

JEWELRY

Background of the invention

5 The present invention relates generally to an item of hollow ring-shaped jewelry and a method for making a hollow ring-shaped jewelry item. More particularly, although not exclusively, it relates to a jewelry ring.

Prior Art

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Finger rings come in many different designs, assortments and prices to cater for people of different ages and sexes. Rings are also meant for different occasions and purposes, for example, a wedding ring set with a precious gemstone, or a magnetic ring that helps to improve blood circulation.

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Often, a finished ring consists of more than one ring, usually two rings. The rings are usually connected or attached together via different means such as a hinge or through magnetic attraction. Such a design provides aesthetic value to those who buy or wear them. Rings with magnetic elements embedded inside
20 them are also used for therapeutic reasons.

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US Patent No. 6,101,843 relates to a double-ring finger ring which comprises an inner ring and an outer ring, with magnets mounted in an outer circumferential region of the inner ring and in an inner circumferential region of
the outer ring. The outer ring is held in suspension by the repellant force of the magnets.

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US Patent No. 5,669,241 describes a finger ring having at least two members, connected together at a point by a hinge, with the first member having a clasp hingably connected thereto, while the second member has a catch. In a

closed position, the clasp engages with the catch to form a finger ring.

US Patent No. 5,727,399 discloses a ring insert assembly comprising a pair of rings for accommodating an engagement or other ring therebetween.

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In the International Publication No. WO 2004/105539, when a pair of jewelry items is in sufficiently close proximity, a perceptible attractive force may be established, due to their complementary magnetic polarities, like when a person wears a wedding ring having outwardly directed south poles, while his partner wears a wedding ring having outwardly directed north poles.

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Conventionally, the method of making a hollow ring involves soldering one half side of the ring with another half side of the ring to become a complete hollow ring. However, by adopting this method, a fine line that exists along the soldered joints can be somewhat visible.

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Accordingly, the present invention aims to provide an improved method of making a ring-shaped jewelry item.

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Summary of the invention

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In one aspect, the present invention provides a method for making a hollow ring-shaped jewelry item, by assembling an internal cylindrical piece within an external cylindrical piece. The internal piece defines a radially inner peripheral surface of the jewelry item, while the external piece defines a radially outer peripheral surface of the jewelry item. The outer diameter of the internal piece is smaller than an inner diameter of the external piece, such that a generally annular hollow space exists between the internal and external pieces when the two pieces are assembled together.

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The hollow space on each side of the assembly is closed off by joining a respective side piece that bridges the neighbouring axial edges of the internal and external pieces. The joining of the side piece on each side of the assembly is done by means of sintering or soldering, according to the metal of which the component pieces are made.

Preferably, the internal piece and/or the external piece each further comprises protrusions that extend into the hollow space. The protrusions divide the hollow space into a few hollow sections and are adapted to locate the internal and external pieces relative to one another.

If required or preferred, prior to closing off the assembly, magnetic elements can be inserted within the annular hollow sections that exists between the internal and external pieces.

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The magnetic elements embedded inside the body of the ring, make it magnetically attractive. Such magnetic attraction enables two rings of the same make to be stacked or combined, and worn on the same finger as an entity. The two rings, when designed and sold as a set, are adapted respectively to be worn by a couple of lovers.

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After sintering, the assembled jewelry item is then cooled off. Some lines may be visible due to the sintering process. Therefore enameling is done on the outer surface of the jewelry assembly after sintering to make the lines less or not visible.

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For the purpose of making the jewelry item look more attractive, the jewelry may bear different decorative appearances. The jewelry is then sent for polishing to make it sparkling and captivating.

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Further, in another aspect, the present invention provides a hollow ring-shaped jewelry item consisting of an internal cylindrical piece, an external cylindrical piece, and a respective side piece that bridges the neighbouring edges of the internal and external pieces to close off the hollow space on each side of
5 the assembly.

Preferably, the jewelry item comprises a hollow body of materials commonly used like gold, silver or platinum. For a gold jewelry item, it can be of different kinds such as yellow gold, white gold or red gold.
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The jewelry item may also comprise external ornamentation like one or a multitude of precious stones, semi precious stones, crystals or the equivalents thereof, bearing different designs, depending on the creativity of an artist or craftsman.
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After the jewelry item is polished, the jewelry is then sent out to be marketed.

Brief description of the drawings

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Fig. 1 shows front and side views of an external piece of a hollow ring-shaped jewelry item.

Figs. 2 shows a front view of an internal piece of a hollow ring-shaped jewelry
25 item.

Fig. 3 shows a front view of an internal piece assembled within an external piece of a hollow ring-shaped jewelry item.

Fig. 4 shows each side of the assembly is closed off by joining a respective side piece.

Fig. 5 shows hollow sections of an assembled hollow ring-shaped jewelry item.

Fig. 6 shows an assembled hollow ring-shaped jewelry item with a precious stone as external ornamentation.

Fig. 7 shows magnetic elements within hollow sections of a ring-shaped jewelry item.

Fig. 8 shows the orientations of two magnetic ring-shaped jewelry items when they are brought together.

Description of preferred embodiments

The invention is illustrated, although not limited by the following description of preferred embodiments, that is given by way of example only with reference to the accompanying drawings.

In accordance with the embodiment, a method for making a hollow ring-shaped jewelry item, comprising the steps of assembling an internal cylindrical piece 2 (Figure 2) that defines a radially inner peripheral surface of the jewelry item within a external cylindrical piece 1 (Figure 1) that defines a radially outer peripheral surface of the jewelry item.

Preferably, the jewelry item comprises a hollow body of conventional materials commonly used like gold, white gold, red gold, silver or platinum.

When the internal cylindrical piece 2 is assembled within the external cylindrical piece 1, a generally annular hollow space exists between the internal and external pieces due to the internal piece having a smaller outer diameter than an inner diameter of the external piece.

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The cylindrical pieces 1, 2 have a relatively short axial length and basically define the axial width of the final ring. The difference in radius of the pieces 1, 2, on the other hand, defines the radial thickness of the ring.

10 Preferably, the internal piece 2 and/or the external piece 1 each further comprises protrusions 3 that extend into the hollow space.

In the present embodiment, a total of six protrusions 3 are formed on the outer surface of the internal piece 2, as shown in Figure 2. The protrusions 3 are
15 preferably of the same material as the internal piece 2, soldered to the outer surface of the internal piece 2, of similar rounded shape, and equally spaced apart at approximately 9.8mm from one another. The method of soldering the protrusions to the internal piece is known to those skilled in the art.

20 Figure 3 shows the process of assembling the internal cylindrical piece 2 within the external cylindrical piece 1. The protrusions 3 which extend radially outward on the internal piece 2 are then adapted to locate the internal and external pieces relative to one another.

25 Alternatively, it is the external piece 1 that comprises protrusions 3. The protrusions 3 which extend radially inward on the external piece 1 are adapted to locate the internal and external pieces relative to one another.

Alternatively, both the external and internal pieces 1, 2 can comprise
30 protrusions 3. The protrusions 3 which extend radially inward on the external

piece 1 and the protrusions 3 which extend radially outward on the internal piece 2 are equally spaced apart between one another so that the protrusions 3 can be adapted to locate the internal and external pieces relative to one another.

5 Further, due to the protrusions, the hollow space is now divided into hollow sections 4. However, if both the external and internal pieces 1, 2 comprise protrusions 3, the spacing on each piece can be relatively much bigger.

10 As shown in Figures 4 and 5, each side of the assembly is then closed off by joining a respective annular plate-like side piece 5 that bridges the neighbouring edges of the internal and external pieces. The joining of the side piece 5 on each side of the assembly is done by means of sintering in this embodiment, by using a sintering machine, known to those skilled in the art.

15 While the side pieces 5 are being joined to the external and internal pieces 1, 2, soldering tweezers are used to hold the pieces so as to prevent them from moving about.

20 Sintering takes approximately between 5 to 8 minutes to complete. The process starts off with heating the two external and internal pieces 1, 2 and side pieces 5 at a high temperature. The heating process takes roughly between 2 to 3 minutes.

25 For gold, sintering is done at a temperature within a range of 880°C to 920°C. For white gold and red gold, sintering is done at a temperature within a range of 860°C to 910°C. For silver, sintering is done at a temperature within a range of 850°C to 900°C.

30 The heating process is performed by first placing the pieces 1, 2 and 5 in a chamber of the sintering machine. After the power of the sintering machine is

switched on, an induction heating device which is connected to the machine will heat up. The optimum temperature for the heating to continue can be set up by using user-controlled mechanism on the machine, depending on the types of rings to be assembled.

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After reaching the range of sintering temperature, a pressing machine will press the side pieces 5 to bridge the neighbouring edges of the internal and external pieces 1, 2 at a high pressure within a range of 50 to 1 500 kPa (0.5 to 15 bar). The pressing phase takes roughly between 30 seconds to 1 minute.

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A combination of high temperature and high pressure enables side pieces 5 to be joined together to the external and internal pieces 1, 2. At the same time, nitrogen gas is also used as protective gas during sintering at a flow rate of between 500 to 800 liter/hour.

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After sintering, the assembled jewelry item is then cooled off from the sintering temperature, down to approximately 550°C, by switching off the power to the sintering machine, while maintaining the flow of the protective gas in the chamber of the sintering machine.

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The cooling off period takes roughly between 3 minutes to 4 minutes, after which the jewelry item is removed from the sintering machine. The assembled and sealed jewelry item is shown in Figure 5. However, just like a conventional soldering method of two half-ring pieces, the sintering process may also cause some lines, although minute, to be visible on the surface of the jewelry. For the purpose of making the lines less or not visible, enameling is done on the outer surface of the jewelry assembly after sintering.

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The sintering process is applicable only for gold, white gold, red gold or silver rings. As for a platinum ring, the joining of respective annular plate-like

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side piece that bridges the neighbouring edges of the internal and external pieces is done by means of soldering. The soldering technique is known to those skilled in the art but is still explained herewith and should not be considered to limit the scope of the invention.

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Before soldering is performed, soldering flux is applied on the parts that need to be joined, to provide proper soldering quality. During soldering, karat solder sheet is used and by means of hydrogen generator, soldering torch will heat up the pieces until the solder sheet melts and causes the pieces to stick together. Temperature involved during soldering is between 600°C to 650°C while time taken is between 10 to 20 seconds.

After sintering or soldering, the assembled jewelry item is then sent for polishing, which contains a few steps as disclosed herein. First, the item is cleaned for approximately 1 to 2 minutes in a container which contains water and hydrogen peroxide mixed together.

The item is then transferred to a rotary tumbler, which contains a solution of polishing powder and anti rust powder mixed together. The power to the rotary tumbler is switched on for approximately 30 to 45 minutes, depending on the number of items inside the tumbler, since the tumbler can allocate more than one piece of jewelry items.

After tumbling, the items are smoothed out by rubbing (burnishing), preferably using a tool with a smooth, rounded end.

The item is now ready to be hand polished, using three different tools. During initial polishing, wheel brush is used to apply yellow rouge if it is a gold ring or a silver ring, while white rouge is applied if it is a platinum ring.

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Polishing buff is used to pre-fine polish the items. For a gold ring or a silver ring, yellow rouge is applied, while for a platinum ring, blue rouge is applied.

- 5 For final polishing, cotton buff is used and red rouge is applied for a gold ring or a silver ring, while white or orange rouge is applied for a platinum ring.

If necessary, the jewelry item is now ready for matting (making the appearance look not too glossy). The matting process is done using a machine or manually, both of which can be performed by skilled workers. In a case where the designer wants sections of the jewelry item to be glossy, those parts are covered with tape or lacquer before matting. After matting, the tape is removed or the lacquer is cleaned using thinner, before sending it for further cleaning.

- 15 The matting step can be skipped by sending the item straight for cleaning, to remove rouge residues that may be left behind after the hand polishing steps. This is performed by putting the item into a container of boiling wax removing liquid, followed by performing ultrasonic sound cleaning on the item.

- 20 A gold jewelry item can be of many kinds of gold plating. They can be yellow gold or white gold. The plating method is already commonly known but is still tabulated herewith (Table 1) by way of non-limiting examples only.

1. 916 yellow gold	Use gold plating powder mixed with water. Adjust rectifier of plating machine to 10 V. Plating time is 10 second.
2. 835 yellow gold	Use silver plating powder and gold plating powder mixed with water. Adjust rectifier of plating machine to 10 V. Plating time is 10 second.

3. 750 yellow gold	Use silver plating powder mixed with water. Adjust rectifier of machine to 10 V. Plating time is 10 second.
4. White gold	Use Rhodium solution mixed with water. Adjust rectifier of machine to 3 V. Plating time is 1 minute.
5. Red gold	Use Auruna Color Salt Mixture mixed with water. Adjust rectifier of machine to 10 V. Plating time is 10 second.

Table 1

5 If only sections of a finished yellow gold jewelry item are to be plated with a different colour, for example white, the method is similar to matting. Sections that need not to be white plated are applied with lacquer before the jewelry item is plated.

10 It is also preferred that the jewelry item bears external ornamentation. The outer surface of the jewelry assembly may be decorated with one or multitudes of precious stones, semi precious stones, crystals or the equivalents thereof, bearing different designs, depending on the creativity of an artist or craftsman.

15 In another embodiment, the jewelry item broadly comprises of an internal cylindrical piece 2 that defines an inner peripheral surface of the jewelry item, and an external cylindrical piece 1 that defines an outer peripheral surface of the jewelry item.

20 The internal piece 2 has a smaller outer diameter than an inner diameter

of the external piece 1, such that a generally annular hollow space exists between the internal and external pieces.

The internal piece 2 and/or the external piece 1 each further comprise
5 protrusions 3 that extend into the hollow space.

Preferably, the protrusions 3 are of similar rounded shape and equally spaced apart at approximately 9.8mm from one another. The protrusions 3 extend radially between the outer wall of the internal piece 2 and the inner wall of the
10 external piece 1.

Further, due to the protrusions, the hollow space is now divided into hollow sections 4.

15 A respective annular plate-like side piece 5 bridges the neighbouring concentrically arranged edges of the internal and external pieces 1, 2 to close off the hollow space on each side of the assembly by virtue of sintered joints between said respective side piece 5 and said edges of the internal and external pieces 1, 2.

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In another embodiment and referring to Figures 7 and 8, a method of making a magnetic hollow ring-shaped jewelry item is disclosed. The preferred dimensions of the internal and external pieces 1, 2, the protrusions 3 and the magnetic elements are also disclosed.

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The width of the external piece 1 is 5 mm, while the thickness of the internal piece 2 and the external piece 1 are the same, i.e. 0.5 mm. However, the width of the internal piece 2 may be varied depending on the designs of the ring.

The dimension of each of the protrusions 3 is 0.8 mm (thickness) x 3.5 mm (width). The length of each protrusion is suitably small so that there is enough space within the hollow sections 4 to accommodate the magnetic elements.

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For the purpose of making a magnetic hollow ring-shaped jewelry item, magnetic elements are then inserted within the hollow space, more particularly within the hollow sections 4.

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A minimum of one piece of magnetic element is inserted within the hollow sections 4, and preferably each hollow section should contain the same number of magnetic elements.

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The magnetic elements can be in the forms of flexible magnetic thread or magnetic pieces. The magnetic elements may be secured in place by using tools such as tweezers, pliers or adhesive, as known by those skilled in the art.

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Referring to Figure 7, the thickness of each magnetic element is 0.7 mm (for woman's ring) and 0.8 mm (for man's ring), while the width is between the ranges of 2.5 to 3.0 mm. The length of each magnetic element is between the ranges of 9.0 to 23.0 mm and depends on a number of factors such as;

- a) the length of the hollow sections 4,
- b) the size of the ring, and
- c) the number of magnetic elements inserted in each hollow section 4,

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The magnetic elements can be magnetised before or after they are incorporated into the jewelry item. If they are magnetised before completion, the magnetism may need to be recharged in the final product.

The magnetisation is performed by placing the magnetic elements or the jewelry item with magnetic elements incorporated therein, in a container of a charging machine. The magnetisation period is only for a few seconds (1 to 2 seconds) and it starts after power to the charging machine is switched on.

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In the case where the magnets are magnetised before being incorporated into the jewelry item, the arrangement of the magnetic elements is such that one polarity of the magnetic elements is facing radially outward of the jewelry item, and the opposite polarity is facing radially inward of the jewelry item. For example, the north pole of the magnetic elements of an assembled jewelry ring is facing outward and the south pole is facing inward. When another jewelry ring with the south pole of its magnetic elements facing outward and the north pole facing inward, the two jewelry rings will be mutually magnetically attractive when they are significantly close, as shown in Figure 8. Such magnetic attraction enables the two rings of the same make to be stacked or combined, and worn on the same finger as an entity. The two rings, when designed and sold as a set, are adapted respectively to be worn by a couple of lovers.

Each side of the assembly is then closed off by joining a respective side piece 5 that bridges the neighbouring edges of the internal and external pieces. The joining of the side piece 5 on each side of the assembly is done by means of sintering.

Based on the dimensions as stated above (the thickness of both the internal and external pieces 1, 2 is 0.5 mm; the thickness of the protrusions 3 is 0.8 mm), after the assembly and the joining processes, the thickness of the complete jewelry item is 1.8mm.

If the magnetic elements have not been magnetised earlier, they are now magnetised using the methods as already described above.

5 For magnetic jewelry item, enameling also helps to prevent water or moisture from seeping into the jewelry item, thus affecting the magnetism of the magnetic elements.

The same polishing method and plating steps (if necessary) as described earlier are adapted for a magnetic hollow ring-shaped jewelry item.

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The outer surface of the magnetic jewelry assembly may also be decorated with one or multitudes of precious stones, semi precious stones, crystals or the equivalents thereof, bearing different designs, depending on the creativity of an artist or craftsman.

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The preferred embodiments are for making a hollow ring-shaped jewelry item, wherein the jewelry item is a ring. The invention can also be applied to other types of jewelry items, such as a bangle, a necklace, an earring, a wristwatch, a locket and a pendant, or ring-shaped component elements of such items.

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While preferred embodiments have been shown and described, various modifications and substitutions may be made thereto without departing from the scope of invention. Accordingly, it is to be understood that the present invention has been described by way of illustration and not limitation.

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Claims

1. A method for making a hollow ring-shaped jewelry item, comprising the steps of:
 - 5 assembling an internal cylindrical piece (2) that defines an inner peripheral surface of the jewelry item within an external cylindrical piece (1) that defines an outer peripheral surface of the jewelry item, the internal piece having a smaller outer diameter than an inner diameter of the external piece, such that a generally annular hollow space exists between the internal and external pieces; and
 - 10 closing off the hollow space on each side of the assembly by joining a respective side piece (5) that bridges the neighbouring edges of the internal and external pieces.
2. A method for making a hollow ring-shaped jewelry item according to claim 1,
15 wherein the joining of the side piece (5) on each side of the assembly is done by means of sintering.
3. A method for making a hollow ring-shaped jewelry item according to claim 1,
20 wherein the internal piece (2) and the external piece (1) each further comprises protrusions (3) that extend into the hollow space.
4. A method for making a hollow ring-shaped jewelry item according to claim 1,
25 wherein the internal piece (1) or the external piece (2) further comprises protrusions (3) that extends into the hollow space.
5. A method for making a hollow ring-shaped jewelry item according to claim 3 or claim 4, wherein the protrusions (3) are adapted to locate the internal and external pieces (1, 2) relative to one another in the assembly step.

6. A method for making a hollow ring-shaped jewelry item according to claim 3 or claim 4, wherein the protrusions (3) divide the hollow space into sections (4).
7. A method for making a hollow ring-shaped jewelry item according to claim 1,
5 further comprising the step of inserting magnetic elements within the hollow space.
8. A method for making a hollow ring-shaped jewelry item according to claim 6,
10 further comprising the step of inserting magnetic elements within the hollow sections (4).
9. A method for making a hollow ring-shaped jewelry item according to claim 7 or claim 8, wherein the magnetic elements are inserted such that one polarity of the magnetic elements is facing radially outward of the jewelry item, and the
15 opposite polarity is facing radially inward of the jewelry item.
10. A method for making a hollow ring-shaped jewelry item according to claim 7 or claim 8, wherein the magnetic elements are magnetised before they are incorporated into the jewelry item.
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11. A method for making a hollow ring-shaped jewelry item according to claim 7 or claim 8, wherein the magnetic elements are magnetised after they are incorporated into the jewelry item.
12. A method for making a hollow ring-shaped jewelry item according to claim
25 1, wherein the jewelry item comprises gold, white gold, red gold or silver.
13. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein the joining step is done at a temperature within a range of 880°C -
30 920°C for gold.

14. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein the joining step is done at a temperature within a range of 860°C - 910°C for white gold or red gold.
- 5 15. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein the joining step is done at a temperature within a range of 850°C - 900°C for silver.
- 10 16. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein the joining step is carried out at a pressure within a range of 50 to 1 500 kPa.
- 15 17. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein during the joining step, nitrogen gas is used as protective gas at a flow rate of 500 - 800 liter/hour.
18. A method for making a hollow ring-shaped jewelry item according to any one of claims 13 to 17, wherein the joining step is done by means of sintering.
- 20 19. A method for making a hollow ring-shaped jewelry item according to claim 18, wherein after the joining step, the assembled jewelry item is cooled off from the sintering temperature down to approximately 550°C.
- 25 20. A method for making a hollow ring-shaped jewelry item according to claim 2, wherein the total time taken during sintering is approximately between 5 to 8 minutes.
- 30 21. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein the joining of the side piece (5) on each side of the assembly is done by means of soldering.

22. A method for making a hollow ring-shaped jewelry item according to claim 21, wherein the jewelry item comprises platinum.

23. A method for making a hollow ring-shaped jewelry item according to claim 21 or claim 22, wherein soldering is done at a temperature within a range of 600°C to 650°C.

24. A method for making a hollow ring-shaped jewelry item according to claim 21 or claim 22, wherein the total time taken during soldering is approximately between 10 to 20 seconds

25. A method for making a hollow ring-shaped jewelry item according to claim 1, further comprising the steps of:
enameling the outer surface of the jewelry assembly after the joining step,
and
decorating the outer surface of the jewelry assembly with ornamentation.

26. A method for making a hollow ring-shaped jewelry item according to claim 1, wherein the jewelry item is a ring.

27. A hollow ring-shaped jewelry item, comprising:
an internal cylindrical piece (2) that defines an inner peripheral surface of the jewelry item;
an external cylindrical piece (1) that defines an outer peripheral surface of the jewelry item;
the internal piece having a smaller outer diameter than an inner diameter of the external piece, such that a generally annular hollow space exists between the internal and external pieces; and
a respective side piece (5) that bridges the neighbouring edges of the

internal and external pieces to close off the hollow space on each side of the assembly.

28. A hollow ring-shaped jewelry item according to claim 27, comprising
5 sintered joints between said respective side piece (5) and said edges of the internal and external pieces (1, 2).

29. A hollow ring-shaped jewelry item according to claim 27, wherein the internal piece (2) and the external piece (1) each further comprises protrusions (3)
10 that extend into the hollow space.

30. A hollow ring-shaped jewelry item according to claim 27, wherein the internal piece (2) or the external piece (1) further comprises protrusions (3) that extend into the hollow space.

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31. A hollow ring-shaped jewelry item according to claim 29 or claim 30, wherein the protrusions (3) divide the hollow space into sections (4).

32. A hollow ring-shaped jewelry item according to claim 31, wherein the
20 protrusions (3) extend radially between the outer wall of the internal piece (2) and the inner wall of the external piece (1) in the assembled jewelry item.

33. A hollow ring-shaped jewelry item according to claim 27, further comprising magnetic elements disposed within the hollow space.

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34. A hollow ring-shaped jewelry item according to claim 31, further comprising magnetic elements disposed within the hollow sections (4).

35. A hollow ring-shaped jewelry item according to claim 33, wherein one
30 polarity of the magnetic elements is facing radially outward of the

jewelry item, and the opposite polarity is facing radially inward of the jewelry item.

36. A hollow ring-shaped jewelry item according to claim 27, wherein the
5 jewelry item is a ring.