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(71) Applicant: **VIVI Jewellery Limited**
HungHom, Kowloon
Hong Kong (CN)

(72) Inventor: **Kwong, Chun Fat**
c/o VIVI Jewellery Limited
HungHom,
Kowloon (HK)

(74) Representative: **Müller-Boré & Partner Patentanwälte**
Grafinger Strasse 2
81671 München (DE)

(54) **Movable vertical displacement device**

(57) Disclosed herein is a movable vertical displacement device (100) used in multi-directional positioning synchronous-response for cover-activated vertical transfer action. The device comprises: a chassis frame (1) for supporting a main body (2), a vertical displacement mechanism (3) attached to said chassis frame which is also capable of rendering vertical transfer of said chassis frame, and a backing base (5) attached to said vertical displacement mechanism. Implementation of this movable vertical displacement device enables the same piece of jewelry to be displayed by the wearer in two or more distinct styles, thereby allowing more choice, adding new ornamental dimension to the jewelry for the wearer, and making possible omni-directional synchronous preset-response vertical transfer action.

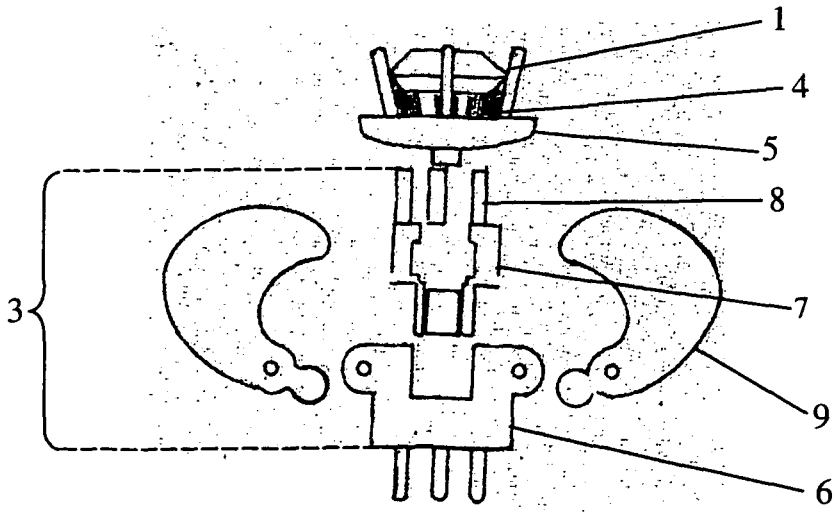

FIG. 10

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims foreign priority under 35 U.S.C. § 119 to Hong Kong Patent Application no. 07112678.7, filed in Hong Kong on November 21, 2007, the entire contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates generally to a movable vertical displacement device. More particularly, the present invention features a new means for vertical displacement movement that supports an omni-directional synchronous-response vertical transfer system.

2. Related Art

[0003] As well known to those skilled in the art, existing jewelry such as necklaces, watches, diamond rings and earrings are not provided with omni-directional synchronous-response mechanism for unveiling and lifting the main body, and thus lack in flexibility

SUMMARY OF THE INVENTION

[0004] Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a new form of vertical movement mechanism capable of omni-directional synchronous-response vertical displacement vis-à-vis the abovementioned shortcoming.

[0005] The present invention solves the above-mentioned technical problem by: constructing a moveable vertical displacement device that is to be used for multi-directional positioning synchronous-response for cover-activated vertical displacement. The device includes: a chassis frame used for supporting a main body, a vertical displacement mechanism attached to said chassis frame which is also capable of rendering vertical transfer of said chassis frame, and a backing base attached to said vertical displacement mechanism, and fitted to a piece of jewelry.

[0006] In one embodiment of the present invention, the chassis frame incorporates a stopper and a main body.

[0007] In one embodiment of the present invention, the aforementioned stopper comprises of a delimiter lever assembly fitted onto the main body, as shown in figure 16B.

[0008] In one embodiment of the present invention, the vertical displacement mechanism includes: a fixed rigid base, a tube strut, a riser rod, an activation lever as shown in figure 16A, and a transfer mechanism wherein said tube strut is fixed onto the rigid base, said riser rod is encased in the tube strut, said transfer mechanism incorporates a rack and pinion set as shown in figure 10, said activation lever is attached onto the pinion gear, and said pinion set is attached to the surface of the riser rod.

[0009] In one embodiment of the present invention, diamonds or other gemstones may be attached to the main body.

[0010] In one embodiment of the present invention, jewelry includes necklaces, watches, Diamond rings, bracelets, arm-bands, brooches, pendants, earrings, and so on, as well as other jewelry and ornaments not listed herein, of which, the watches may include various models of men's and women's watches, ornamental watches, sports watches, plastic watches, etc. Necklaces may be of various types, including, diamond necklaces, pearl necklaces and so on. Diamond rings may also be of different types, such as gold rings, and precious stone rings. By analogy, bracelets, armbands, brooches, pendants, and earrings, may also have many varieties.

[0011] Implementation of the movable vertical displacement device described by the present invention have the following beneficial outcomes: It allows the same piece of jewelry to be worn and displayed in two or more different styles, thereby giving the user more choices, adding new ornamental dimension to the jewelry, and making possible an omni-directional synchronous-response vertical displacement of the jewelry.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] In order to fully describe embodiments of the present invention, reference is made to the accompanying drawings. These drawings are not to be considered limitations in the scope of the invention, but are merely illustrative.

[0013] FIG 1 is a top view of a decorated ring device with petal shaped covers in a closed position, according to an embodiment of the present invention.

[0014] FIG 2 is a top view of the decorated ring device with petal shaped covers in an open position, according to an embodiment of the present invention.

[0015] FIG 3 is a front view of the decorated ring device with petal shaped covers in a closed position, according to an embodiment of the present invention.

[0016] FIG. 4 is a top perspective view of an undecorated ring device, with the petal shaped covers in an open position and without gemstone, according to an embodiment of the present invention.

[0017] FIG 5 is a side view of the undecorated ring device with the petal shaped covers in closed position, according to an embodiment of the present invention.

[0018] FIG 6 is an example of implementation of the ring device installed onto a ring, and freely moving up and down, according to an embodiment of the present invention.

[0019] FIG 7 is another example of implementation of the ring device installed onto a ring, with the petal shaped

covers in a completely open position, according to an embodiment of the present invention.

[0020] FIG. 8A is a side view of a top portion of the ring device, according to an embodiment of the present invention.

[0021] FIG 8B is a top view of a top portion of the ring device, according to an embodiment of the present invention.

[0022] FIG 8C is a side perspective view of a top portion of the ring device, according to an embodiment of the present invention.

[0023] FIG 9A is a side outline view of a covered top portion of a ring device in a closed position, according to an embodiment of the present invention.

[0024] FIG 9B is a side view of a left facing petal shaped cover of a top portion of a ring device, according to an embodiment of the present invention.

[0025] FIG 9C is a side perspective view of a right facing petal shaped cover of a top portion of a ring device, according to an embodiment of the present invention.

[0026] FIG 10 is an exploded side view of a top portion of a ring device, according to an embodiment of the present invention.

[0027] FIG 11 is a side view of a cover activated top portion of a ring device in an open position, according to an embodiment of the present invention.

[0028] FIG 12A is a top perspective view of a cover activated top portion of a ring device, according to an embodiment of the present invention.

[0029] FIG 12B is a top perspective view of a cover activated top portion of a ring in a closed position, according to an embodiment of the present invention

[0030] FIG. 13A is a side view of a bottom portion of a ring device, according to an embodiment of the present invention.

[0031] FIG. 13B is a top view of a bottom portion of a ring device, according to an embodiment of the present invention.

[0032] FTG. 13C is a top perspective view of a bottom portion of a ring device, according to an embodiment of the present invention.

[0033] FIG 14A is a top perspective view of a gimbal, according to an embodiment of the present invention.

[0034] FIG 14B is a top perspective view of a straight pin, according to an embodiment of the present invention.

[0035] FIG 15A is a top perspective view of a cover activated top portion of a ring device fitting into and engaging with a bottom portion of a ring device, according to an embodiment of the present invention.

[0036] FIG 15B is a side view of the cover activated ring device, according to an embodiment of the present invention.

[0037] FIG 15C is a top perspective view of the cover activated ring device, according to an embodiment of the present invention.

[0038] FIG 16A is a side view of a cover activated ring device in a closed position, according to an embodiment of the present invention.

[0039] FIG 16B is a side view of a cover activated ring device in an open position, according to an embodiment of the present invention.

[0040] FIG 17A is a top perspective view of a cover activated ring device in a closed position, according to an embodiment of the present invention.

[0041] FIG 17B is a top perspective view of a cover activated ring device in an open position, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

[0042] The description above and below coupled with the drawings of the present document, focus on one or more currently preferred embodiments of the present invention and also describe some exemplary optional features and/or alternative embodiments. The description and drawings are for the purpose of illustration and not limitation. Those of ordinary skill in the art would recognize variations, modifications, and alternatives. Such variations, modifications, and alternatives are also within the scope of the present invention. Section titles are terse and are for convenience only.

[0043] Figures 1-5 illustrate an embodiment of how the device 100 of the present invention may be used in a ring.

[0044] Figure 1 depicts a top view of a decorated ring device 100, with four petal shaped covers 9 in a closed position.

[0045] Figure 2 depicts a top view of a decorated ring device 100 where the four petal shaped covers 9 are in an open position and wherein is seen the main body 2, and the decorated backing base 5.

[0046] Figure 3 is a side view of a decorated ring device 100 where all the petal shaped covers 9 are in a closed position.

[0047] Figure 4 shows a top perspective view of an undecorated ring device 100, where the petal shaped covers 9 are in an open position, and wherein is seen, the main body 2, a stopper 4, and the backing base 5.

[0048] Figure 5 is a side view of an undecorated ring device 100, where the petal shaped covers 9 in a closed position.

[0049] Figure 6 is an example of an implementation of the ring device 100. Figure 6 specifically depicts the activation of the petal shaped covers 9 as they move into an open position, thereby exposing the chassis frame 1, the main body 2, the stopper 4, and the backing base 5.

[0050] Figure 7 is another example of implementation of the ring device 100. In figure 7, the petal shaped covers 9 are in a completely open position, thereby exposing the chassis frame 1, the main body 2, the stopper 4, and the backing base 5.

[0051] Figure 8A is a side view of a top portion of the ring device 100 depicting the chassis frame 1, the backing base 5, and a rigid base 6.

[0052] Figure 8B is an top view of a top portion of the ring device 100, depicting the main body 2, a stopper 4

used for fixing a gemstone or diamond onto the main body 2, and the backing base 5.

[0053] Figure 8C is a side perspective view of a top portion of the ring device 100, depicting the chassis frame 1, a main body 2, a stopper 4, a backing base 5, a rigid base 6, and a socket 11.

[0054] Figure 9A shows an outline view of three petal shaped covers 9 is a closed position.

[0055] Figure 9B shows a side view of a left facing petal cover 9 and an attachment knob 10.

[0056] Figure 9C shows a side perspective view of a right facing petal cover 9 and an attachment knob 10.

[0057] Figure 10 is an exploded side view of a top portion of the ring device 100, representing an embodiment of the present invention. As shown in figure 7, the top portion of the ring device 100 comprises of at least three separate vertical units fitting into each other. Specifically, Figure 7 shows the chassis frame 1 attached to a stopper 5 and fitting into a vertical displacement mechanism 3, further consisting of a tube strut 7 and a riser rod 8, and fitting into the rigid base 6, to which are attached one or more petal shaped covers 9.

[0058] Figure 11 is a side view of a top portion of the ring device 100, depicting the chassis frame 1, the backing base 5, the petal shaped covers 9, and the rigid base 6. Figure 11 shows the petal shaped covers as they attach into their respective sockets 11 in the rigid base 6.

[0059] Figure 12A is a top perspective view of a cover activated top portion of the ring device 100, depicting the attachment of the various petal shaped covers 9 into their respective sockets 11 positioned in the rigid base 6.

[0060] Figure 12B is a top perspective view of a cover activated top portion of the ring device 100, wherein the petal shaped covers 9 are attached onto the rigid base 6, and are in a closed position.

[0061] Figures 13A is a side view of the base holder 14 specifically depicting the socket extensions 15, wherein each extension contains an aperture 16.

[0062] Figure 13B is a top view of the base holder 14, showing the central opening 17 into which is fitted, the top portion of the ring device 100, consisting of the chassis frame unit coupled with the vertical displacement mechanism unit and the rigid base 6.

[0063] Figure 13C is a top perspective view of the base holder 14 showing the central opening 17 as well as the socket extensions 15 and apertures 16.

[0064] Figures 14A depicts a gimbal 18 which is inserted through the apertures 16 that are attached to the socket extensions 15 and used for securing and supporting the top portion of the ring device 100 as it fits into the base holder 14.

[0065] Figure 14B shows a straight pin 19, which is also inserted through the apertures 16 that are attached to the socket extensions 15 and used for securing and supporting the top portion of the ring device 100 as it fits into the base holder 14.

[0066] Figure 15A is a top perspective view of a cover activated top portion of the ring device 100 with all four petal shaped covers 9 in a closed position, as it fits into and engages with the base holder 14, which forms the bottom portion of the ring device 100, to form an embodiment of the present invention.

[0067] Figure 15A is a side view of the cover activated top portion of the ring device 100 fitted into the base holder 14, which forms the bottom portion of the ring device 100, and depicting the apertures 16, into which are inserted the gimbal 18 and the straight pins 19.

[0068] Figure 15C is a top perspective view of the entire cover activated ring device 100.

[0069] Figure 16A is a side view of the cover activated ring device 100 with three petal shaped covers 9 in a closed position and showing the chassis frame 1, the main body 2, the backing base 5, the vertical displacement mechanism 3 as enclosed inside the rigid base 6, the socket extensions 15, the apertures 16, and the base holder 14.

[0070] Figure 16B is a side view of the cover activated ring device 100 with three petal shaped covers 9 in an open position and showing the chassis frame 1, the main body 2, the backing base 5, the vertical displacement mechanism 3, the socket extensions 15, the apertures 16, and the base holder 14.

[0071] Figure 17A is a top perspective view of the cover activated ring device 100 in a closed position, and can be mounted on a ring to form an embodiment of the present invention.

[0072] Figure 17A is a top perspective view of the cover activated ring device 100 in with all the petal shaped covers 9 in an open position, and exposing the chassis frame 1, the main body 2, the backing base 5, the socket extensions 15, and the apertures 16.

[0073] As shown in figures above, according to an embodiment of the present invention, the a moveable vertical displacement device comprises: a chassis frame 1 used for supporting the main body 2, a vertical displacement mechanism 3 attached to said chassis frame 1 which is also capable of rendering vertical movement for the chassis frame 1, and a backing base 5 fitted to the jewelry and attached to the vertical displacement mechanism 3 such that the vertical displacement mechanism may freely move by itself, without any manual input.

[0074] In one implementation example, the chassis frame 1 incorporates a stopper 4 and a main body 2, of which, the stopper 4 is used for fixing a gemstone or diamond onto the main body 2, which in turn, is attached to the vertical displacement mechanism 3, so as to make it possible for the gemstone or diamond to move up and down.

[0075] In another implementation example, the stopper mechanism 4 is the delimiter lever assembly fitted onto the main body 2. In one embodiment of the present invention, three delimiter levers may be used.

[0076] In another implementation example, the vertical displacement device includes a fixed base 6, a tube strut 7, a riser rod 8, an activation lever, and a transfer mechanism, wherein the tube strut 7 is fixed onto the rigid base

6, the riser rod 8 is encased in the tube strut 7, the transfer mechanism incorporates a rack and pinion set, the activation lever is attached onto the pinion gear and the pinion set is attached onto the surface of the riser rod 8.

[0077] In this implementation the main body may carry diamonds or gemstones. The jewelry includes necklaces, watches, diamond rings, bracelets, armbands, brooches, pendants, earrings, and so on, as well as other jewelry and ornaments not listed in full herein, of which, watches of various models for men and women, various models of ornamental watches, sports watches, plastic watches, etc are included. Necklaces of various types, for instance, diamond necklaces, and pearl necklaces may also be included. Diamond rings of different types, such as gold rings, and precious stone rings may be used. Varieties of bracelets, armbands, brooches, pendants, earrings, and so on may also be chosen from the various commercial products found in the market.

[0078] In another implementation example, a gimbal 18, which is a contrivance, consisting of a ring or base on an axis, permitting an object mounted in or on it to tilt freely in any direction, is fitted underneath the rigid base 6. A lever is attached on the tube strut 7, and the chassis frame 1 is attached to the top of the riser rod 8 or secondary riser rod by a pin.

[0079] In another implementation example, the vertical displacement mechanism 3 also incorporates a rack-locking buckle, which is fitted onto the top of the tube strut 7.

[0080] The present invention is described by a number of specific implementation examples. Technical personnel within this specialty domain should appreciate that without prejudice to the essence of the present invention, it may also be possible to effect different variations and equivalent substitutions to this present invention. In addition, in particular situations or specific circumstances, it may be possible to make various modifications to this present invention without prejudice to the essence of this present invention. Therefore, this present invention is not limited to the disclosed implementation examples, and it should be allowed to encompass the full range of implementation schemes that fall within the scope of the request for this present invention.

[0081] Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

Claims

1. A movable vertical displacement device, used for multi-directional positioning synchronous-response for cover-activated vertical transfer action, the device comprising:

a chassis frame used for supporting a main body,

a vertical displacement mechanism attached to said chassis frame, which is also capable of rendering vertical transfer of said chassis frame, and

a backing base attached to a jewelry and to said vertical displacement action mechanism.

2. The movable vertical displacement device according to claim 1, wherein the chassis frame incorporates a stopper and the main body.

3. The movable vertical displacement device according to claim 1, wherein a delimiter lever assembly is fitted onto the aforesaid main body.

4. The movable vertical displacement device according to claim 1, wherein the movable vertical displacement mechanism comprises: a fixed base, a tube strut, a riser rod, an activation lever, and a transfer mechanism, with said tube strut being fixed onto the rigid base, said riser rod being encased in the tube strut, said transfer mechanism incorporating a rack and pinion set, said activation lever being attached onto the pinion gear and said pinion attached to the surface of the riser rod.

5. The movable vertical displacement device according to claim 1, wherein, diamonds or other gemstones are attached to the main body.

6. The movable vertical displacement device according to claim 1, wherein, the jewelry may include necklaces, watches, diamond rings, bracelets, armbands, brooches, pendants, or earrings.

7. The movable vertical displacement device according to claim 1, wherein the chassis frame incorporates a stopper and a main body, of which, the stopper is used for fixing a gemstone or diamond onto the main body, and is attached to the vertical displacement mechanism, allowing the gemstone or diamond to move up or down.

8. The movable vertical displacement device according to claim 4, wherein a gimbal, is fitted underneath the rigid base, allowing the base to tilt freely in any direction.

9. The movable vertical displacement device according to claim 4, wherein a lever is attached to the tube strut, and the chassis frame is attached to the top of the riser rod by a pin.

10. The movable vertical displacement device according to claim 9, wherein the pin is a U-shaped pin.

11. The movable vertical displacement device according to claim 9, wherein the pin is a straight pin.

12. The movable vertical displacement device according to claim 4, wherein the vertical displacement mechanism also incorporates a rack-locking buckle fitted onto the top of the tube strut.

13. A movable vertical displacement device comprising:

a chassis frame used for supporting a main body, wherein the chassis frame incorporates a stopper and a main body, on to which are attached diamonds or other gemstones;
a vertical displacement mechanism attached to said chassis frame and consisting of a fixed base, a tube strut, a riser rod, an activation lever, and a transfer mechanism, with said tube strut being fixed onto the rigid base, said riser rod being encased in the tube strut, said transfer mechanism incorporating a rack and pinion set, said activation lever being attached onto the pinion gear and said pinion attached to the surface of the riser rod; and
a backing base attached to a jewelry and to said vertical displacement action mechanism.

14. The movable vertical displacement device according to claim 13, wherein, the jewelry may include necklaces, watches, diamond rings, bracelets, armbands, brooches, pendants, or earrings.

15. The movable vertical displacement device according to claim 13, wherein the stopper is used for fixing a gemstone or diamond onto the main body, and is attached to the vertical displacement mechanism, allowing the gemstone or diamond to move up or down.

16. The movable vertical displacement device according to claim 13, wherein a gimbal, is fitted underneath the rigid base, allowing the base to tilt freely in any direction.

17. The movable vertical displacement device according to claim 13, wherein a lever is attached to the tube strut, and the chassis frame is attached to the top of the riser rod by a pin.

18. The movable vertical displacement device according to claim 13, wherein the pin is a U-shaped pin.

19. The movable vertical displacement device according to claim 13, wherein the pin is a straight pin.

20. The movable vertical displacement device according to claim 13, wherein the vertical displacement mechanism also incorporates a rack-locking buckle fitted onto the top of the tube strut.

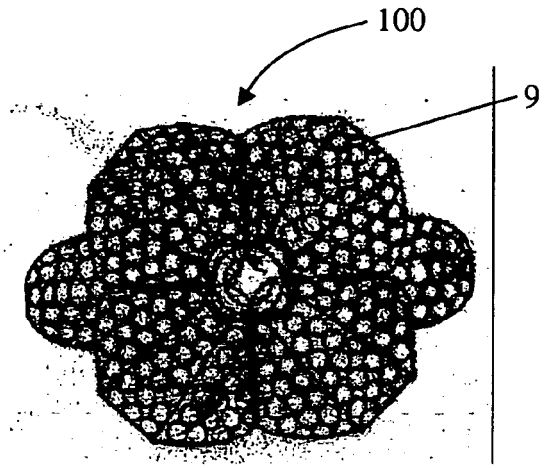

FIG. 1

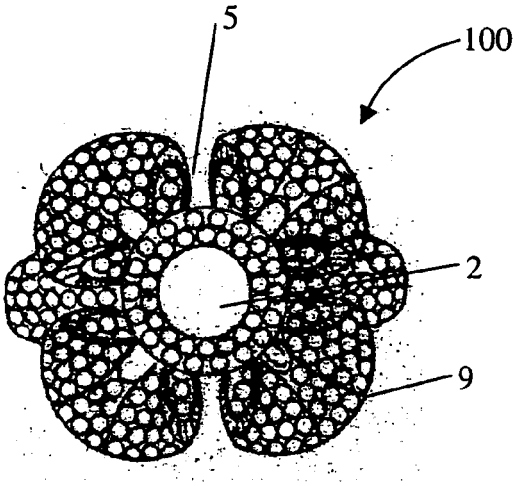

FIG. 2a

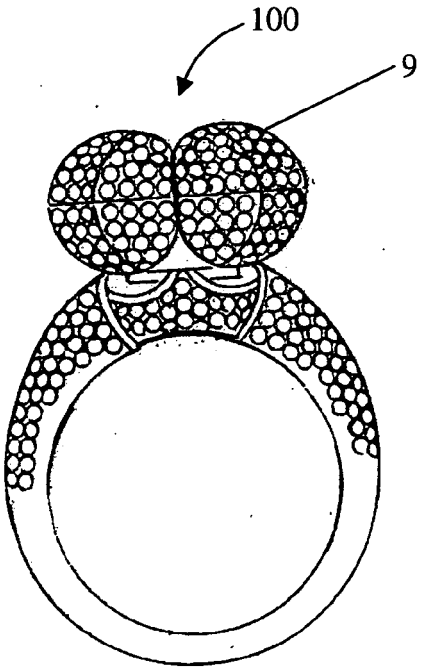

FIG. 3

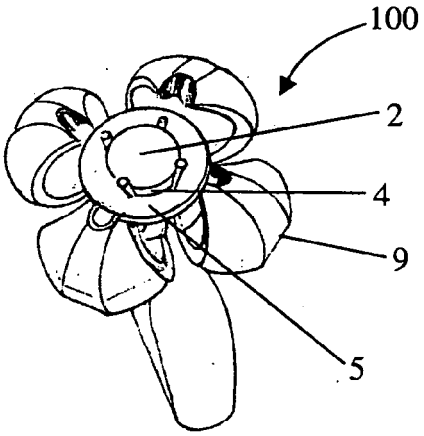

FIG. 4

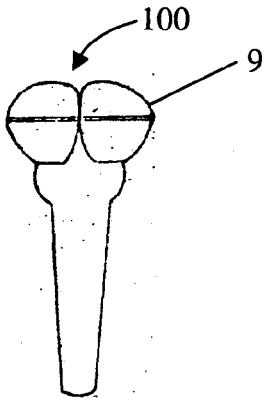

FIG. 5

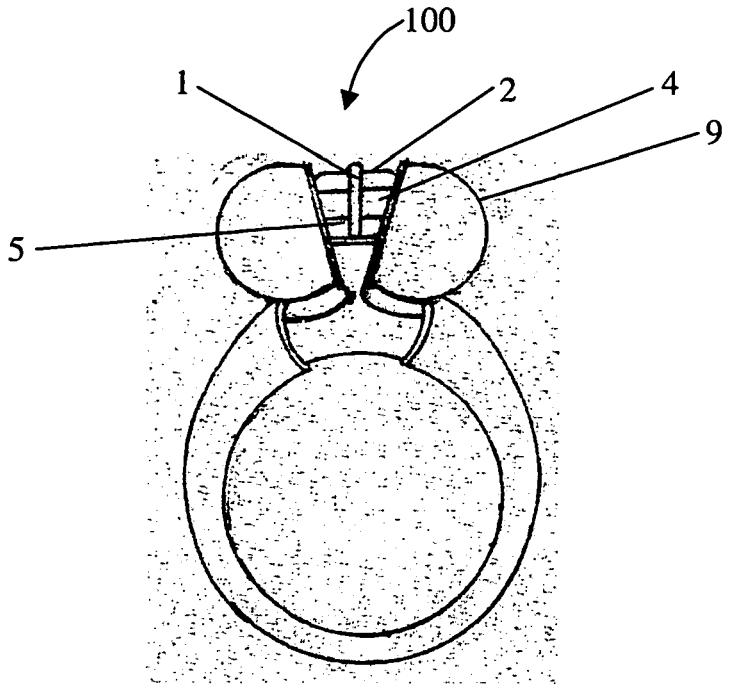

FIG. 6

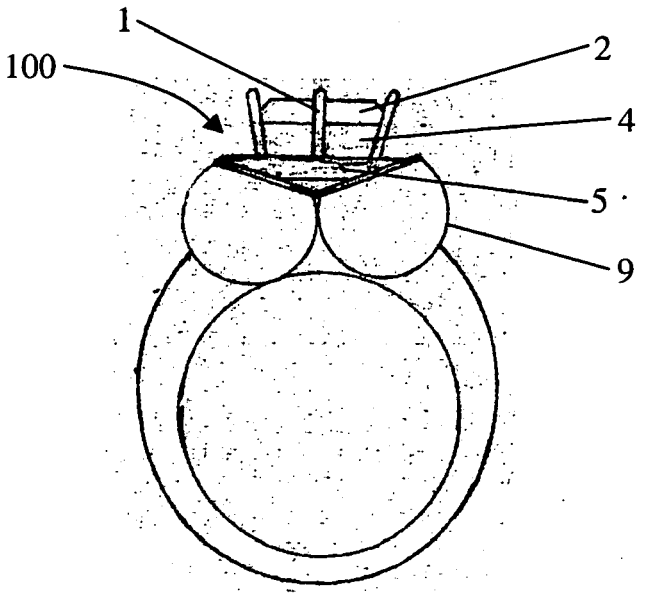

FIG. 7

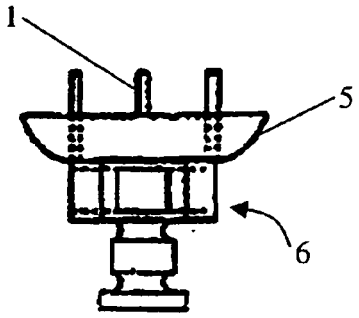

FIG. 8A

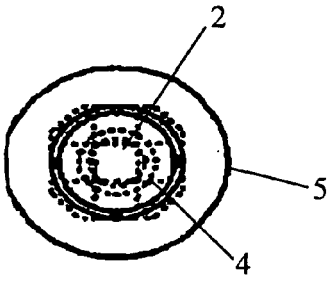

FIG. 8B

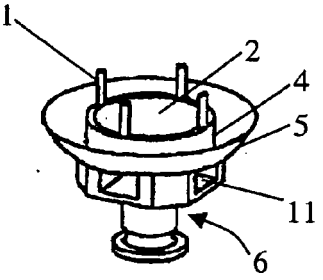

FIG. 8C

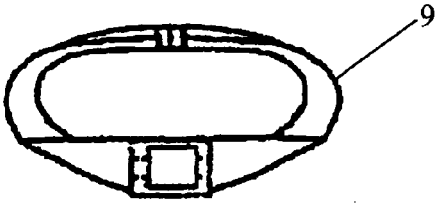

FIG. 9A

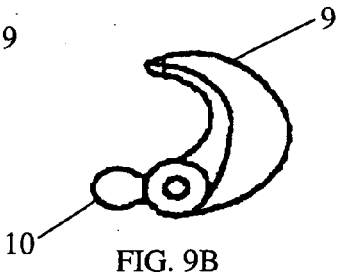

FIG. 9B

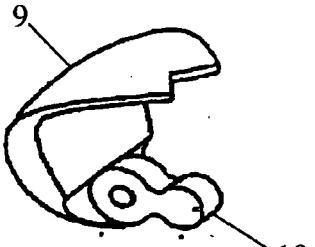

FIG. 9C

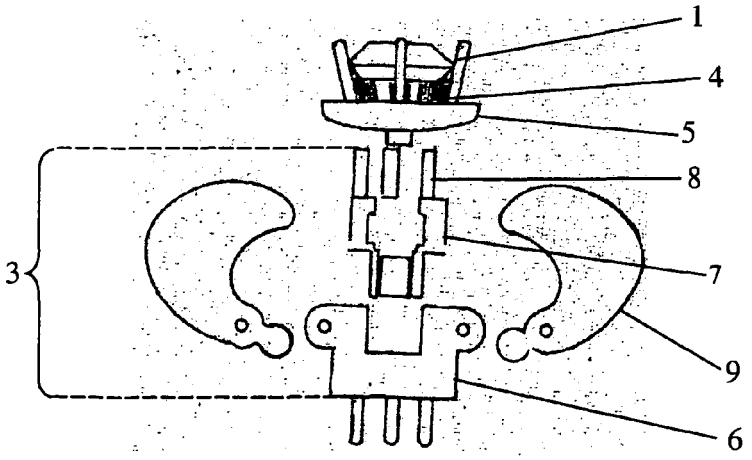

FIG. 10

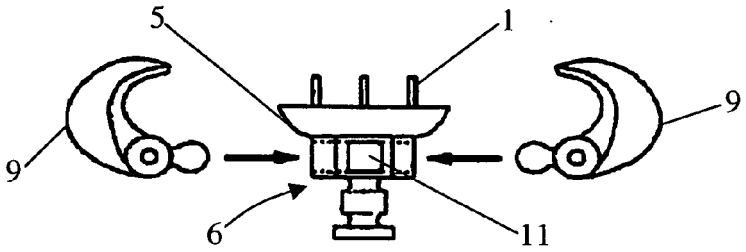

FIG. 11A

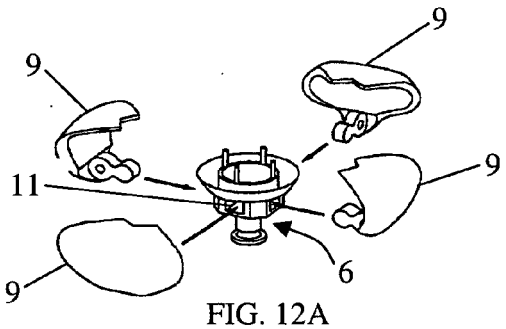

FIG. 12A

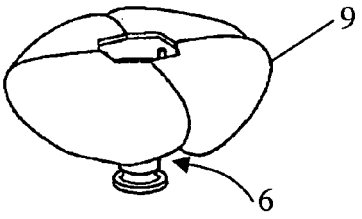

FIG. 12B

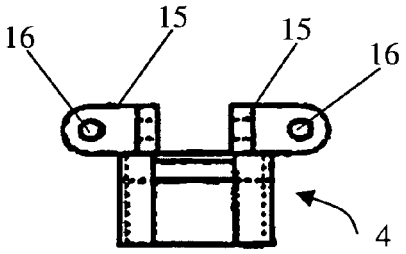

FIG. 13A

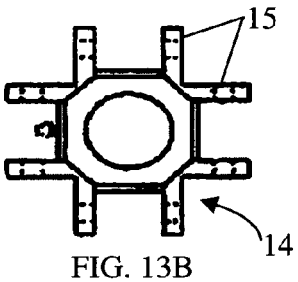

FIG. 13B

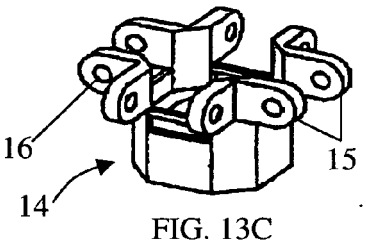

FIG. 13C

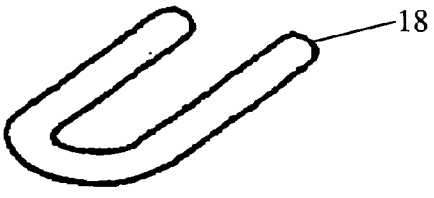

FIG. 14A

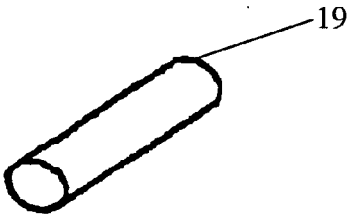

FIG.14B

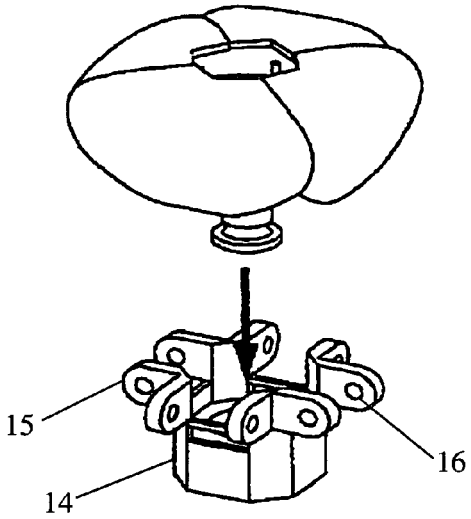

FIG. 15A

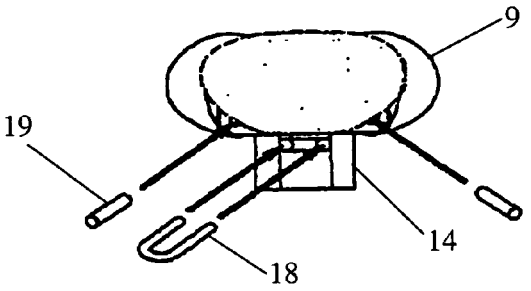

FIG. 15B

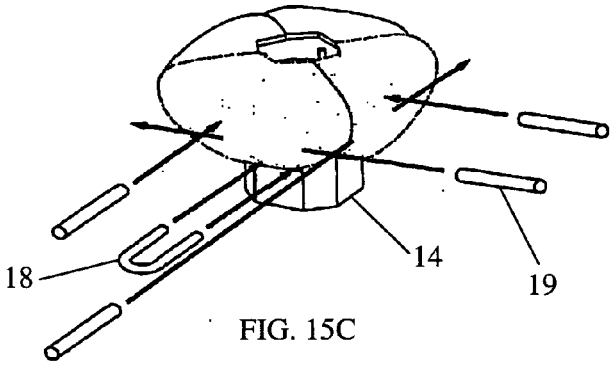

FIG. 15C

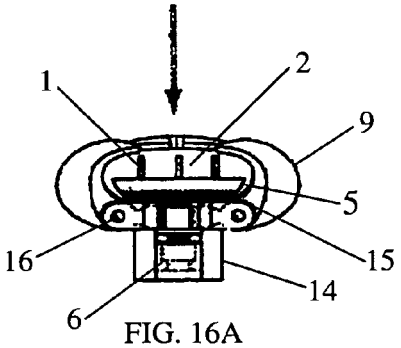

FIG. 16A

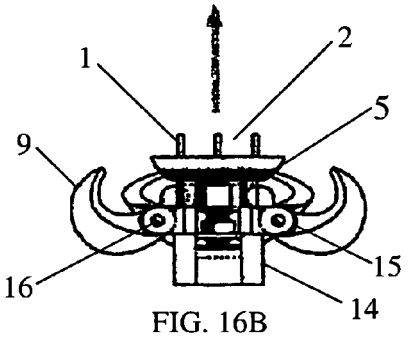

FIG. 16B

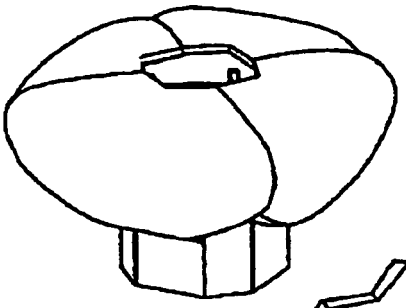

FIG. 17A

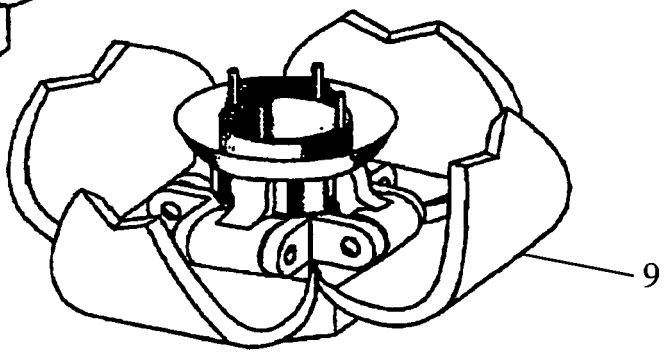

FIG. 17B

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EUROPEAN SEARCH REPORT

Application Number
EP 08 02 0181

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 790 517 A (LEO GRUNBERG) 12 February 1958 (1958-02-12) * figures 1-6 * * page 1, line 58 - page 2, line 106 * * page 3, lines 1-5 * -----	1-20	INV. A44C9/00 A44C17/02 G04B47/04
X	US 2003/192345 A1 (BRASSEM JAN W [US] ET AL) 16 October 2003 (2003-10-16) * abstract; figures 20-27 * * paragraphs [0039], [0047] - [0051] * -----	1-3,5-7	
X	WO 96/33633 A (HURON DIDIER [FR]; COUVRET STEPHANE [FR]) 31 October 1996 (1996-10-31) * abstract; figures 1-4 * * page 4, line 20 - page 6, line 9 * -----	1-3,5-7	

TECHNICAL FIELDS SEARCHED (IPC)

A44C
G04B
A41G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 April 2009	Contreras Aparicio

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