiment in accordance with the invention is hereinafter particularly described with reference to the figures of the accompanying drawings, wherein:

Figure 1 is a view in perspective of a faceplate similar to that of Figure 4 of the above-mentioned patent of the Applicant, but provided with connections of round wire, before cutting in accordance with the invention;

Figure 2 is a partial view of Figure 1, with another arrangement of the couplings between connections, and

Figure 3 is a view in plan of a faceplate similar to that of Figure 1, but with couplings between three connections.

Referring to Figure 1 there has been shown at 1 a faceplate intended to close a relay housing, and carrying an inverter contact constituted by a movable blade 2, a fixed working contact 3, and a fixed reset contact 4. These elements are carried by electrical connections the ends of which serve as output wiper contacts arranged in line at the lower part of the faceplate.

More precisely, the working contact 3 is carried by a wire connection 5, for example by soldering or welding a tongue of precious metal onto the wire. This latter is bent so as to emerge at 6 from the lower part of the faceplate, to constitute a output wiper contact for coupling up the relay.

In the same way the rest contact 4 is carried by a wire connection 7 terminated by an outlet wiper contact 8.

The movable blade 2 is for example welded on a tongue 9, itself welded on a wire connection 10 terminated by an output wiper contact 11.

Finally, a last connection 12, terminated by an output wiper contact 13, extends from the face of the faceplate at 14 to serve as a coupling for a winding.

These connections are put in position in the mould for the faceplate in such a manner as to obtain moulding-in and precise positioning of the elements of the contacts.

Before moulding-in, two connections 5,7 are coupled together by existence of the wire between the ends of their output wiping contacts 6,8. The corresponding coupling 14 forms a "U" with the wiper contacts 6 and 8. It is the same for the coupling 15 between the output wiper contacts 11 and 13.

In the case of Figure 1, the connections 5,7 joined to each other before moulding-in have their neighbouring output wiper contacts on the line L of the output wiper contacts. It is the same for the couplings 10 and 12.

After moulding-in, the connections 5 - 7 - 10 - 12 are electrically separated by cutting the wires at the lower part of the "U" along a line P. In this manner one then obtains the free ends of the output wiper contacts.

In the case of Figure 2, it will be seen that the coupling 14 connects the output wiper contacts 8 and 11 by forming a "U", whilst the output wiper contacts 6 and 13, enclosing the preceding "U", are

connected by the coupling 15 by forming another "U" surrounding the preceding 'U'.

The choice between one or the other of the arrangements can be dictated by a greater or lesser ease of formation of the wires and of welding of contact elements.

In every case it will be seen that one only has to place two inserts in the mould, and that these inserts are prehensile and do not turn about themselves.

In the case of Figure 3, there are only three connections, the output wiper contact of the winding forming part of another assembly of the relay.

It will be seen that the coupling 14 joins the output wiper contacts 8 and 6 as in the case of Figure 1, but furthermore the connection 7 is coupled to the connection 10 by extending the wire between those ends of the connections which are situated remote from the line L of the output wiper contacts. More precisely this coupling comprises a part 16 situated externally of the faceplate 1 in such a manner that after the moulding operation one can electrically separate the connection 10 from the connection 7 by cutting the external connection 16 along a plane Q.

It will thus be seen that the operation of moulding only makes use of a single insert.

Of course, it is possible to couple a larger number of connections when a moulded member equivalent to the faceplate 1 bears a greater number of output wiper contacts.

Apart from the elimination of the above-mentioned inconveniences for the moulding of blades in the form of a comb, the employment of wire connections in accordance with the invention permits the simpler obtaining of contacts or supports which are relatively close one to the other whilst still having good insulation. Furthermore, it is possible to use tinned wires, which permits the avoiding of the operation of tinning of the output wiper contacts in the case of mounting on a printed circuit.

With combs, even tinned on the principal faces, the edge surfaces resulting from cutting off are not tinned, which is inacceptable in certain cases.

The invention is not restricted to the employment of wire of circular section, and it is also envisaged to use flatted wires or even wires of square section.

The invention adapts itself to various miniaturised components, for example to the contact carriers of miniature relays or to the connection bars or to the housings of integrated circuits.

CLAIMS

1. A process for the production of electrical connections each comprising

(a) a first conductive portion embodied in a support member of plastics material which forms part of a component, and

(b) forming extension of the said conductive portion, a second conductive portion which emerges from the said support member in a general direction which is substantially perpendicular to a connection face of the component, the said first portion having its end not connected to the second portion cooperating with internal contact elements of the component, the second portion constituting an output wiper contact of the component, the said process comprising the steps of

(i) preparing inserts comprising the said electrical connections and, for at least two thereof, supplementary portions coupling the ends of the said second portion,

(ii) placing said inserts in a mould;

(iii) moulding of the said support member, and

(iv) the removal of the said supplementary portions by cutting of the said second portions in the region of their ends, characterised in that the said inserts are formed by bending in the shape of a "U" of rigid wire of circular section and that there is precise positioning of the inserts in the mould.

2. A process, according to claim 1, wherein said rigid wire, used to form the inserts, is tinned.

3. A process, according to claim 1 or 2, wherein two connections connected together at the end of their second portions to form a first "U" are enclosed by two other connections coupled together at the end of their second portions to form a second "U".

4. A process, according to claim 1 or 2, wherein a first and a second connection are coupled together at the end of their second portions to form a first "U' and wherein there is a third connection of which the second portion is free, the first and the third connections each having a third portion which extends the first at the end of the latter not coupled to the second portion, the three said connections being produced from a single rigid wire in such a manner that the said third portion form a single "U" shaped bend at the exterior of the support member, cutting being carried out after moulding to eliminate the electrical connection between the said third portions.

5. A process, for the production of electrical connections, as claimed in claim 1, substantially as described herein with reference to the accompanying drawings.

6. Electrical connections produced in accordance with the process of any one of claims 1 to 5.

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