(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 016 356 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
05.07.2000 Bulletin 2000/27

(51) Int Cl.[7]: **A44C 5/00**

(21) Application number: **99830787.0**

(22) Date of filing: **21.12.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **29.12.1998 IT FI980282**

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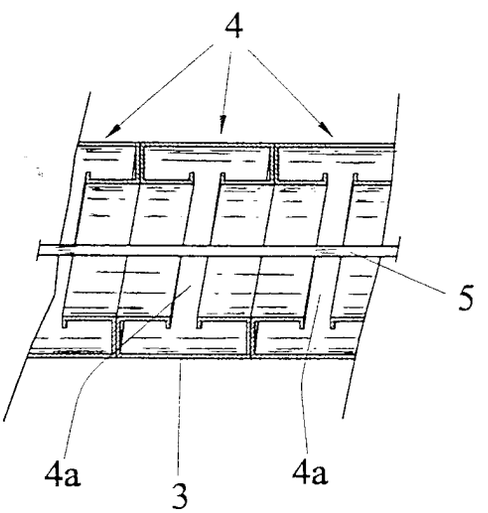
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(54) Ornamental element and production method

(57) Ornamental element with tubular shape formed by a hollow wire (3), made of precious or non-precious metal, having a substantially quadrilateral section and wound helically around a longitudinal axis to form coils arranged in a side-by-side relationship. The ends of the wire are connected by a substantially filiform tie rod (5) extending within said coils along said axis. The method of production comprises winding a bimetallic wire, formed by a layer of precious metal fixed to a non-precious metal, inner core, on a support mandrel (6) of non-precious material, subsequently emptying of the bimetallic wire and removal of the support mandrel by chemical treatment, and connecting the ends of the workpiece by a tie rod (5), such as a small chain, extending within the coils (4).

Fig. 2



EP 1 016 356 A1

Description

[0001] The present invention relates to the field of jewellery and costume jewellery and in particular relates to a tubular ornamental element for use in the above field.

[0002] The invention also relates to a method for producing the tubular ornamental element as well as the jewellery and costume jewellery articles, typically necklaces and earrings, which can be made from the above mentioned ornamental element.

[0003] An ornamental chain of the known type in the above mentioned field comprises a tubular structure, known as "gas-tube" according to a term familiar to any person skilled in the art. This chain is used in particular for the production of necklaces and bracelets and is formed by the connection of two helicoidal strip-shaped members with longitudinal edges bent in opposite sides. The coils of the helicoidal members are coaxially alternated in a continuous sequence, each of the two longitudinal bent edges of a coil of one member engaging with one of the opposedly bent edges of a pair of adjacent coils of the other one. Therefore, the structure of the "gas-tube" chain exhibit a nearly negligible axial and transverse play.

[0004] It must be taken into account that a constantly felt need in the jewellery field is to propose always new technical solutions with the aim of allowing the production of new ornamental designs, the improvement of the production process of the already known articles, for example by reducing the production costs, and more generally to give more room to the designer's creativity.

[0005] Under the above mentioned needs, it has been found a novel structure of a continuous tubular ornamental element which, when embodied in a jewellery article such as a necklace or an earring, considerably improves upon the ornamental effect of a conventional "gas-tube" chain. It has been also found an original method for the production of the ornamental element according to the invention.

[0006] The structure of the tubular ornamental element according to the present invention is characterized in that a precious or non-precious hollow wire with a substantially quadrilateral section, which is helicoidally bent according to adjacent coils about a longitudinal axis, the ends of the wire being connected by a substantially filiform tie rod extending along the longitudinal axis within the wire coils.

[0007] The essential features of the process for the production of the above mentioned tubular element are set forth in claim 6.

[0008] Further features and advantages of the tubular ornamental element and the relevant production method according to the invention will be apparent with the following description of a non-limiting, exemplifying embodiment thereof, made with reference to the attached drawings wherein:

- figure 1 is a chain made from a ornamental element according to the invention;
- figure 2 is a longitudinal section of a length of the ornamental element of the invention;
- figure 3 is a mandrel used in the production method of the invention.

[0009] With reference to figures 1 and 2, a necklace is formed by a ornamental element according to the invention generally indicated at 1, with a closure 2 schematically shown in figure 1, connected at the ends la thereof in a conventional way and fit for engaging chain ends la with one another.

[0010] Element 1 is formed by a hollow wire 3 of a substantially C-shaped quadrilateral cross section, of the known type, typically of precious metal, such as gold. Wire 3 is bent in the shape of a helic with side-by-side adjacent coils, of substantially circular cross section in the embodiment shown in figure 2, according to a substantially tubular arrangement. In the same figure 2, each coil 4 is shown as having a box-like section with a circumferential cut 4a on its inner side resulting form the wire production process, as will be described here below. In the embodiment shown in figure 1, the diameter of coils 4 is constant for a given length from ends la and symmetrically and continuously increases at an intermediate portion 1b of element 1 and, in such a way that the overall shape of element 1 and, consequently, of the necklace formed therewith is of the variable link size type.

[0011] A substantial filiform tie rod 5 extends between ends la of element 1 inside coils 4, in a substantially axial direction with respect to the tubular development of element 1. More precisely, tie rod 5 connects the ends of hollow wire 3 threbetween, to ensure the axial alignment of coils 4, due to the traction force exerted by it , and consequently, to ensure the compactness of element 1, without hindering the mutual movement between adjacent coils. Tie rod 5, schematically shown in figure 2, may be constituted by a thin chain made of gold or other precious, metallic material, or, particularly for less valuable products, by a wire made of non-precious metal or other material such as nylon.

[0012] With reference also to figure 3, according to the invention the ornamental element 1 is made through a specific production process.

[0013] Preliminarly, a bimetallic wire must be prepared. The wire is formed by a non-precious metal core, such as copper, iron or an alloy fit for being solubilized by chemical attack with a suitable solvent, and an external layer of precious metal such as gold. The wire may be produced by known techniques such as plating or seaming. In the present case a bimetallic workpiece of quadrilateral section, in particular rectangular section has been used.

[0014] The bimetallic wire produced in this way is then helically wound around a substantially cylindrical mandrel 6 shown in figure 3. Mandrel 6 is especially made in metallic or plastic material, for instance by known

moulding or turning processes. Advantageously, the mandrel material is iron or an alloy thereof which, according to what will be described herebelow, also the above mentioned core can be made of.

[0015] Wounding, carried out by means of a mechanical wounding equipment and in a proper lubricating oil bath, is a very delicate step of the method, in which a special care must be taken to maintain the bimetallic wire constantly under tension so as to form coils 4 which are in as compact as possible relationship along the axis of mandrel 6. In the embodiment shown in figure 3, mandrel 6 comprises an enlarged central portion 6a for generating coils 4 of larger diameter and therefore the above mentioned variable size shape of element 1.

[0016] Mandrel 6 also comprises end blocks 7 having respective through holes 8, within which the ends of the bimetallic wire are engaged as wounding is completed. The two or three coils forming the end portions of the workpiece are soldered together.

[0017] The method further comprises a step of radial hammering of the workpiece with press or vibrating hammer means of known type to stabilize the helicoidal shape of coils 4 and eliminate, as far as possible, any discontinuity, in the form of small steps or gaps unavoidably formed between adjacent coils during wounding operation, with the aim of obtaining an essentially uniform and smooth external surface.

[0018] Emptying operation is then carried out by immersion of the workpiece in a chemical bath to remove mandrel 6 and the core of the bimetallic wire, according to any of the emptying method known in the art. Only one processing is sufficient when mandrel 6 and wire core are both made of the same metallic material. If, for instance, mandrel 6 is made of plastic material, suitable solvent will have to be used in a first bath, while the emptying of bimetallic wire 3 will have to be carried out in a second bath. In order to ensure quick and effective removal of mandrel 6 it is anyway advisable to use low viscosity and low density solvents, capable of penetrating among the coils to more easily contact the material to be solubilized.

[0019] After emptying, even if lacking of the support provided by mandrel 6, coils 4 maintain an helical configuration due to their compression. On the other hand they are substantially free to mutually slide in the radial direction and, therefore, need a suitable locking capable of forming a stable tubular configuration of element 1. To this end tie rod 5 is inserted axially within coils 4 and is connected to the ends of hollow wire 3.

[0020] The ornamental article to be produced, with particular reference to the necklace shown in figure 1, will be then completed by performing the usual finishing operations, including in particular the application of clasp 2 by glueing or soldering.

[0021] Although in the present invention reference has been made to a variabile link size configuration of element 1, which is obtained thanks to the intermediate enlarged portion 6a of mandrel 6, element 1 can have also a tubular development of a substantially constant diameter. Furthermore, coils 4 can have an elliptical or generally curved development, formed by means of a mandrel 6 with a correspondingly profiled cross section. Tie rod 5 can be formed by two or more chains or wires optionally intertwined to each other.

[0022] As said before, the ornamental element according to the invention is particularly suited for the production of necklaces and earrings, but it can be used for the production of other jewellery goods as well, such as bracelets and pendants. Even if the ornamental effect of the element of the invention is somewhat similar to that of a "gas-tube" chain, it is made of only one piece with important advantages as far as the functionality and the aesthetic value of the product as well as the productivity of the process are concerned, the process being also relatively easy and inexpensive to carry out.

[0023] Variations and modifications can be made to the tubular shaped ornamental element and the relevant production method according to the present invention, without departing from the scope of the invention as defined in the appended claims.

Claims

1. Ornamental element (1) made of precious or non-precious metal and having a substantially tubular shape, characterized in that it comprises a hollow wire (3) made of said precious or non-precious metal with a generally quadrilateral cross section helically wound around a longitudinal axis to form side-by-side coils (4), said element being delimited by ends of said wire which are connected by a substantially filiform tie rod (5) extending along said axis within said coils.

2. Element according to claim 1, wherein said tie rod (5) comprises at least a thin chain of precious metal.

3. Element according to claim 1, wherein said tie rod (5) comprises a wire of non-precious metal or plastic material.

4. Element according to any of the previous claims, wherein the diameter of said coils (4) is not uniform along the longitudinal axis thereof.

5. Element according to claim 4, having an axially intermediate portion in which the coils have a symmetrically increasing diameter towards the center of said portion.

6. Method for the production of an ornamental element according to any one of the previous claims, characterised in that it comprises the following steps:

   - preparing a bimetallic wire (3) of a substantially

quadrilateral cross section, formed by a core of non-precious metal soluble in a suitable solvent supporting a layer of preciuos metal;

- helically wounding said wire around a substantially cylindrical mandrel (6), to form coils (4) arranged in a side-by-side relationship;
- securing the ends of the workpiece thus formed to the ends (7) of said mandrel (6);
- soldering at least two coils at both ends of the workpiece to each other so as to make the coil shape stable and the external surface uniform;
- immersing said workpiece in at least one bath for solubilizing the metal forming said core and said mandrel thus emptying said workpiece;
- placing a substantially filiform tie rod (5) within said coils and connecting it to the ends of the emptied workpiece.

7. Method according to claim 6, wherein, during the wounding step, the bimetallic wire is wound on at least an enlarged portion (6a) of said mandrel (6) to form at least a sequence of coils of larger diameter.

8. Method according to claims 6 or 7, wherein said securing step of said workpiece on said mandrel comprises engaging the ends of said workpiece with respective through holes (8) formed on end blocks (7) of said mandrel.

9. Method according to any of the claims 6 to 8, wherein said mandrel and said core are made of the same material and are removed by immersion in only one bath for solubilizing said material.

10. Method according to any one of the claims 6 to 8, wherein said mandrel and said core are made of different materials and are removed by subsequent immersions in respective baths for separately solubilizing said materials.

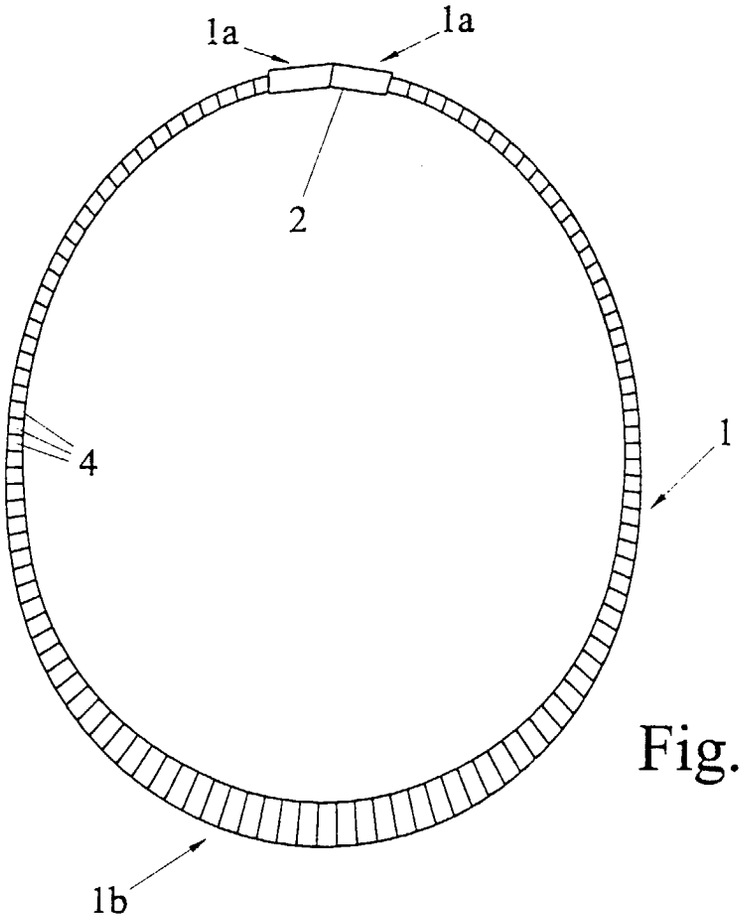


Fig. 1

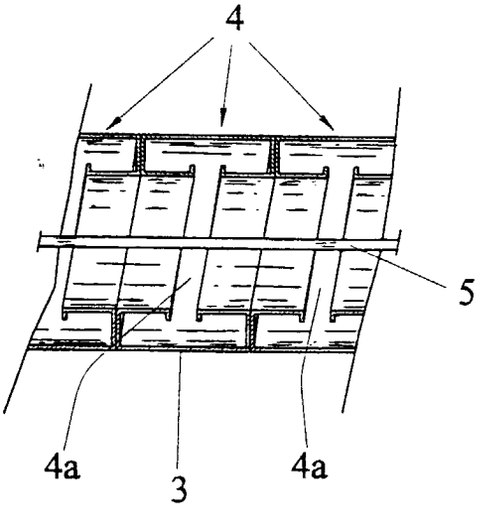


Fig. 2

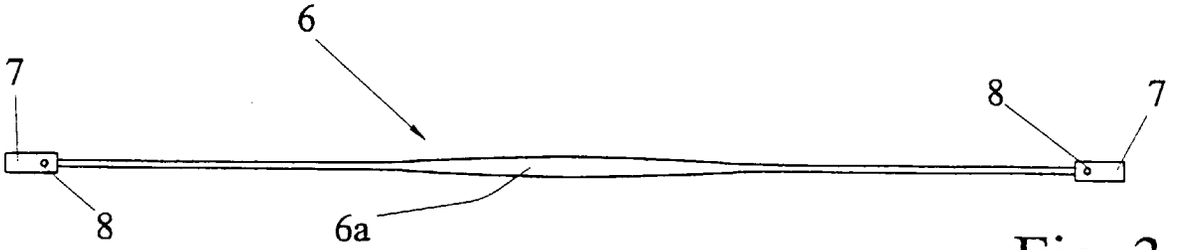


Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0787

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.7)
Y	EP 0 214 363 A (NIESSING GEB) 18 March 1987 (1987-03-18) * column 1, line 19 - column 3, line 7; figures *	1,3-7,10	A44C5/00
Y	EP 0 638 256 A (LOUYOT COMPTOIR LYON ALEMAND) 15 February 1995 (1995-02-15) * column 3, line 54 - column 6, line 39; figure 2B *	1,3-7,10	
Y	GB 2 161 695 A (SHIKISEIMITSU KABUSHIKIKAISHA) 22 January 1986 (1986-01-22) * abstract; figures *	4,5,7	
A	GB 2 099 285 A (VIERI SPA) 8 December 1982 (1982-12-08) * abstract; figures *	1,6	
A	EP 0 441 138 A (BUNZ GEORG) 14 August 1991 (1991-08-14) * abstract; figures *	1,6	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A44C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	26 April 2000	Kock, S

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 83 0787

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26-04-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0214363 A	18-03-1987	DE 8521923 U	19-09-1985
		AT 39822 T	15-01-1989
EP 0638256 A	15-02-1995	FR 2708837 A	17-02-1995
		FI 943698 A	12-02-1995
GB 2161695 A	22-01-1986	NONE	
GB 2099285 A	08-12-1982	IT 1212497 B	22-11-1989
		JP 57206539 A	17-12-1982
EP 0441138 A	14-08-1991	DE 4003790 A	22-08-1991
		AT 106204 T	15-06-1994
		DE 59101737 D	07-07-1994
		DK 441138 T	05-09-1994
		ES 2056498 T	01-10-1994
		HK 46695 A	07-04-1995
		JP 2110387 C	21-11-1996
		JP 6078816 A	22-03-1994
		JP 8013282 B	14-02-1996
		SG 1195 G	16-06-1995

EPO FORM P0459

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