

Description

5 The invention relates to the connection of a bundle of electrical wires to conducting wires, such as a demagnetization loop for a cathode ray tube, and its production method.

10 For various reasons, such as mechanical rigidity or compliance with insulation standards, the connection of certain bundles of electrical wires with other circuits cannot be performed directly by the wire or wires which constitute them, but, for example, by two wires of larger diameter insulated by a sheath.

15 This is the case with demagnetization loops for a cathode ray tube which consist of a certain number of turns of copper or enamelled aluminium wire. These loops are connected to the printed circuit of the television set, at a certain distance from the latter, which requires a bifilary connection. There are thus two connections to be made between the wire of the loop and the
20 conducting wires for connecting towards the printed circuit.

In a known connection device of this type, an insulating casing is provided which accommodates the part of the demagnetization loop from which the two end
25 strands, to be connected to connecting wires, are separated, and on which is crimped a connector for connection by plugging or by welding with the connecting wires. This casing is formed from two parts fixed together by a riveting means.

30 This known device cannot easily be manufactured automatically, on the one hand due to the method of electrical connection between the end strands of the coil and the connecting wires, and, on the other hand, because of the method for fixing the two parts of the casing.

35 The invention remedies these drawbacks.

It is characterized in that the casing, which is rigid, comprises a first half-body with a half-cavity receiving the bundle and a lateral plate from which housings project at the same side as the half-cavity, and
40 in each housing are inserted, on the one hand, an end

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strand perpendicularly to the bundle and, on the other hand, perpendicularly to the plate, a connecting member receiving the end of a corresponding connecting wire, the casing moreover comprising a second half-body presenting the second part of the cavity, and a part for protecting the connecting members.

The connecting member is preferably a self-peeling member of the type described in the Patent US-4,130,331; a member of this type constitutes, by itself, an electrical connection without welding or other means of connection.

The mounting of such a connecting device may easily be automated.

In order to facilitate automatic mounting, the various parts forming the casing are preferably articulated together, the articulation being advantageously, in order to facilitate manufacture, a simple thinning of the plastic material of which these various parts of the casing are made.

In one embodiment, the second half-body and the protecting part form separate parts.

The invention, its particular features and advantages will be better understood on reading the following description which is given by way of example and illustrated by the appended figures in which:

Figure 1 shows an embodiment of the connecting device according to the invention.

Figure 2a shows the same connecting device shown in Figure 1, the casing being open, and

Figure 2b shows an enlarged view of a fixing means of the device in Figure 2a.

In the example shown in Figures 1 and 2, the connection electrically connects the end strands 8A, 8B of wires of a bundle 1, forming a demagnetization coil for a colour television tube, to two connecting wires 2A and 2B connected to the rest of the circuit of the television set. The bundle is generally surrounded by a sheath 3; the same may apply to the connecting wires.

A rigid casing 4 surrounding the bundle of

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wires 1 forms the main part of the connecting device. It is composed of three elements made from a self-extinguishing plastic material, such as Ultramid. These three elements are a first half-body 5, a second half-body 6 completed by a protecting part 7. The first and the second half-bodies each have a half-cavity such that, when they are placed opposite one another, they delimit a cylindrical cavity passing through the casing 4 according to an axis X and surrounding the bundle. The first half-body 5 is extended, laterally to this cavity, by a lateral plate 5A and means for fixing the two end strands of the bundle (not shown, Figure 1) to the connecting wires. The protecting part 7 fits into this lateral plate 5A, while at the same time permitting the lateral exit of each of the two connecting wires 2A and 2B parallel to the axis X of the cavity.

The second half-body 6 and the protecting part 7 (Figure 2a) are articulated - according to the axes Y and Z, respectively, substantially parallel to the axis X - on the first half-body 5. These articulations consist of a simple thinning of the plastic material of which the half-bodies 5 and 6 and the part 7 are formed, these three elements being moulded in one piece.

The two ends 8A and 8B of the coiled wire have been separated from the bundle itself at the same point. The bundle 1, if it is sheathed, has been partially exposed.

Two housings 9A and 9B, in one piece with the lateral plate 5A, project from this plate on the same side as the half-cavity. In each of these housings is inserted a connecting member 10A and 10B intended to establish contacts between the strands 8A and 8B of the bundle and the connecting wires 2A and 2B. These housings preferably have faces which are perpendicular to the lateral plate of the first half-body and have two faces 20 which are substantially parallel to the axis X of the cavity. These two faces are provided with a slot 18 allowing the strands which are held beneath the fixing members 10A and 10B to pass through (Figure 2b).

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Each of these strands passes under a corresponding housing by virtue of a groove or recess 19 in the upper face of the lateral plate 5A of the first half-body. This groove is divided into two by a rib 13, as shown in Figure 2a, to ensure a minimum separation between the two end strands of the winding.

In the second half-body 6, a notch 14 is provided in which the rib 13 is accommodated when this half-body 6 is folded back on the first half-body 5.

The protecting part 7 has a cavity 11 in which are accommodated the walls delimiting the two housing 9A and 9B when this element is folded back on the first half-body.

The ends of the connecting wires 2A and 2B inserted in the connecting members 10A and 10B emerge from the protecting part 7 parallel to the bundle 1 via two lateral orifices 12 made in two faces 22 perpendicular to the axis Z. These lateral orifices have a height which is substantially equal to that of the faces 21. The protecting part 7 covering the housings, the connecting wires 2A and 2B which emerge from the connecting members 10A and 10B perpendicularly to the lateral plate are folded back and oriented parallel to the latter. Each connecting wire therefore undergoes a sudden change in direction at its exit from the connecting member. This arrangement prevents these wires from being torn out unexpectedly.

Spikes 15 are provided inside the cylindrical cavity delimited by the two half-bodies. When the latter are folded back against one another, the spikes penetrate partially into the sheath of the bundle and hold the latter in the position which is most favourable for the connection.

In order to immobilize the half-body 6 and the part 7, in a position of closure, relative to the half-body 5, there are provided on the second half-body 6 and on the protecting part 7 two harpoon-shaped catches 16A which penetrate, during the folding back, into holes 17, which are rectangular in the example shown in Figure 2a,

made in the first half-body 5. The casing is closed when the harpoon-shaped catches emerge on the other side of this half-body 5 and bear on the face opposite to that carrying the housings 9A and 9B. This closing is thus effected by simple snapping.

The connecting members 10A and 10B used are preferably self-peeling contacts of the type described in the Patent US-4,130,331. Each of these contacts consists of a metal blade folded into a U which is split in its lower part in order to receive and immobilize the first wire. One of the upper edges is folded back inside the contact and partially penetrates into the second wire inserted in the upper part in order to lock and ensure metal contact.

The connecting device according to the invention is such that its production may be automated and even integrated into the manufacture of the winding.

Only the first operation which consists in threading the two end strands 8A and 8B into their respective grooves beneath the housings 9A and 9B is performed manually. However, this operation may be performed without wastage of time and is, in fact, performed when the following bundle is shaped or covered with its sheath 3.

The method for producing a connecting device according to the invention is as follows:

The first phase consists in positioning the bundle 1 in the half-cavity of the first half-body 5 and in positioning the two end strands of the bundle in the groove 19 and in the slots 18 of the walls 20 of the housings.

The second phase consists in folding the second half-body 6 back on the first half-body 5, thus imprisoning the bundle 1. Since fixing is ensured by the harpoon-shaped catches 16A of the second half-body 6 in the corresponding holes in the first half-body 5, the bundle is thus locked by the spikes 15.

In the following phase, the connecting members 10A and 10B are inserted into the housings.

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During the fourth phase, the connecting wires 2A and 2B are placed in the connecting members.

5 The final operation consists in folding the protecting part 7 back on the central half-body 5, the wires being folded on the sides of the casing and positioned by the lateral orifices 12 of the protecting part. Since this part is held folded back by the fixing of the harpoon-shaped catches 16B of the protecting part in the corresponding holes 17, the connecting wires can no longer be torn out. Moreover, the connecting members are insulated from any metal element extraneous to the connection.

15 As the casing is rigid, it can, if it is in a first specific position, be grasped by a robot and positioned precisely on a machine table or between the clamps of a holding device. Each casing then being held in a second specific position, a similar action or a similar movement may perform the same operation on all the casings of one manufacturing series. The operations of folding back and positioning the connecting members 10A and 10B and the connecting wires 2A and 2B may be performed by robots.

25 The outer forms of the casing may be varied and adapted to the manufacture of the connection, but also to its subsequent use.

30 The example described and shown in the figures is that provided for connecting the demagnetization loop of a colour television cathode ray tube to the printed circuit of the latter. The positioning (distance of 6 mm between the connecting wires) and insulation standards imposed because of the high voltages involved in operating the apparatus may thus be complied with by using the connection according to the invention.

35 Several modifications which may be necessary for different applications of the connection may be provided without thereby departing from the scope of the invention. For example, the casing may consist of only two parts, the first being the first half-body 5 and the second being the second half-body 6 extended by the



protecting part 7 which is integrally attached thereto.

5 It is also possible to envisage the number of end strands of wires forming the bundle and needing to be connected to a similar number of connecting wires being other than two. The same number of grooves and of housings will then be provided in the first half-body as well as the same number of connecting members.

10 It is also possible to provide for the connecting wires to emerge from the protecting part perpendicularly to the plate 5A, the two lateral orifices 12 then being replaced by orifices in the upper face of the protecting part 7.

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Claims

1. Device for connecting the end strands of electrical wires of a bundle to other conducting wires by means of connecting members, the said end strands separating from the bundle at adjacent points, the device comprising a casing and being characterized in that the casing, which is rigid, comprises a first half-body (5) with a half-cavity receiving the bundle (1) and a lateral plate (5A) from which housings (9A, 9B) project at the same side as the half-cavity, and in each housing are inserted, on the one hand, an end strand (8A, 8B) perpendicularly to the bundle and, on the other hand, perpendicularly to the said plate, a connecting member (10A, 10B) receiving the end of a corresponding connecting wire (2A, 2B), the casing moreover comprising a second half-body (6) presenting the second part of the cavity, and a part (7) for protecting the connecting members.

2. Connecting device according to Claim 1, characterized in that the cavity of the casing is provided with spikes (15) intended to immobilize the bundle.

3. Connecting device according to either of the preceding claims, characterized in that the second half-body (6) and the protecting part (7) are articulated on the first half-body (5) about two axes (Y and Z) which are substantially parallel to one another and to the axis (X) of the said cavity.

4. Connecting device according to any one of the preceding claims, characterized in that the casing (4) is made from a self-extinguishing material.

5. Connecting device according to Claim 3 or 4, characterized in that, the casing being made of a plastic material, the said articulations consist of a simple thinning of the material, the parts of the casing being moulded in one piece.

6. Connecting device according to any one of the preceding claims, characterized in that the housings (9A and 9B) in which the said connecting members (10A and 10B) are inserted, have two faces (20), substantially parallel to the bundle (1) and comprising a slot (18)



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through which one of the said end strands of the bundle passes, each strand being locked in the housing and in contact with the corresponding connecting member.

7. Connecting device according to any one of the preceding claims, characterized in that the protecting part (7) is provided with lateral orifices (12) made in the two sides perpendicular to the bundle (1) in order that the connecting wires (2A and 2B) emerge laterally from the casing (4) and parallel to the bundle.

8. Device according to Claim 7, characterized in that each connecting wire undergoes a sudden change in direction at its exit from the connecting member in order to prevent tearing out.

9. Connecting device according to any one of the preceding claims, characterized in that the first half-body (5) has holes (17), the second half-body (6) and the protecting part (7) have harpoon-shaped catches (16A, 16B) which pass through the holes in order to ensure the closing of the casing (4) when the second half-body and the protecting part are folded back on the first half-body.

10. Connecting device according to Claim 1 or 2, characterized in that the second half-body (6) and the protecting part (7) are integrally attached in order to form a single rigid part which is articulated on the first half-body (5) about an axis (Y) substantially parallel to the axis (X) of the said cavity.

11. Method for producing a connecting device according to any one of Claims 1 to 8, characterized in that it comprises the following phases:

placing the open casing (4) such that the bundle (1) is positioned in the first half-body (5),

folding the second half-body (6) back on the first half-body such that the bundle to be connected is surrounded and immobilized,

insertion of each one of the end strands (8A and 8B) of the bundle into a corresponding housing (9A or 9B),

placing each one of the connecting members (10A

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and 10B) in a housing in order to immobilize the previously inserted strand and to establish electrical contact,

insertion of the connecting wires (2A and 2B) into the connecting members,

folding the protecting part (7) back on the said housings.

12. Use of a connecting device according to any one of Claims 1 to 10 for electrically connecting the demagnetization loop of a colour television tube to the printed circuit of a television set.

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Claims

1. A device for connecting the ends of electrical wires of a bundle to other conducting wires through connecting members, said ends diverging from the bundle at points close to each other, the device including a casing, characterized in that the casing, which is rigid, comprises a first half body (5) including a half cavity for receiving the bundle (1) and a lateral plate (5A) from which housings (9A, 9B) project at the same side as the half cavity, in each housing being inserted on the one hand one said end (8A, 8B) perpendicularly to the bundle and on the other hand, perpendicularly to said plate, a connecting member (10A, 10B) which receives the end of a corresponding connecting wire (2A, 2B), the casing more-over comprising a second half body (6) presenting the second half of the cavity, and a protecting member (7) for protecting the connecting members.

2. A connecting device according to claim 1, characterized in that the cavity of the casing is provided with pointed pins (15) intended to immobilize the bundle.

3. A connecting device according to any one of the preceding claims, characterized in that the second half body (6) and the protecting member (7) are articulated at the first half body (5) about two axes (Y and Z) which are substantially parallel to each other and to the axis (X) of said cavity.

4. A connecting device according to any one of the preceding claims, characterized in that the cavity (4) is made from a self-extinguishing material.

5. A connecting device according to claim 3 or 4, characterized in that the casing being made of synthetic material, said articulations are constituted merely by a thin section of the material, the elements constituting the casing being moulded in one piece.

6. A connecting device according to any one of the preceding claims, characterized in that the housings (9A and 9B) in which the connecting members (10A and 10B) are inserted, have two faces (20), substantially parallel to the bundle (1) and comprising a slot (18) through which one of said end wires of the bundle is passed, each end wire being locked in the seat and being in contact with the corresponding connecting member.

7. A connecting device according to any one of the preceding claims, characterized in that the protecting member (7) is provided with lateral holes (12) made in the two sides perpendicular to the bundle (1) in order to allow the connecting wires (2A and 2B) to exit laterally from the casing (4) and parallelly to the bundle.

8. A device according to claim 7, characterized in that each connecting wire is submitted to an abrupt change of direction at its exit from the connecting member in order to prevent the connecting wires from being torn out.

9. A connecting device according to any one of the preceding claims, characterized in that the first half body (5) is provided with holes (17), whereas the second half body (6) and the protecting member (7) possess harpoon-shaped nooks (16A, 16B) which pass through these holes in order to ensure the closing of the casing (4) when the second half body and the protecting member are folded back on the first half body.

10. A connecting device according to claim 1 or 2, characterized in that the second half body (6) and the protecting member (7) form a unique rigid element which is articulated at the first half body (5) about an axis (Y) substantially parallel to the axis (X) of said cavity.

11. A method of realizing a connecting device according to any one of claims 1 to 8, characterized in that it includes the following phases: placing the opened casing (4) such that the bundle (1) is positioned in the first half body (5), folding the second half body (6) back on the first half body such that the bundle to be connected is imprisoned and immobilized.

insertion of each one of the end wires of the bundle into a corresponding housing (9A or 9B), placing each one of the connecting members (10A and 10B) in one housing in order to immobilize the previously inserted wire and to establish the electrical contact.

insertion of the connecting wires (2A and 2B) into the connecting members.

folding the protecting member (7) back on the housings.

12. The use of a connecting device according to any one of claims 1 to 10 for electrically connecting the demagnetization loop of a colour TV tube to the printed circuit of a TV set.

Patentansprüche

1. Vorrichtung zum Anschließen von Endadern elektrischer Drähte eines Adernbündels an andere Leiterdrähte über Anschlußorgane, wobei die Endadern an benachbarten Stellen aus dem Bündel vorstehen und die Vorrichtung ein Gehäuse aufweist, dadurch gekennzeichnet, daß das Gehäuse, das starr ist, einen ersten Halbkörper (5) mit einem halben Hohlraum zur Aufnahme des Bündels (1) und einer Seitenplatte (5A), von der auf derselben Seite wie der Halbhohlraum Sitze (9A, 9B) vorspringen, in die je einerseits eine Endader (8A, 8B) senkrecht zum Bündel und andererseits senkrecht zur Platte ein Anschlußorgan (10A, 10B) eingelegt ist, daß das Ende eines entsprechenden Anschlußdrahts (2A, 2B) aufnimmt, und daß das Gehäuse außerdem einen zweiten Halbkörper (6), der den zweiten Teil des Hohlraums bildet, und ein Schutzglied (7) für die Anschlußorgane besitzt.



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2. Anschlußvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Hohlraum des Gehäuses mit Dornen (15) versehen ist, die dazu bestimmt sind, das Bündel festzuhalten.

3. Anschlußvorrichtung nach einem beliebigen der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der zweite Halbkörper (6) und das Schutzglied (7) an den ersten Halbkörper (5) bezüglich zweier im wesentlichen zueinander und zur Achse (X) des Hohlraums paralleler Achsen (Y und Z) angelenkt sind.

4. Anschlußvorrichtung nach einem beliebigen der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Gehäuse (4) aus einem schwer entflammaren Material ist.

5. Anschlußvorrichtung nach Anspruch 3 oder 4, dadurch gekennzeichnet, daß die Gelenke bei einem Kunststoffgehäuse aus einer einfachen Materialschwächung bestehen, wobei die Teile des Gehäuses aus einem Stück gegossen sind.

6. Anschlußvorrichtung nach einem beliebigen der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Sitze (9A und 9B), in die die Anschlußorgane (10A und 10B) eingesetzt sind, zwei im wesentlichen zum Bündel (1) parallele Seiten (20) haben, die einen Schlitz (18) aufweisen, durch den eine der Endfasern des Bündels hindurchgeführt ist, wobei jede Ader in dem Sitz blockiert ist und mit dem entsprechenden Anschlußorgan in Kontakt steht.

7. Anschlußvorrichtung nach einem beliebigen der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß das Schutzglied (7) seitliche Öffnungen (12) auf den beiden zum Bündel (1) senkrechten Seiten besitzt, durch die die Anschlußdrähte (2A und 2B) seitlich aus dem Gehäuse (4) und parallel zum Bündel austreten.

8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß jeder Anschlußdraht an seinem Austritt aus dem Anschlußorgan eine deutliche Richtungsänderung erfährt, um ein Herausreißen zu vermeiden.

9. Anschlußvorrichtung nach einem beliebigen der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der erste Halbkörper (5) Locher (17) besitzt, daß der zweite Halbkörper (6) und das Schutzglied (7) harpunenförmige Haken (16A, 16B) besitzen, die die Löcher durchdringen, um das Schließen des Gehäuses (4) zu bewirken, wenn der zweite Halbkörper und das Schutzglied auf den ersten Halbkörper umgeklappt werden.

10. Anschlußvorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der zweite Halbkörper (6) und das Schutzglied (7) ein gemeinsames starres Bauteil bilden, das am ersten Halbkörper (5) um eine im wesentlichen zur Achse (X) des Hohlraums parallele Achse (Y) schwenkbar angelenkt ist.

11. Verfahren zur Herstellung einer Anschlußvorrichtung nach einem beliebigen der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß es folgende Verfahrensschritte umfaßt:

Ausrichtung des offenen Gehäuses (4) derart, daß das Bündel (1) im ersten Halbkörper (5) positioniert ist.

Umklappen des zweiten Halbkörpers (6) auf den ersten Halbkörper derart, daß das anzuschließende Bündel umfaßt und festgelegt wird.

Einführung jeder der Endadern (8A und 8B) des Bündels in einen entsprechenden Sitz (9A oder 9B).

Anbringen jedes der Anschlußorgane (10A und 10B) in einem Sitz, so daß die vorher eingesetzte Ader festgelegt wird und ein elektrischer Kontakt hergestellt wird.

Einlegen der Anschlußdrähte (2A und 2B) in die Anschlußorgane.

Umklappen des Schutzgliedes (7) auf die Sitze.

12. Verwendung einer Anschlußvorrichtung nach einem beliebigen der Ansprüche 1 bis 10 zum elektrischen Anschluß der Entmagnetisierungsschleife einer Farbfernsehrröhre an die gedruckte Schaltung eines Fernsengeräts.

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