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(51) INT CL⁶

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H2E ECHU EEKD E163
U1S S1935

(56) Documents Cited

| | | |
|-----------------------|----------------------|----------------------|
| GB 2293052 A | GB 2170062 A | GB 2115623 A |
| EP 0715375 A1 | EP 0438120 A1 | EP 0411216 A1 |
| WO 92/05607 A1 | US 5027262 A | |

(58) Field of Search

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INT CL⁶ H01R

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(54) Abstract Title

Multi-outlet line coupling

(57) A multi-outlet line coupling has a metal conductor strip 7 for each line and, projecting from each strip a plurality of contacts 8, one for each outlet 3. Each contact is formed by cutting and bending from the strip, and the contacts may be formed along opposite edges of the strip (figure 3, not shown). The strips are located within two insulating shells 9,10 which are joined to form the body of the coupling.

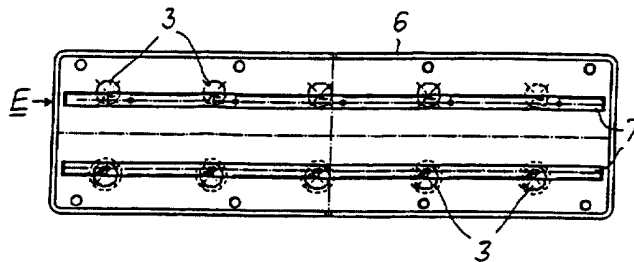


Fig. 2

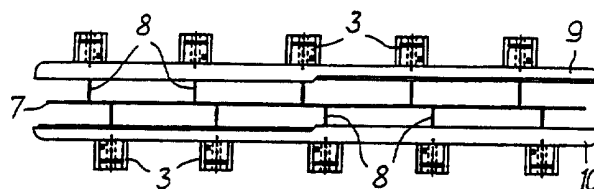


Fig. 5

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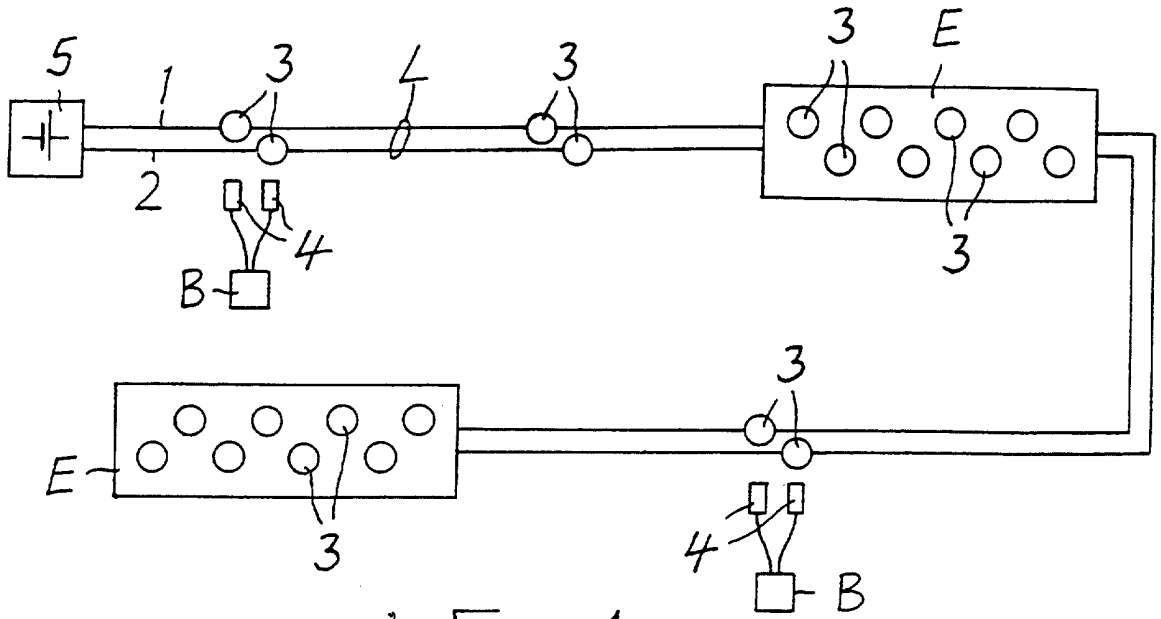


Fig. 1

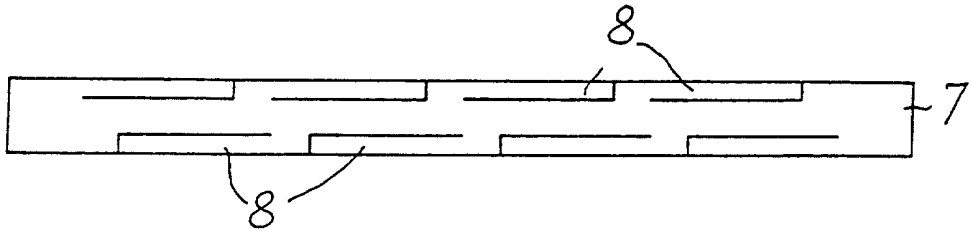


Fig. 3

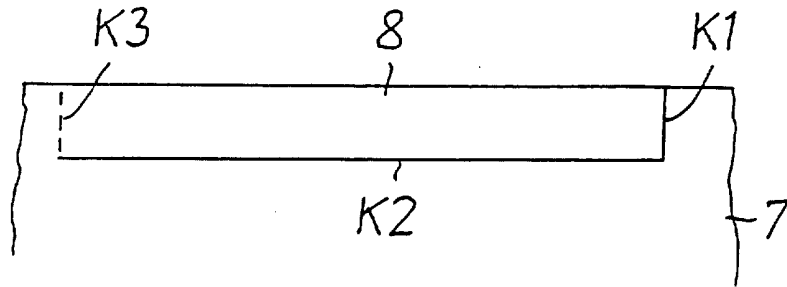


Fig. 4

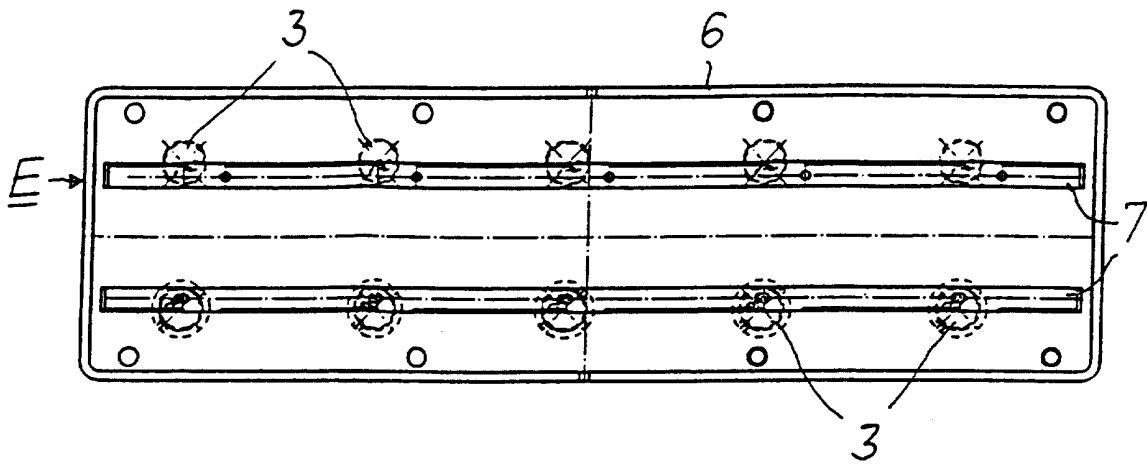


Fig. 2

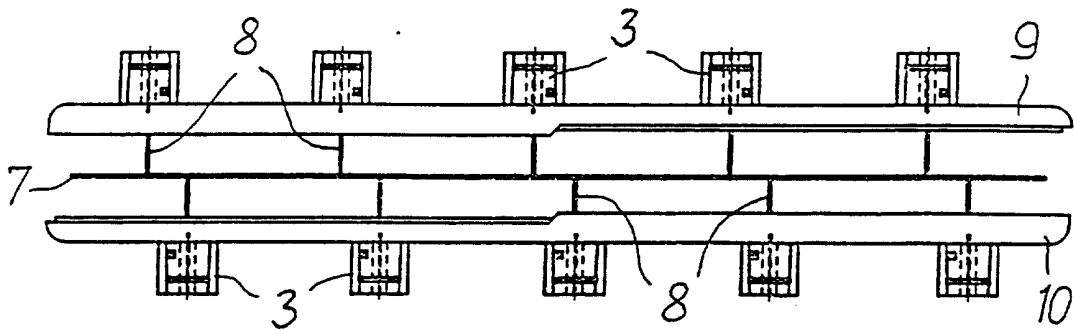


Fig. 5

**A coupling and connection system for
a plurality of electrical components**

The invention relates to a coupling and connection system for a plurality of electrical components which can be connected to a common electric line comprising two mutually insulated conductors at a distance space from one another. Along the line first coupling parts of insulating material are each attached to at least one contact element, which are connected to the conductors of the line and serve to receive two coupling parts of insulating material with cooperating contact(s) corresponding to the contact element, which are connected conductively to the components (DE 296 05 165 U1).

Connection systems of this kind are known in principle for strings of lights which are used for example on Christmas trees and in beer gardens. In the course of the lines used for such connection systems are attached spaced sockets for the screwing in of bulbs. The continuous current path is closed only when a bulb is correctly disposed in all sockets. Otherwise the entire connection system is inoperable. There is the added fact that the sockets quickly corrode when such a connection system is used in the open. Unless expensive protection measures are taken, the whole connection system then quickly becomes unusable.

In DE 296 05 165 U1 mentioned in the preamble, a connection system is described which is protected as a whole against moisture. This connection system is also operable if second coupling parts are not connected to all the first coupling parts present. It is used for example for the connection of explosives charges with which buildings or other structures are to be demolished. The line of this connection system has two mutually insulated conductors to which the contact elements of the first coupling parts are connected without interruption of the conductors. The connection points between conductors and contact elements are surrounded in moisture-tight manner by a covering

produced by spraying. This connection system has proved to be effective in practice. Its manufacture is complicated if a large number of closely packed first coupling parts have to be attached to the line in a confined space.

5 The present invention seeks to develop the connection system previously described in such a way that it permits a large number of closely packed first coupling parts to be attached to the line in a simple manner.

10 According to one aspect of the invention there is disposed at at least one point along the line and as part of the latter a metal strip, out of which, for forming the contact elements of the first coupling parts, at least two tongues are cut out and bent so as to project from it, which tongues are surrounded by the insulating material of the
15 first coupling parts while leaving free a space for receiving the second coupling parts.

 According to another aspect of the invention there is provided a coupling for connecting a plurality of components to a common electric line the coupling comprising
20 a metal strip for connection to the line which strip is formed to provide a plurality of projecting metal tongues and is contained within an insulating material such that the individual tongues are each accessible through an individual aperture adapted to receive a matable coupling part of a
25 component to be connected thereto.

 In the coupling and system the contact elements of the first coupling parts are effectively protected against moisture by the insulating material surrounding them. At at least one point along the line of the connection system a
30 number of first coupling parts are connected to the line in a closely packed arrangement. This is brought about by the metal strip introduced into the line, which provides with the cut-out tongues two or more contact elements which are

connected conductively to one another by the metal strip itself. A metal strip of this kind with projecting tongues can be prefabricated in a simple manner. It can be connected to a conductor of an electric line just as simply. The
5 element of the connection system is completed when the insulating coupling parts are formed around the tongues and the metal strip is provided with an insulating covering.

This can be achieved particularly simply with a casing consisting of insulating material, with which the
10 coupling parts are integrally moulded. Such a casing then requires simply to be slipped onto the tongues of the metal strip until it comes to rest on it.

In order that the invention and its various other preferred features may be understood more easily, some
15 embodiments thereof will now be described, by way of example only, with reference to the drawings, in which

Figure 1 shows in diagrammatic representation a connection system according to the invention,

Figure 2 shows part of the connection system of
20 Figure 1 in enlarged scale,

Figure 3 shows an element of the part of Figure 2,

Figure 4 shows a portion of Figure 3 in an even larger scale,

Figure 5 shows the part of Figure 2 prior to
25 assembly.

A line L comprises two mutually insulated conductors 1 and 2 to which there are to be connected mutually spaced electrical components B. The quantity of components B is determined by the length of the line L, which can for
30 example be more than 100 m. At each connection point for a component B there are attached, in moisture-tight manner to the line L, first coupling parts 3. A first coupling part 3 has contact elements which are connected conductively to the conductors 1 or 2 of the line L. There can be slipped

onto the contact elements of the first coupling parts 3 cooperating contacts of second coupling parts 4, which are each connected to an electrical component B. Preferably the coupling parts 3 and 4 are formed from polyvinyl chloride.

5 Contact elements and cooperating contacts are disposed in moisture-tight manner and in the latter.

Along the line L there are provided units E, in which a large number of components B can be connected to first coupling parts 3 in a confined space. The connection system incorporates at least one unit E. The connection system consisting of line L, unit E and components B can be used for example for the demolition of buildings. The components B are then electrical igniters (detonators). The line L can be connected at one end to a power source 5.

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In a unit E there are packed closely near one another, in accordance with Figure 1, for example, eight first coupling parts 3. The latter are attached to a casing 6 of insulating material, which also encloses two metal strips 7. Such a metal strip 7, of for example copper, is shown in Figure 3. A unit E is produced for example as follows:

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Tongues 8 are cut into the metal strip 7 shown in Figure 3, preferably at the two edges disposed opposite one another. This can be achieved for example for all the tongues 8 in a single step by punching. The tongues 8 are separated from the metal strip 7 only at the edges K1 and K2 (Figure 4). At the end K3 shown in dashes they remain connected to the metal strip 7. They can therefore be bent around the end K3. At least two tongues 8 are cut out of a metal strip 7. In a preferred embodiment there are more than two tongues 8, which according to Figure 3 are cut out of the metal strip 7 at both edges of the latter.

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The tongues 8 are after cutting into the metal strip

7 bent away from the latter, namely around the end K3 in each case. They then project in a preferred embodiment at right angles from the metal strip 7, as is shown in Figure 5. The tongues 8 of the two edges of the metal strip 7 are suitably bent in opposite directions to one another. Depending on the shape of the metal strip 7, the tongues 8 can have a rectangular or a square cross-section. It is also possible to deform the tongues 8 mechanically after the bending. They can then have a round cross-section or, in the case of an intrinsically square cross-section, have at least a curved edge.

The casing 6 fitted with first coupling parts 3 is formed around the metal strip 7 provided with the projecting tongues 8. Pre-fabricated casing parts 9 and 10 are used for this in preferred embodiment. They are, for example, constructed as illustrated in Figure 5 and slipped onto the two metal strips 7 in such a way that the tongues 8 lie on a level with the first coupling parts 3. The two casing parts 9 and 10 are then moved onto one another in such a way that the tongues 8 penetrate into the first coupling parts 3. They are in the fully fitted state the contact elements of the coupling parts 3. In the final position the two casing parts 9 and 10 are together joined to the casing 6 which forms an insulating and moisture proof enclosure for the metal strips 7. The two casing parts 9 and 10 can for example be firmly connected to one another by means of ultra-sound (ultrasonic welding).

The conductors 1 and 2 of the line L can be directly connected to the ends of the metal strips 7. They are suitably however equipped with second coupling parts 4, so that they can be plugged into first coupling parts 3 of the unit E.

CLAIMS:

1. A connection system for a plurality of electrical components which can in the course of a common electric line comprising two mutually insulated conductors be connected to said electric line at a distance from one another, in which in the course of the line first coupling parts of insulating material are each attached to at least one contact element, which are connected to the conductors of the line and serve to receive two couplings parts of insulating material with cooperating contact corresponding to the contact element, which are connected conductively to the components, wherein there is disposed at at least one point along the line a metal strip, out of which, for forming the contact elements of the first couplings parts, at least two tongues are cut out and bent so as to project from it, which tongues are surrounded by the insulating material of the first coupling parts while leaving free a space for receiving the second coupling parts.

2. A connection system as claimed in claim 1, wherein tongues project at right angles from the metal strip.

3. A connection system as claimed in claim 1 or 2, wherein the tongues have a rectangular cross-section.

4. A connection system as claimed in claim 4, wherein the cross-section of the tongues is square.

5. A connection system as claimed in claim 1 or 2, wherein the tongues have a round cross-section.

6. A connection system as claimed in any one of claims 1 to 5, wherein the first coupling parts are attached to a common casing of insulating material which encloses the metal strip.

7. A connection system as claimed in any one of

claims 1 to 6, wherein on the two mutually opposite edges of the metal strip tongues are cut out and bent.

5 8. A connection system as claimed in claim 7, wherein the tongues of the two different edges of the metal strip project from it in mutually opposite directions.

10 9. A coupling for connecting a plurality of components to a common electric line the coupling comprising a metal strip for connection to the line which strip is formed to provide a plurality of projecting metal tongues and is contained within an insulating material such that the individual tongues are each accessible through an individual aperture adapted to receive a matable coupling part of a component to be connected thereto.

15 10. A connection system substantially as described herein with reference to the drawings.

11. A coupling for connecting a plurality of components to a common electric line substantially as described herein with reference to the drawings.



Application No: GB 9823280.4
Claims searched: 1 to 11

Examiner: Mr F J Fee
Date of search: 15 April 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.Q): H2E [ECJA, ECJE, ECHU]
Int Cl (Ed.6): H01R
Other:

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|---|--------------------|
| X | GB 2293052 A [YAZAKI] | 1 to 3, 6 to 9 |
| X | GB 2170062 A [REHAU] figure 2 | 1, 2, 6, 9 |
| X | GB 2115623 A [HONDA] | 1 to 3, 6, 9 |
| X | EP 0715375 A1 [P.G.E] e.g. figures 13 to 16 | 1, 2, 5, 6, 9 |
| X | EP 0438120 A1 [YAZAKI] | 1 to 3, 6, 9 |
| X | EP 0411216 A1 [LEE] e.g. figure 14 | 1 to 3, 6, 9 |
| X | WO 92/05607 A1 [SIEMENS] | 1 to 3, 6, 7, 9 |
| X | US 5027262 [FREED] | 1 to 3, 6, 9 |

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