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(54) Quick-connect conductor cable clamp for small lamp holders

(57) A quick-connect conductor cable clamp (1) for a small lamp holder (20) comprises a substantially box-shaped body that provides two holes or slots (2) for quick connection of two conductor cables (40) and a housing (12) to receive a stem (33) of a lamp (30). A small lamp holder (20) able to receive a pair of said clamps (1) so that a hole of each clamp can be used to receive the cables of electric supplies and the other hole of each clamp to receive other conductor cables for cascade connection to another lamp holder.

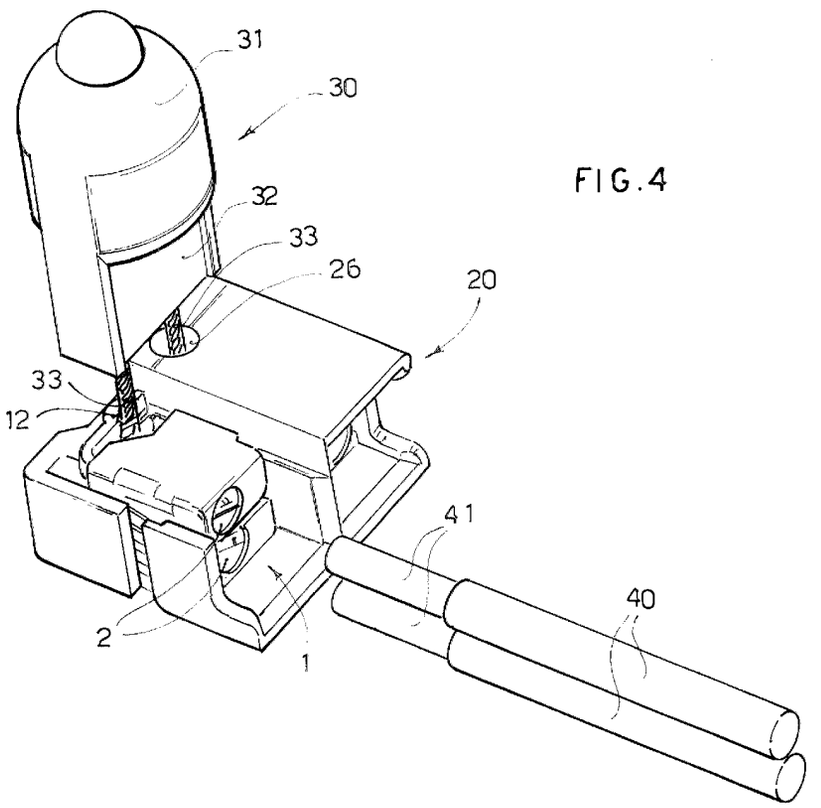

FIG.4

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Description

[0001] The present invention refers to a clamp for quick connection of conductor cables for a small lamp holder, in particular for low-voltage halogen lamps.

[0002] Lamp holders currently exist with quick-connect clamps for the conductor cables, with the possibility of double insertion of conductor cables. Precisely because such clamps must receive two conductor cables, they are large in size; consequently they are intended for large lamp holders, such as, for example, lamp holders for fluorescent or incandescent lamps.

[0003] Low-voltage halogen lamps, on the other hand, can be mounted on small lamp holders. Various types of small lamp holders for low-voltage halogen lamps are currently widely available on the market at present.

[0004] Small lamp holders already provided with conductor cables are known in the art. In said lamp holders the cables are fixed to electrical contacts of the lamp holder by means of various fixing means, such as clinching or welding.

[0005] Also known are lamp holders without conductor cables. These lamp holders are provided with two quick-connect cable clamps and each clamp allows connection of a single conductor cable. Moreover, the conductor cable must be prepared for connection, that is to say the end of the conductor must be stripped for a length of about 6-7 mm and a brass clip destined to engage inside the clamp is clinched to the bare conductor wire.

[0006] Small lamp holders for low-voltage halogen lamps are often used in small-sized devices which, in some applications, are connected to each other in parallel, that is to say the conductors of one device are connected to the conductors of the adjacent device.

[0007] In order to be able to make such a connection, according to the prior art, additional connection devices are necessary. Said additional connection devices are not generally provided with quick-connect clamps, but with screw clamps.

[0008] It is obvious that such a connection system requires a considerable use of additional components and an excessive waste of time for performing the connections. In fact the conductors must be connected to the single apparatus, the apparatus to the additional connection device and the additional connection device to the next apparatus.

[0009] An object of the present invention is to eliminate the drawbacks of the prior art, providing a quick-connect conductor cable clamp for a small lamp holder that affords the possibility of double insertion of conductor cables.

[0010] Another object of the present invention is to provide such a quick-connect conductor cable clamp for a small lamp holder that is practical, versatile, economical and simple to make.

[0011] These objects are achieved in accordance with the invention with the characteristics listed in appended independent claim 1.

[0012] Advantageous embodiments of the invention are apparent from the dependent claims.

[0013] The quick-connect clamp according to the invention comprises a box-shaped body with two holes for quick connection of two conductor cables and a housing to receive a stem of a lamp. Instead of the two holes a single slot can be provided for fast connection of two conductor cables. Two clamps of this type can be housed in a small lamp holder suitable to hold, for example, a low-voltage halogen lamp.

[0014] In this manner the two stems of the halogen lamp are housed in respective housings of the two clamps. The two cables coming from the electrical supply are inserted in a hole in each clamp. Consequently two holes remain free, one for each clamp. Said free holes can receive two electrical branch cables for cascade connection of another lamp holder.

[0015] The advantages of the quick-connect clamps according to the invention are obvious. In fact a pair of said clamps can be inserted in a small lamp holder, allowing simple, rapid cascade connection of a plurality of small lamp holders, by means of simple insertion of conductor cables inside the holes of the clamps, without the need to create connection jumpers.

[0016] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non-limiting embodiment thereof, illustrated in the appended drawings, in which:

Figure 1 is a perspective view showing a quick-connect clamp according to the invention;

Figure 2 is a perspective view illustrating the clamp of Figure 1 from another angle in which a side wall has been removed;

Figure 3 is a perspective view illustrating a lamp holder with two clamps according to the invention;

Figure 4 is a perspective view illustrating the lamp holder of Figure 3 with a part of upper wall removed, a halogen lamp assembled thereto and two conductor cables in an exploded view;

Figure 5 is a perspective view illustrating a connection in parallel of three lamp holders according to the invention.

[0017] A quick-connect clamp for the conductor cables of a small lamp holder is described with the aid of the figures.

[0018] Figures 1 and 2 show a clamp according to the invention which is designated as a whole with reference numeral 1. The clamp 1 has a substantially parallelepiped box-shaped body.

[0019] In the front wall 10 of the clamp 1 two holes or slots 2 able to guide insertion of the respective conductor cables are provided. Instead of the holes 2 a single slot can be provided. Inside the body of the clamp 1, behind the holes 2, two flexible tongues 3 are provided, connected to the side wall 9 of the clamp and suitably inclined with respect to the front wall 10. The flexible tongues 3 are intended to be bent by the force of the conductors during insertion. At the end of each tongue 3 a V-shaped notch 4 is provided to hold the conductors, preventing their removal. Said V-shaped conformation of the tongues 3 allows conductors of the flexible type prepared with a brass clip applied to the end wires, or even rigid conductors without a clip, to be retained.

[0020] Between the two holes 2 a partition wall 5 that protrudes at right angles toward the inside from the front wall 10 is provided. The partition wall 5 serves to keep the conductors separate when they are inserted in the holes 2.

[0021] In the rear part of the upper wall 11 of the clamp 1 a housing 12 is provided, able to receive a stem of a halogen lamp. The housing 12 is defined by two electrical contact elements 13 and 14. The first electrical contact element 13 consists of a concave part of the rear wall 15, bent into a C shape, and the second electrical contact element 14 consists of a tongue connected to the side wall 9 and disposed toward the inside with respect to the first element 13 and opposed to the concavity of the first element 13.

[0022] The outer contact element 13 is made of a material that has good electrical conduction characteristics and has a suitable section to allow the passage of the particularly high currents that occur in the case of cascade connection of a plurality of halogen lamps.

[0023] The contact inner contact element 14, on the other hand, must be made of a particularly elastic material, so as to allow elastic yielding thereof on insertion of the stem of the halogen lamp in the housing 12.

[0024] In the side wall 16 opposed to the side wall 9 two flexible tabs 17 are provided that protrude externally therefrom. The flexible tabs 17 are intended to engage in a seat of a lamp holder to allow snap insertion of the clamp 1 inside the lamp holder.

[0025] The side wall 9, the internal contact element 14 and the tongues 3 are preferably made of a single flexible material to allow elastic yielding of the tongues 3 and of the inner contact element 14, whilst the remaining parts are made of an element having good electrical conduction characteristics. Alternatively, the entire clamp 1 can be made of a single material having both good electrical conducting characteristics and good elastic characteristics.

[0026] Figure 3 shows a small lamp holder 20 with two clamps 1 assembled. The lamp holder 20 has a substantially parallelepiped box shape and is open at the front, having two seats 21 separated by a dividing wall 22. Each seat 21 is of such a size as to house a clamp 1.

[0027] In each side wall 23 of the lamp holder 20 a slot-type seat 24 is provided, able to receive the protruding tabs 17 that protrude outward from the side wall of the clamp 1. In this manner, when the clamp 1 is completely inserted in the seat 21 of the lamp holder 20 the tabs 17 snap fit into the seat 24 of the lamp holder 20.

[0028] In the upper surface 25 of the lamp holder 20 two flared holes 26 are provided, in alignment with the housings 12 of the respective clamps 1.

[0029] As shown in Figure 4, a halogen lamp 30 comprises a transparent bulb 31 that allows transmission of light radiation, supported by a support 32 to which two stems 33 are connected for the electrical supply of the halogen lamp 30. The stems 33 are inserted in the two holes 36 of the lamp holder 20. Consequently each stem 33 enters the respective housing 12 of the clamp 1 and is retained between the two contact elements 13 and 14.

[0030] At this point each hole 2 of the clamps 1 can receive the tip 41 of a conductor cable 40 for electrical connection of a lamp holder 20.

[0031] Figure 5 shows the parallel connection of three lamp holders 20A, 20B and 20C. Two cables 40, 40' connected to the electrical supply 100 are inserted in two holes 2 of two respective clamps 1 of the lamp holder 20A; in this manner the halogen lamp mounted on the lamp holder 20A is supplied by the cables 40, 40'.

[0032] The ends of two connecting cables 140 and 140' are connected respectively to the two holes 2 left free in the clamps 1 of the lamp holder 20A and to two holes 2 of two clamps of the lamp holder 20B. In this manner the lamp mounted in the lamp holder 20B is supplied by means of connection cables 140 and 140'.

[0033] The ends of two other connection cables 240, 240' are inserted in the holes left free in the two clamps of the lamp holder 20B and the other two ends of said connection cables are inserted in the two respective holes of two clamps of the lamp holder 20C. Thus the lamp of the lamp holder 20C is supplied by the cables 240, 240'.

[0034] If another lamp holder is to be connected in cascade with the lamp holder 20C, another two connecting conductors 340, 340' are inserted in the two holes left free in the two clamps of the lamp holder 20C and will be connected to two holes in the two clamps of another lamp holder.

[0035] Numerous variations and changes of detail within the reach of a person skilled in the art can be made to the present embodiment of the invention without departing from the scope of the invention expressed by the appended claims.

Claims

1. A quick-connect clamp (1) for conductor cables (40) for a small lamp holder (20), comprising a substantially box-shaped body for quick connection of two conductor cables (40) and a housing (12) to receive a stem (33) of a lamp (30).

2. A clamp according to claim 1, **characterized in that** two holes (2) or a slot are provided as a guide for said conductor cables (40).

3. A clamp according to claim 1 or 2, **characterized in that** it provides at least one tongue (17) protruding outward from a wall (16) thereof, to snap fit into a seat (24) of a lamp holder (20).

4. A clamp according to claim 2 or 3, **characterized in that** inside the body of said clamp (1), behind the holes (2) for insertion of the conductors, two elastic tongues (3) are provided, which allow insertion of the conductors, preventing removal thereof.

5. A clamp according to claim 4, **characterized in that** said tongues (3) provide at their end a V-shaped notch able to clamp the conductors.

6. A clamp according to any one of claims 2 to 5, **characterized in that** in the wall (10) of the clamp (1) that houses the two holes (2) for insertion of the conductors, an inward protruding dividing wall (5) is provided to keep the conductors inserted in the holes (2) spaced apart.

7. A clamp according to any one of the preceding claims, **characterized in that** said housing (12) to receive the stems of a lamp comprises two electrical contact elements, a first element (13) consisting of a part of the wall of the clamp bent into a C shape and a second element (14) consisting of a flexible tab opposed to the concavity of the C.

8. A clamp according to claim 7, **characterized in that** said first contact element (13) has a suitable section to allow the passage of high currents due to cascade connection of a plurality of lamps.

9. A clamp according to claim 7 or 8, **characterized in that** it is made of two materials, a first material having good electrical conduction characteristics to make the first electrical contact element (13) and a second material having good elastic characteristics to make the tab (14) of the second contact and the flexible tongues (3) to lock the conductor cables.

10. A clamp according to any one of claims 1 o 8, **characterized in that** it is made from a material having good electrical conductivity and flexibility characteristics.

11. A small lamp holder (20) comprising two holes (26) to receive two stems (33) of a lamp (30) and two housings (21) to receive two clamps (1) according to any one of the preceding claims.

12. A lamp holder according to claim 11, **characterized in that** it provides at least one slot-type seat (24) able to snap engage the tabs (17) of the clamp (1).

13. A lamp holder according to claim 11 or 12, **characterized in that** it provides a dividing wall (22) that separates said two housings (22) to receive said clamps (1).

14. A lamp holder according to any one of claims 11 to 13, **characterized in that** it is employed for low-voltage halogen lamps (30).

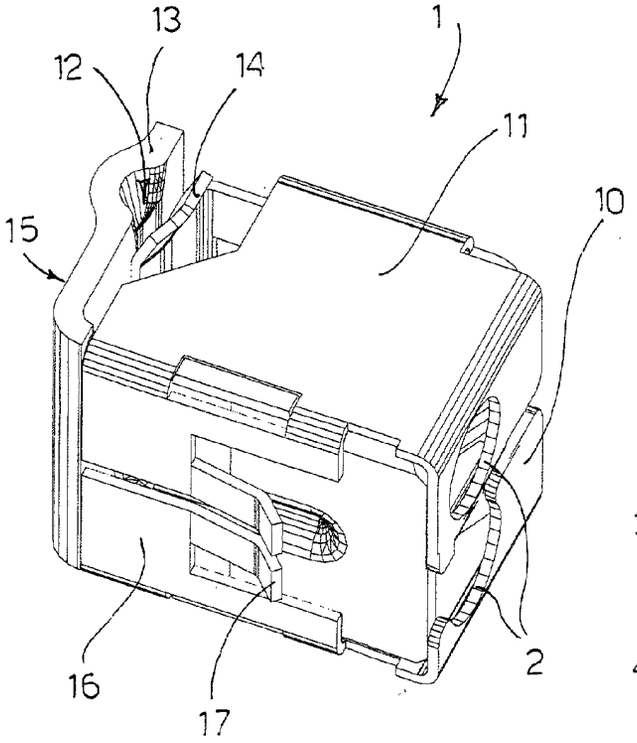


FIG. 1

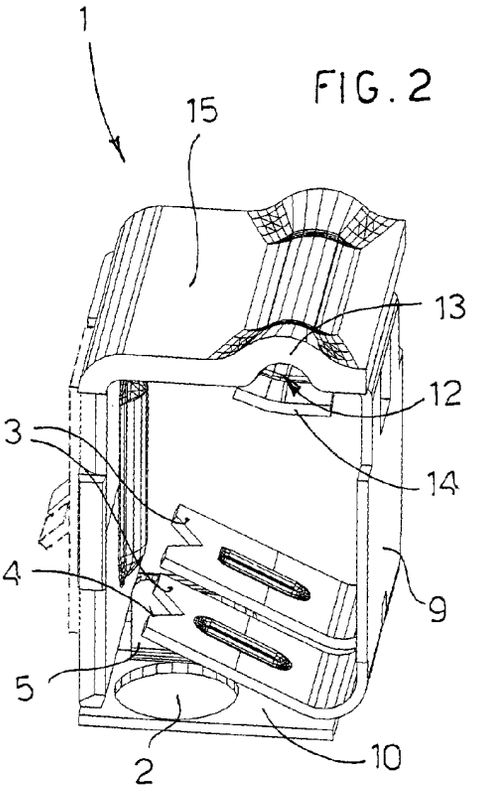


FIG. 2

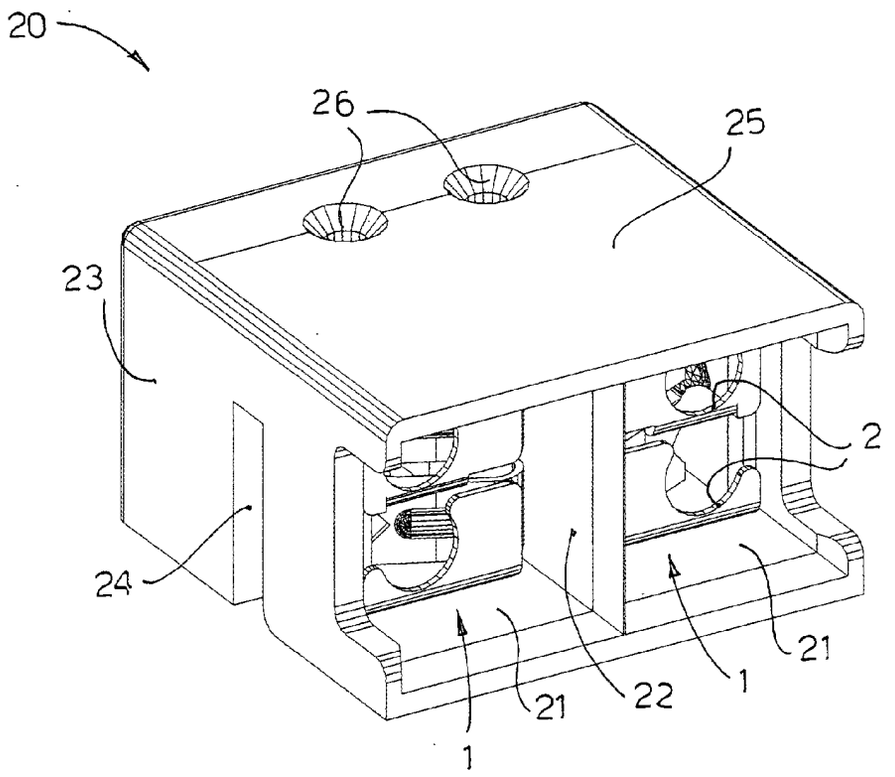
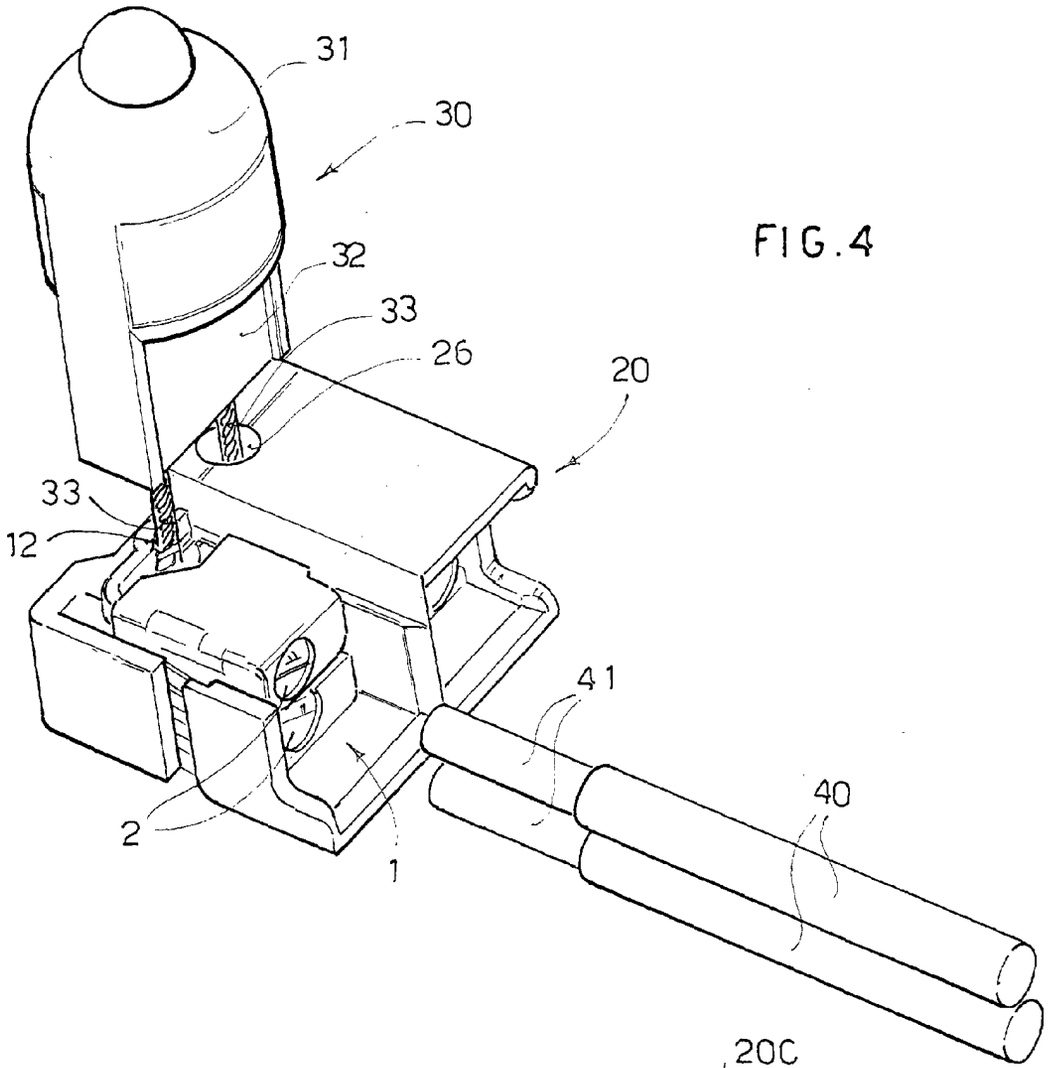


FIG. 3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33
26
20
33
12
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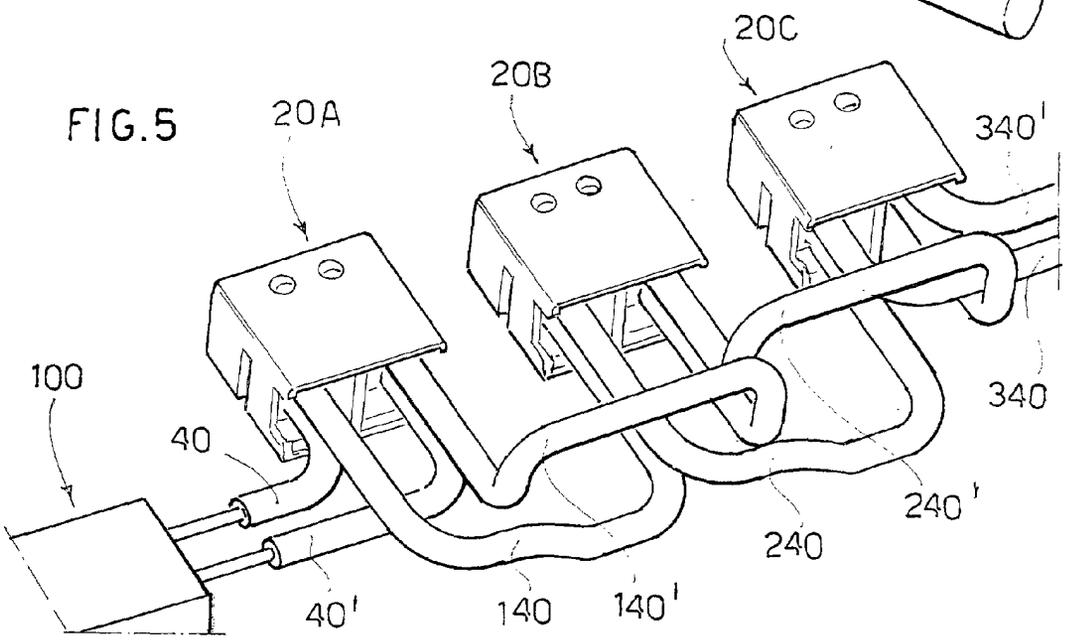
2
1

FIG.4

FIG.5


20C
20B
20A
340'
100
40
340
240'
240
40'
140
140'

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EUROPEAN SEARCH REPORT

Application Number
EP 01 10 7673

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 November 2001	Bertin, M

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