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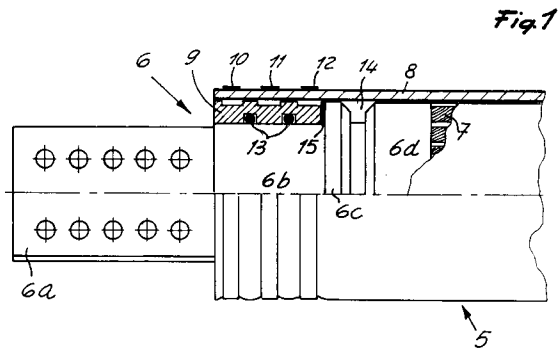
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54 **Power supply cable for arc furnaces.**

57 The power supply cable for arc furnaces comprises water-cooled current-conductive plaits which are connected to two terminals and are contained in a tube which is made of a rubber-like material extending from one of the terminals to the other; the tube is clamped, at at least one terminal, on a bush which is associated with a head of the terminal so that it can rotate.



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The present invention relates to a power supply cable for arc furnaces.

It is known that the supply of electric power to arc furnaces, which are used particularly for the production of steel and of ferrous alloys, is performed by means of appropriately designed cables which connect a transformer to electrode-bearing arms located at the cover of said furnaces and arrange themselves in a sagging configuration due to their own weight.

Said cables comprise a plurality of water-cooled plaits which conduct the electric current, are connected to two terminals and are contained in a tube which is made of an elastic material, such as rubber, extending from one of said terminals to the other.

In the known art, said rubber tube is clamped at its ends on heads which are comprised within the terminals, so that it cannot perform any movement with respect to said heads, and this fact is the cause of rather unsatisfactory functional situations.

It is in fact known that when the cover of the furnace is opened, the electrode-bearing arms rotate about a vertical axis which causes a rotation of the terminal of the cable which is connected thereto, whereas the terminal of the cable which is connected to the transformer remains fixed; this leads to a torsion of the cable with all of its components, i.e. with the current-conductive plaits and with the rubber covering tube, which is unfavorable both as regards the strength of said tube and as regards the force to which the structures of the furnace are subjected.

The aim of the present invention is therefore to provide a power supply cable for arc furnaces which allows to obtain improved functional conditions but maintains great constructive simplicity.

The proposed aim is achieved by a power supply cable for arc furnaces, according to the invention, which comprises water-cooled current-conductive plaits which are connected to two terminals and are contained in a tube which is made of a rubber-like material extending from one of said terminals to the other, characterized in that said tube is clamped, at at least one terminal, on a bush which is associated with a head of said terminal so that it can rotate.

Further characteristics and advantages will become apparent from the description of a power supply cable for arc furnaces, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a view of a terminal of a cable according to the invention, shown partially in cross-section with the locking straps not yet tightened and partially in a side view with said straps tightened;

figure 2 is a schematic view of a cable according to the invention during use in two different positions, one indicated in solid lines and the other one indicated by dot-and-dash lines.

With reference to the above figures, the reference numeral 1 generally designates a power supply cable for an arc furnace, which is intended to connect the output of a current transformer 2 to an electrode-carrying arm 3.

While the terminal 4 of the cable 1 which is connected to the output of the transformer 2 is of a conventional type, the terminal 5 connected to the electrode-carrying arm 3 is executed according to the invention and is described in detail with reference to figure 1.

Within said terminal, is thus noted the presence of the head, generally designated by the reference numeral 6, which comprises a milled portion 6a which has a rectangular cross-section, a cylindrical portion 6b, a first ridge 6c and a second ridge 6d to which the current-conductive plaits, such as 7, converge.

The reference numeral 8 furthermore designates a tube, made of an elastic material such as rubber, which extends from one to the other of said terminals 4 and 5 of the cable 1 while it is locked on the head of the terminal 4 in a conventional manner, so that it is unable to perform any movement with respect thereto, it is associated with the head 6 of the terminal 5 with the interposition of the bush 9, which is suitable for rotating about the axis of the portion 6b of said head.

More precisely, said tube 8 is locked on the outer surface of the bush 9 by means of the clamps 10, 11 and 12 which are arranged at regions delimited by the circumferential ridges provided on said surface.

Seats for containing the gaskets 13 for providing a seal against the water for the cooling of the current-conductive plaits are provided at the inner surface of the bush 9; in a known manner, by means of ducts not shown in the figure, said water reaches the space portion 14 delimited by the ridges 6c and 6d of the head and by the tube 8.

Finally, the reference numeral 15 designates a non-magnetic steel ring which is inserted between the brass bush 9 and the ridge 6c of the head 6, which is made of copper, in order to protect the surfaces of said elements against excessively rapid wear.

From what has been described it is evident that the functional condition which the invention allows to provide is optimum: in fact, when the electrode-carrying arm 3 rotates upon the opening of the furnace cover, moving the cable 1 from the position shown in solid lines in figure 2 to the position shown in dot-and-dash lines, the head of the terminal 5 performs the rotation about its own

axis shown in said figure 2, producing torsion of the assembly of the electric power-conductive plaits but not of the tube 8, since a relative rotation, allowed by the bush 9, occurs between said tube and said head. 5

The tube 8 is thus not subjected to torsion, as occurs in known cables, and this leads to greater durability of said tube and to a reduction of the stresses induced in the structures of the furnace; possible negative effects of the torsion of the tube 8 on the assembly of the electric power-conductive plaits are also eliminated. 10

In the practical execution of the invention, all the details may be replaced with other technically equivalent elements; the materials employed, as well as the shapes and dimensions, may furthermore be any. 15

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs. 20 25

Claims

1. Power supply cable for arc furnaces, comprising water-cooled current-conductive plaits which are connected to two terminals and are contained in a tube which is made of a rubber-like material and extends from one of said terminals to the other, characterized in that said tube is clamped, at at least one terminal, on a bush which is associated with a head of said terminal so that it can rotate. 30 35
2. Cable according to claim 1, characterized in that said bush has, at its inner surface which is intended for contact with the head of the cable terminal, seats for containing gaskets for providing a seal against the water for the cooling of said cable, and is provided, at its outer surface, with circumferential ridges which are suitable for delimiting regions at which said tube is suitable for being secured by means of locking clamps. 40 45
3. Cable according to one or more of the preceding claims, characterized by the presence of a ring made of non-magnetic steel interposed between the surface of the bush which is directed toward the cable and a ridge of the head of the terminal of said cable with which said bush is associated. 50 55

Fig.1

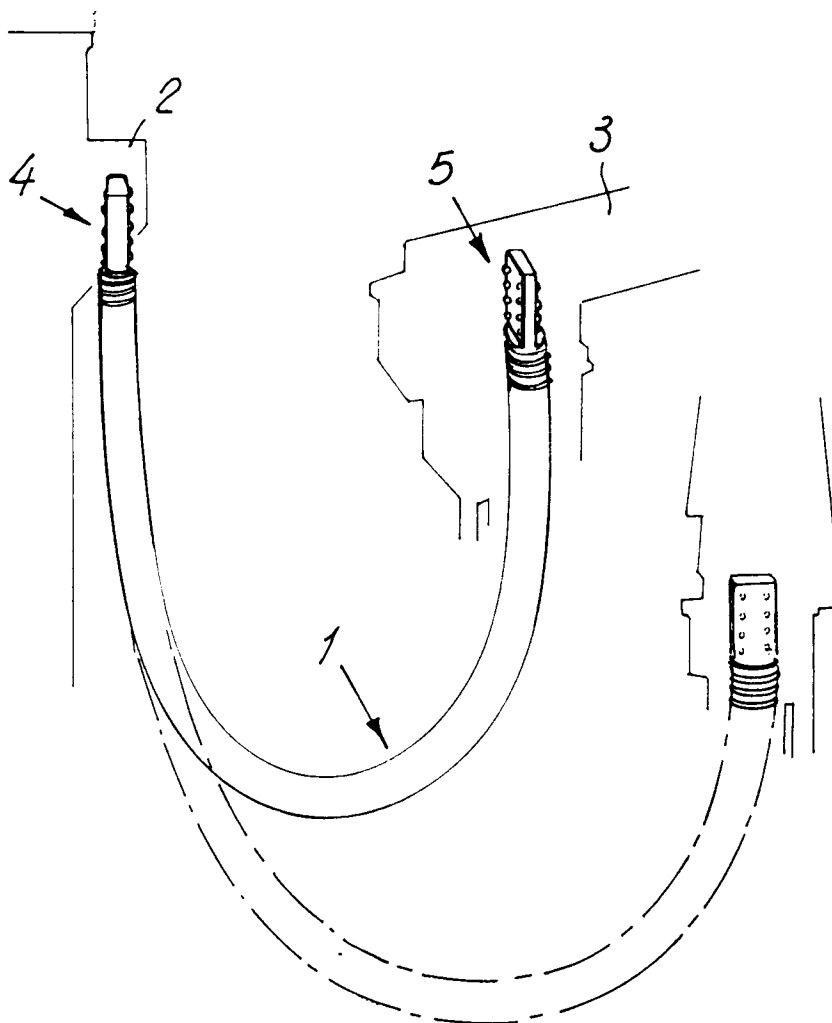
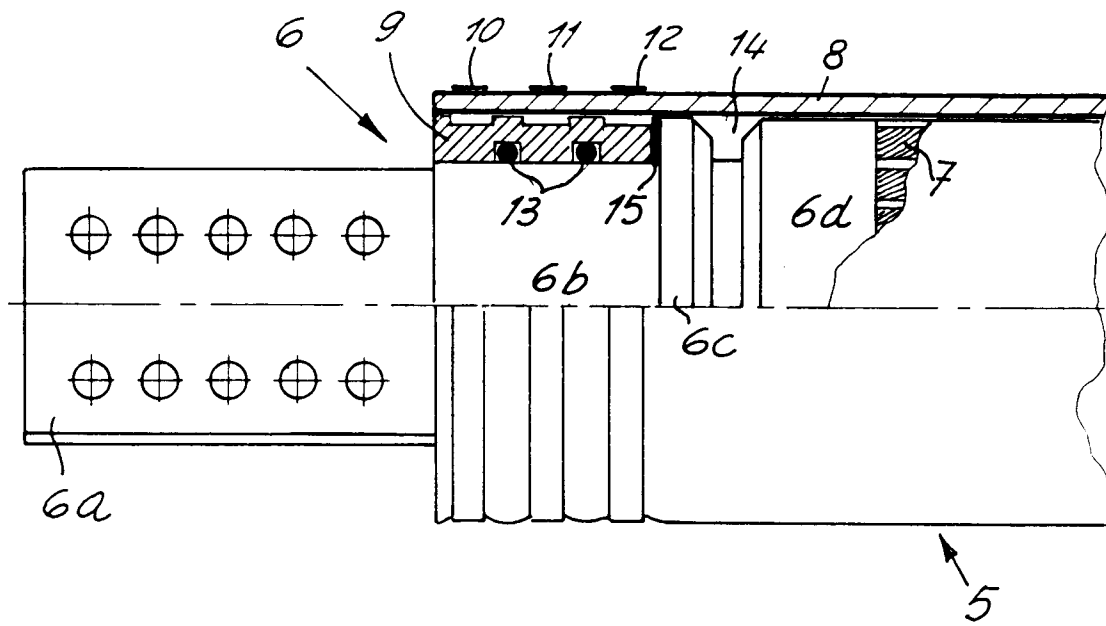


Fig.2



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	DE-A-2 353 364 (KABEL UND METALLWERKE GUTEHOFFNUNGSHÜTTE AG) * page 3, paragraph 3 - page 4, paragraph 3 * ---	1-3	H05B7/11
X	US-A-3 983 310 (HORST FISCHER) * column 2, line 16 - column 4, line 5; figure 1 * ---	1,3	
X	EP-A-0 408 476 (ERICO FRANCE S.A.R.L.) * column 3, line 32 - column 5, line 34; figures 1-5 * ---	1,2	
A	US-A-3 917 898 (SEIJIRO IKETANI ET AL.) ---		
A	DE-A-2 357 674 (GOODMAN, DANIEL J.) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H05B H01B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31 JULY 1992	Examiner RAUSCH R. G.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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