

PATENT SPECIFICATION

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(54) HEALTHY MAGNETIC ORNAMENT

(71) We, TDK ELECTRONICS CO., LTD., a Company organized and existing under the laws of Japan of 2-14-6, Uchikanda, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to an improved magnetic ornament suitable for healthy, personal adornment. More particularly, it relates to an ornament such as a necklace, a bracelet and a chain belt which are provided with permanent magnets and suitable for both promoting good health and personal adornment.

A variety of healthy, magnetic ornaments have been heretofore proposed. However, these ornaments are not satisfactory in that they have at least one of the following disadvantages. That is, they are poor in good health promotion effect, ornamental effect, or are harmful to the skin, or they are not enjoyable or pleasing to the wearer. That is, pieces of permanent magnets used in most of the known healthy, magnetic ornaments are made of ferrite. However, ferrite magnets possess small coercive force, residual magnetic flux density and energy product (B_rH_u), and therefore, are poor in good health promotion effect. If the size of magnet is made large for the purpose of the good health promotion, the ornaments would not be enjoyable or pleasing to the wearer and would become poor in ornamental effect. Further, some healthy, magnetic ornaments are of a structure such that each piece of permanent magnet is inserted in a case of non-magnetic metal and the case is linked with a non-magnetic metal chain; however, the non-magnetic metal used is sometimes affected by perspiration and is dissolved therein although in a trace amount, and the dissolved metal has a bad effect on the skin of the wearer.

It is an object of the present invention, therefore, to provide a magnetic ornament

suitable for promotion of good health and personal adornment which possesses none of the above-mentioned disadvantages.

In accordance with the present invention there is provided a magnetic ornament for use in the promotion of good health and for personal adornment, said ornament comprising at least one capsule for enclosing a permanent magnet in a hollow interior thereof and at least one chain of a non-magnetic, corrosion-resistant metal, said chain being linked to said capsule, wherein said capsule consists of a non-magnetic metal having a corrosion-resistant surface and at least one rare earth element-cobalt permanent magnet having a longitudinal axis and completely enclosed within the hollow interior of said capsule, the or each permanent magnet having at least one pair of magnetic poles formed on the peripheral surface thereof, each of said poles of said pair being formed on a line which extends parallel to the longitudinal axis of the magnet.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figures 1A and 1B are perspective and side views, respectively, of a piece of rare earth element-cobalt permanent magnet used in an ornament embodying the invention;

Figure 2 is a side view of another piece of rare earth element-cobalt permanent magnet;

Figure 3 is a graph showing the relationship between the magnetic flux density and the distance from the skin;

Figures 4A and 4B are front and side views, respectively, of a capsule of an ornament embodying the invention, and;

Figure 5 is a necklace embodying the invention.

In Figures 1A and 1B, a cylindrical piece 1 of a rare earth element-cobalt magnet (hereinafter referred to as an "RE-Co magnet" for brevity) is magnetized in the

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direction perpendicular to the axis of the cylinder, i.e. in the radial direction, so that one or more N-poles and one or more S-poles are formed on two straight lines, respectively, which extend on the peripheral surface in the axial direction. Lines of magnetic force are formed as shown by reference numeral 10 in Figure 1B. That is, the magnetic flux density is large in the vicinity of the magnetic poles on the peripheral surface. Therefore, when the RE-Co magnet 1 is used in a manner such that the peripheral surface, particularly the magnetic poles, is adjacent to the skin, the magnetic force exerts a more favorable influence upon the human body than known magnets magnetized in the axial direction.

Figure 2 shows another RE-Co magnet piece in the form of a cylinder which possesses two pairs of N-poles and S-poles on the periphery of the cross section cut perpendicularly to the axis. The pairs of the N-poles and S-poles are formed on four straight lines, respectively, which extend on the peripheral surface in the axial direction. This magnetic has a magnetic flux density larger than that of the magnet shown in Figure 1B. Thus, an RE-Co magnet having a plurality of pairs of N-poles and S-poles on the peripheral is preferred.

Figure 3 shows the relationship of the magnetic flux density as measured on the skin to the distance from the skin of the periphery of the magnet. Curves a and b indicate a samarium cobalt permanent magnet (as one example of the RE-Co permanent magnets) and a ferrite permanent magnet, respectively. Although the magnetic flux density decreases as the distance from the skin to the magnet increases, the samarium cobalt permanent magnet exhibits a very large magnetic flux density and magnetic field gradient, particularly when said distance is very small.

Figures 4A and 4B are front and side views, respectively, of the disassembled capsule 3. The capsule 3 is comprised of a cylindrical case 2 with a link 4' and a cap 5 with a link 4. A cylindrical RE-Co magnet rod 1 magnetized in the radial direction is inserted in the cylindrical case 2, so that the magnet rod 1 and the case 2 are coaxial, and the screw part 7 of the cap 5 is screwed into the case 2. The cylindrical case 2 and the cap 5 are made of a non-magnetic corrosion-resistant metal such as gold, platinum or rhodium so that they are not affected by perspiration. Alternatively the case 2 and the cap 5 may be made of a non-magnetic but corrosive metal such as brass, provided that they are thereafter plated with a non-magnetic corrosion-resistant metal.

The capsule 3 may be of any decorative design and of a shape other than the cylindrical shape. However, the cylindrical shape is most preferable because it is enjoyable and pleasing to the wearer.

Figure 5 shows a necklace comprised of a plurality of capsules 2 shown in Figure 4 and a plurality of chains 8. The chains 8 are made of a non-magnetic corrosion-resistant metal. The necklace is provided with connections 9 and 9' at its ends.

A healthy, magnetic ornament embodying the invention may be, instead of the necklace illustrated above, a bracelet, a chain belt or the like.

The permanent magnet material used in the magnetic ornament of embodiments of the invention is comprised of a rare earth element and cobalt. The permanent magnet material includes, for example, Sm-Co, Sm₂-Co₁₇, Ce-Co, Ce₂-Co₁₇, Pr-Co, Pr₂-Co₁₇, Y-Co, Y₂-Co₁₇, La-Co, and La₂-Co₁₇. It includes further a modified RE-Co material which is prepared by replacing a part of the cobalt with another metal such as, copper, iron or manganese.

The magnetic ornament of embodiment of the invention is characterized particularly in that, first, the permanent magnet piece are made of rare earth-cobalt permanent magnetic material and, second, said magnet pieces are magnetized in the radial direction and possess magnetic poles on the peripheral surface. An RE-Co permanent magnet exhibits large coercive force, residual magnetic flux density and energy product (BH_{MAX}) as compared with other known permanent magnets. (BH_{MAX}) is the maximum value of the product magnetic induction B(gauss) and magnetic field H(oersted) in a demagnetizing curve. For example, a samarium-cobalt permanent magnet SmCO₅ exhibits an energy product of approximately 26 million gauss-oersted. In contrast, a known magnetically anisotropic barium-ferrite permanent magnet exhibits an energy product of approximately 10 million gauss-oersted. Therefore, the magnet pieces used in the magnetic ornament of embodiments of the invention may be smaller in size than those of known magnetic ornaments. Consequently, the magnetic ornament of embodiments of the invention is more suitable for promotion of good health, that is, it facilitates blood circulation and, hence, has a favorable effect on the removal of stiffness in the shoulders and muscular pain. Further, the outer surfaces of the magnet ornament are made of a corrosion-resistant material such as noble metals and, hence, the magnet ornament is not harmful to the skin and exhibits good ornamental effects.

WHAT WE CLAIM IS:—

1. A magnetic ornament for use in the promotion of good health and for personal adornment, said ornament comprising at least one capsule for enclosing a permanent magnet in a hollow interior thereof and at least one chain of a non-magnetic, corrosion-resistant metal, said chain being linked to said capsule, wherein said capsule consists of a non-magnetic metal having a corrosion-resistant surface and at least one rare earth element-cobalt permanent magnet having a longitudinal axis and completely enclosed within the hollow interior of said capsule, the or each permanent magnet having at least one pair of magnetic poles formed on the peripheral surface thereof, each of said poles of said pair being formed on a line which extends parallel to the longitudinal axis of the magnet.
2. A magnetic ornament according to claim 1, wherein the or each rare earth element-cobalt permanent magnet is in the form of a rod.

3. A magnetic ornament according to claim 2, wherein said rod is cylindrical.
4. A magnetic ornament according to any one of claims 1 to 3, wherein the or each capsule comprises a cylindrical case and a cylindrical cap, the cap having screw formation for threaded engagement with a corresponding screw formation in the case.
5. A magnetic ornament according to any one of claims 2 to 4 comprising a plurality of capsules, wherein said chain is linked to each of said capsules at the opposite ends thereof.
6. A magnetic ornament suitable for both the promotion of good health and personal adornment, substantially as herein described with reference to and as shown in the accompanying drawings.

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