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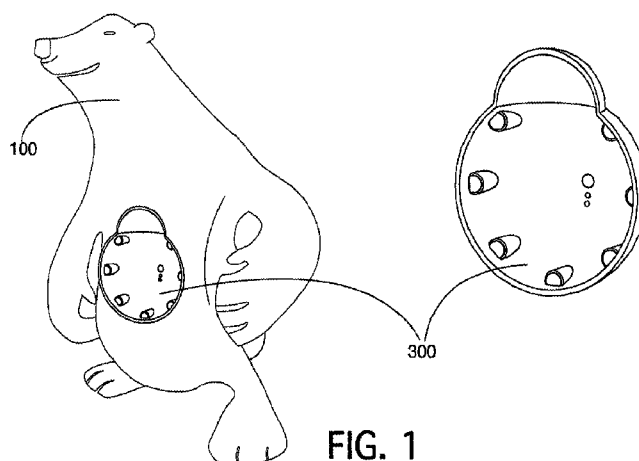


FIG. 1

(57) Abstract: The present invention relates to a game system for providing several kinds of game experiences, the game system comprising: - at least one interconnection toy device, the interconnection toy device comprising: - an interconnection toy device body, - a data processing unit connectable to a computer and/or network, and - a downward connection member for interconnecting with a reconnectable toy unit; - the reconnectable toy unit for repeated interconnection with the interconnection toy device, the interconnection toy device comprising: - identification means for identifying an individual reconnectable toy unit and/or a appearance features for recognizing a type of reconnectable toy unit; - such that many reconnectable toy units may be brought in connection with many interconnection toy devices, wherein a combination of a connection provides parameters of a game experience for providing at least one of the game experiences to a gamer.



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Game system, toy device, game environment definer and method.

5 The present invention relates to a game system.
Furthermore, the present invention relates to an intercon-
nection toy device. Furthermore, the present invention re-
lates to a reconnectable toy unit for repeated intercon-
nection with the reconnection client device. Furthermore,
10 the present invention relates to a game environment defin-
er for defining at least one environment for one or more
interconnection toy devices and or reconnectable toy
units. Furthermore, the present invention relates to a me-
thod for executing a game environment definer.

15 It is known that computers may be used for provid-
ing computer games that are displayable on screen of a
computer monitor or a television set. People of all ages
can find enjoyment by using such systems. It is however
perceived as a problem that the relatively young, such as
20 children of the teen or preteen age spend a large portion
of their time playing such computer games. The reason for
this is that such computer games are perceived as provid-
ing a limited experience, mainly based on the use of what
is visible on screen and an input device, such as a con-
25 troller. It is perceived as beneficial when children are
able to use more of their physical devices for e.g. ob-
taining a broad range of people skills.

In order to provide for at least a different experi-
ence from the known computer games, the present inven-
30 tion provides a game system for providing several kinds of
game experiences, the game system comprising:

- at least one interconnection toy device, the in-
terconnection toy device comprising:

- an interconnection toy device body,

- a data processing unit connectable to a computer and/or network, and

- a downward connection member for interconnecting with a reconnectable toy unit;

5 - the reconnectable toy unit for repeated interconnection with the interconnection toy device, the interconnection toy device comprising:

- a reconnectable toy unit body,

10 - an upward connection member for interconnecting with at least one of the interconnection toy devices,

- identification means for identifying an individual reconnectable toy unit and/or a appearance features for recognizing a type of reconnectable toy unit;

15 - such that many reconnectable toy units may be brought in connection with many interconnection toy devices, wherein a combination of a connection provides parameters of a game experience for providing at least one of the game experiences to a gamer.

20 At least one advantage of such a game system is that it allows for a combination of sensor technology, real toy and a virtual world in a computer facilitated game that is not attainable by known computer games. It is for example possible that a child equipped with an inter-
25 connection toy device has a lot of fun playing with the interconnection toy device. The interconnection toy device may be embodied as a fluffy cuddle, a flashy doll or an action figure, on the 1st look similar to the kind that children can play with for hours and have been playing
30 with for decades.

However, on the inside, the interconnection toy device is preferably equipped with a computing device and connection means for connecting with a computer and or a further play device, defined as a reconnectable toy unit.

Such a reconnectable toy unit may on the outside be shaped as a toy that may be part of the interconnection toy device, and/or an add-on to such a toy.

Such a combination of toys provide a surprising new game environment in which real world toys may also be usable in a computer game environment. One reason for this is that the interconnection toy device may also be connected to a game computer or a computer suitable for games in order to provide a computer game on the screen, which seems more conventional, but in which the above defined toys are represented on screen.

According to a first preferred embodiment, the interconnection toy device comprises:

- an interconnection toy device body,
- a data processing unit connectable to a computer and/or network, and
- a downward connection member for interconnecting with a reconnectable toy unit. An advantage of this interconnection toy device is that it is usable in a game system as defined in the above providing for similar advantages while using it.

According to a further preferred embodiment, a reconnectable toy unit is provided for repeated interconnection with the interconnection toy device for use in a game system according to the present invention, the reconnectable toy unit comprising:

- a reconnectable toy unit body,
- an upward connection member for interconnecting with a reconnectable toy unit,
- identification means for uniquely identifying an individual reconnectable toy unit and/or recognition means for recognizing a type or group of reconnectable toy units. An advantage of this reconnectable toy unit is that

it is usable in a game system as defined in the above providing for similar advantages while using it.

In a further preferred embodiment, the reconnectable toy unit comprises a micro computing device for storing and processing information, comprising a processor, a memory and a power storage device. An advantage thereof is that information may be incorporated into the game experience, which information relates to activities the game player performs with the reconnectable toy unit. For example when a game player connects the reconnectable toy unit to the interconnection toy device, this may be remembered by memory present in either of those devices. Upon later connection of the interconnection device with a game computer, information relating to the earlier interconnection may be used as parameters of the progress of game events in the on screen game. For example, the history of connections and disconnections may be replayed on screen.

In a further preferred embodiment according to the present invention may comprise a game system in which the interconnection toy device and the reconnectable toy unit comprise communication means for wired communications, such as by means of electrically conductive contact means. Advantages of such a communication means are that the connections and the communications may be provided in a durable way, connections may be easily made and the physical connection means may be used for providing power to the device and/or the unit.

In an alternative embodiment, the communications between the interconnection toy device and the reconnectable toy unit may be embodied wirelessly, the devices comprising communication means for wireless communications, such as Bluetooth, passive RFID, or near field communications. In such an embodiment, physical connectors are not necessary and the devices may be able to communicate even

at a certain distance allowed for by the communications technology. The communications may be made by handling the device and the unit this being played from other system components or by initiate in the communications by means of an on-screen graphical user interface.

Preferably, the interconnection toy device and the reconnectable toy unit comprise physical connection means, such as magnetic connection means, clickable connection means, snap on connection means. The said communication means provided for easy initiation of the connections used for the communications.

In a further preferred embodiment, the parts of the system comprise physical contact means that, while connecting the reconnectable toy units and the interconnection toy device, provide for 'always right' connections, such as coaxial circular connectors or connectors that are shaped for one specific physical interconnection. An advantage of such physical contact means is that a game play out with no technical background as to creating physical data connections is able to create a physical data connection.

Preferably, the reconnectable toy unit comprises physical recognition means, such as a predefined shape, a logo, a predefined character scheme, a predefined color scheme and/or a predefined coding scheme. Such physical recognition means allow for a range of recognizable reconnectable toy units that each has a different characteristic. According to an aspect of the present invention, the gameplay a may be faced with a goal of the game being accumulating as many of a set as possible, e.g. by collecting them. This may provide for economic people skills, such as trading skills learned or developed when obtaining such collections.

A further embodiment of the present invention provides a game system, in which the reconnectable toy unit comprises sensors for making measurements of gamer activity, such as movement e.g. by means of an inductive device, related to the content of the game experience and/or environmental parameters, such as time, light and temperature.

Reconnectable toy units according to this embodiment provides for further advantages in that a large number of game influencing parameters may be introduced. By means of the sensors, all kinds of parameters may be introduced into the game experience. The said thing that the device may be used for measuring physical gamer activity, such as the number of steps during a walk, and/or the speed of movement therewith.

Another example is a game in which a game player is constructed to obtain as much 'cold' as possible. This may be obtained by discovering that putting the reconnectable toy unit in a fridge obtained a relatively high level of 'cold' in the summer and/or that placing a reconnectable toy unit into a freezer obtained even better results. In order for the reconnectable toy units to obtain such measuring data, it is equipped with at least a thermometer and or a timer.

Another example is a game, in which a game player obtains points for the amount of light the reconnectable toy unit is exposed to. The innards of such a unit may comprise a light sensor or whereas the exterior of such a unit may be made to look like an eye.

Preferably, the interconnection toy device comprises communication means for wireless communication, such as wi-fi, and or wired communication, such as USB, with the computer and/or computer network. By means of any of such communication means they may be transferred for

obtaining a connection to the computer and for allowing gameplay on the computer based on real-world experiences with the reconnectable toy unit and the interconnection toy device.

5 A further preferred embodiment provides that at least one kind of the reconnectable toy units comprises softened components, such as plastic and or rubber components. Such features are helpful in obtaining a visual and tactile similarity of the reconnectable toy unit and be
10 interconnection toy device to 'real-world toys' coveted by children.

Preferably, reconnectable toy units are defined as forming a complete set of reconnectable toy units, each having distinct physical recognition means which are de-
15 signed for recognizing that the reconnectable toy unit are part of the complete set. Such features of a set of reconnectable toy units cater to the human nature of collecting items. Therefore, such a feature is quite enticing.

A further aspect of the present invention comprises
20 es a game environment definer for defining at least one environment for one or more interconnection toy devices according one or more of the preceding claims and/or reconnectable toy units according one or more of the preceding claims; the game environment definer comprising com-
25 puter readable code stored on a computer accessible medium for:

- executing a game environment creating computer program for rendering a visible or multimedia game environment to a gamer;
- 30 - executing program code for interconnecting with one or more of the interconnection toy devices and optionally thereto connected reconnectable toy unit having an association with the gamer;

- executing adaptive game creation steps for adapting the game experience based on data received during the interconnection step. The application of such a game environment definer provides enablement of creating an on-screen game environment in which parameters obtained while using the reconnectable toy device and the connectable ploy unit are instrumental in the gameplay. Because of this, it now becomes possible while employing the invention, to have children play with toys in a way that develops the real world people skills and physical agility and have the results thereof integrated into an on-screen computer game. Further advantages are set out in the remainder of this text.

Preferably, the game environment definer comprises means for providing at least one virtual item for association with at least one reconnectable toy unit and/or at least one interconnection toy device within the game environment, in which the virtual items are equipable with game experience features, such as appearance features, sound features and or point gaining capabilities. Ultimately, it may preferably look like the off-screen activities are actually represented on screen.

More specifically, the game environment definer comprises means for actually defining on screen items, such as an avatar, defining and manipulation means for defining and manipulation of characters that are either based on interconnection toy devices or on the definitions provided by a game player.

More specifically, it may be desirable that the game environment definer comprises means for advancing the game experience by means of influencing the game experience features of the virtual items based on features or variable values of connected or earlier connected reconnectable toy units. This may be partly enabled by the data

communications between computing devices in the interconnection toy designs and the reconnectable toy units.

In order for the game environment definer to render aspects of the game environment, the game environment
5 comprises environment divisions, such as islands, each capable of providing a distinct game experience based on game experience variables. The on screen representations of the interconnection toy device made be different from island to island. Also the behavior may be influenced by
10 the specific environment the avatar is present in on-screen. Also combinations of reconnectable toy units and interconnection toy devices may initiate different behavior or even different exteriors of one or the other.

Preferably, the game environment comprises computer
15 recreated renderings of the interconnection toy device according to one or more of the preceding claims and/or the reconnectable toy unit. Further renderings that are provided may comprise on screen world defining objects.

A further aspect of the present invention comprises
20 es a method for executing a game environment definer for defining at least one environment for one or more interconnection toy devices according to the present invention and/or reconnectable toy units according to the present invention; the method comprising steps for:

- 25
- executing a game environment creating computer program for rendering a visible or multimedia game environment to a gamer;
 - executing program code for interconnecting with one or more of the interconnection toy devices and optionally thereto connected reconnectable toy unit having an
30 association with the gamer;
 - executing adaptive game creation steps for adapting the game experience based on data received during the interconnection step.

A further aspect of the present invention comprises a computer program product storeable on a computer readable medium for providing a game environment according to the present invention.

5 Further advantages, features and details of the present invention will be further described on the basis of a number of embodiments, which will be described with reference to the accompanying figures.

10 Figure 1 shows a schematic perspective view of a 1st preferred embodiment of an interconnecting toy unit according to the invention and a detail thereof.

Figure 2A shows a schematic perspective view of the embodiment of figure 1.

15 Figure 2B shows a schematic representation of an electronic part of the embodiment of figure 1.

Figure 3 shows several views of a detail of the embodiment of figure 1 and a preferred embodiment of a reconnectable toy unit.

20 Figure 4 shows a representation of a further embodiment of a reconnectable toy unit.

Figure 5 shows a representation of a further embodiment of a reconnectable toy unit.

Figures 6-9 show representation of electronic components of further preferred embodiments.

25 Figures 10-13 show schematic representations of preferred embodiments of methods according to the present invention.

Figure 14 shows a flow diagram of a method according to the present invention.

30 Fig. 15 is a schematic representation of six preferred embodiments according to the present invention of reconnectable toy units.

Fig. 16 is a schematic representation of six further preferred embodiments according to the present invention of reconnectable toy units.

A first preferred embodiment according to the present invention (figure 1) is an exemplary children's toy in the form of a plastic polar bear figure [100] having a holding device [300] for holding reconnectable toy units which in this case are embodied as balls.

In figure 2, a schematic view of exemplary electronics [200] inside the plastic toy figure [100] are shown. A circuit board [200] comprises an RFID (radio frequency identification device) antenna device [220] comprising a spirally shaped antenna [230] and a radio frequency transmitter chip [240]. The RFID antenna activates the RFID tag [620] and transfers a stored unique ID number indicating a kind of ball when it comes in close range, e.g. closer than 5 cm. a technology that is also known as 'passive RFID' may be employed for this purpose. For each ball the tag ID is registered, so that the ball can be uniquely identified.

The circuit board [200] comprises a microchip [270], an on-board memory [260], comprising of a non-volatile programmable memory of one of a number of possible technologies, such as electrically erasable programmable (EEPROM also known as 'Flash memory'). It stores game data files that are to be installed when the toy is connected to the computer. In case the toy is relatively old, updates may be obtained via the Internet.

A USB Type-B female plug [210] as in FIG. 2B is connected to the board [200] and mounted onto the body of the toy in such a way to allow a USB cable with a Type-B plug [215] being connected to the toy from the outside as in FIG. 2C.

A multicolored LED [250] is connected to the circuit board [200] and attached to inside of the ring device [300]. The purpose of the multicolored LED is to show a certain colored light as soon as a pre-determined ball [400] has been inserted into the ring. The light shall lighten the ring device [300] and the half-transparent ball [400].

FIG. 3 shows a detail of stand alone construction drawing of the front- and backside of the ring device [300] and the ball [400]. The ring device has a bulge [350] to allow taking out an inserted ball with one finger. The ball fits into the hub ring device snugly and is held in its position by a magnet [320] and an e.g. metal counterpart on the ball [420]. When the contact between magnet and metal part is made, a characteristic 'click' sound is heard, which is referred to as the 'click'. By means of slots [410] in the side of the ball and inverse protrusions [310] on the ring device, we make sure the ball is always facing the right direction and the contacts fit onto each other.

A transfer of data between the ball [400] and the toy [100] is embodied by contacting metal parts as soon as the ball has been clicked into the ring device. Contact 1 is arranged between the outer ring [440] on the ball and the metal counterpart [340] on the ring device. Contact 2 is arranged between the middle ring [430] on the ball and the metal counterpart [330] on the ring device. The third contact GND (Ground) is arranged between the inner metal circle part [420] of the ball and the magnetic counterpart [320] on the ring device. Three connecting cables leading from the circuit board [200] to the back of the ring device [300] transfer data received from the inserted ball. The contacts of the cables are visible on the back of the ring device in FIG. 3.

FIG. 4 shows an example of an identification system behind the collector type of a ball [400]. Placed on the front is an image of a collector item [450], on the back is the affiliation image to a specific island [460] indicating that the ball is to be considered part of a set, visible on the side is the colored ring and the colored slots [455] showing the rareness and three metal rings of contact 1 [440], contact 2 [430] and contact GND (Ground) [420] for data transmission on the back of the ball;

FIG. 5 shows an example embodying the identification system with respect to the sensor type of a ball [400]. Arranged at the front is an image [450] and a symbol [465] reflecting a predetermined type of sensor placed inside the ball. On the back is the affiliation image with respect to a specific island [460] indicating the belonging of the ball to a certain group. The three metal rings of contact 1 [440], contact 2 [430] and contact GND (Ground) [420] for data transmission are on the back of the ball;

FIG. 6 shows a simplified schematic view of a circuit board [600] inside a collector type of a ball [400], comprising a microchip [610], a unique ID number being stored in the memory and the three cable connectors 1 [440], 2 [430], GND [420] leading to the outside metal rings of the ball for connection with the ring device [300]. Visible on the right side of Figure 6 is a schematic view of an alternative wireless data transmission by a RFID read/write system instead of the cable connection. The RFID tag mounted onto the circuit board comprises of an antenna [640], a microchip [630] with a stored unique ID number inside a vial [620] for protection from shock and vibration

FIG. 7 shows a simplified schematic view of the circuit board [600] inside a kinetic sensor type of an ball [400], comprising a microchip [610] with a stored unique ID number, a capacitor [650] for storing sensor data, an inductive copper wire coil with a movable magnet inside [660] and the three cable connectors 1 [440], 2 [430], GND [420] leading to the outside metal rings of the ball for connection with the ring device [300]. The kinetic ball stores energy accumulated by movement. Shake to charge. If left still, its energy will slowly fade. The active element is a coil with a movable magnetic core inside [660]. When the ball is shaken, the core vibrates in the coil and causes an electrical current to flow through the coil. The current is stored in a capacitor [650], which discharges slowly.

Shown on the right side of Figure 7 is a schematic view of an alternative wireless data transmission by a RFID read/write system. The RFID transponder chip [610] mounted on the circuit board transfers collected sensor data and the unique ball ID number on 13.59 MHz to the RFID antenna [230] inside the toy. It also functions as a charger, distributing the energy from the antenna coil of the RFID antenna device [220] inside the toy to the capacitor [650] as energy storage device.

FIG. 8 is a simplified schematic view of the circuit board inside a light sensor type of an ball [400], containing a microchip [610] with a stored unique ID number, a capacitor [650] for storing sensor data, a solar energy cell [670] and three cable connectors 1 [440], 2 [430], GND [420] leading to outside metal rings of the ball for connection with the ring device [300]. The light sensor ball is partly manufactured from semi-transparent material, allowing outside light to reach the solar energy cell [670] inside. When activated, power from the solar

cell is stored in the capacitor [650] , which discharges slowly.

Shown on the right side of Figure 7 is a schematic view of an alternative wireless data transmission by a RF-ID read/write system. The RFID transponder chip [610] mounted on the circuit board transfers collected sensor data and the unique ball ID number on 13.59 MHz to the RF-ID antenna [230] inside the toy. A further function that may be performed is charging, distributing the energy from the antenna coil of the RFID antenna device [220] inside the toy to the capacitor [650] as energy storage device.

FIG. 9 shows a simplified schematic view of the circuit board inside a temperature sensor type of a ball [400] , comprising a temperature sensor (thermistor) with a microchip [680] , which has a unique ID number stored. Three cable connectors 1 [440] , 2 [430] , GND [420] lead to the outside metal rings of the ball for connection with the ring device [300] . The temperature sensor ball stores energy as the difference between its inner temperature and the outside world. If it is placed hot or cold for a while and then taken back to room temperature, the difference will be it's energy value. The natural properties of the ball substance gives it enough thermal inertia.

Shown on the right side of Figure 7 is a schematic view of an alternative wireless data transmission by a RF-ID read/write system. The RFID transponder chip [610] that is mounted on the circuit board transfers collected sensor data and the unique ball ID number on 13.59 MHz to the RF-ID antenna [230] inside the toy. It also functions as a charger, distributing the energy from the antenna coil of the RFID antenna device [220] inside the toy to the capacitor [650] as energy storage device.

FIG. 10 is a schematic diagram illustrating system components, such as an interconnection toy device 100, a

reconnectable toy unit 400, a game computer or personal computer 101, a server 102 and a database 103. Between these devices information is exchanged when process steps of a method according to the present invention are performed. The method starts as follows. In the initial step a reconnectable toy unit -ball- is connected to an inter-connection toy device -toy-. Subsequently, a connection request 1 is transferred from the ball to the toy, and an acknowledge 2 is returned. In a further step, a connection is made between the toy and a PC 101. A connection request 3 is sent from the toy to the PC allowed by an acknowledged 4 from the PC to the toy. Subsequently information is sent from the toy to the computer for the gameplay by means of transmissions 5 with the return transmissions 6. During these transmissions, also information that is retrieved by the toy from the ball may be used. Such information may be processed by a processor of the toy but may also be sent to the PC unprocessed.

In step 7, a player login may be performed, after which information regarding the game, parameters, software version and the like are send to the server 102 for processing thereof. Based on the received information, the server will send a data request 9 to a database 103, the results of which the server will send back in step 11, after processing of the request in step 10. The server will send back game information to the PC in step 12. The PC may send a data information to the toy in step 12a. Update information may also be sent to the ball in step 13. After removal of the ball in step 14, information regarding such an event is sent to the PC in step 15. The information of step 15 may also comprise game updates. Information regarding removal of the ball may also be forwarded to the server and the database in the respective steps 16 and 17,

after which game that data information is returned to the PC in the steps 18 and 19.

Figure 11 schematically shows events when a ball is attached and/or removed from the toy. In step 21, who the ball is inserted into the connector off the toy and a connecting request is sent. The request is checked in step 22. In step 23 an acknowledge is returned to the ball. In step 24 the toy stores a ball connect event and any data regarding gameplay that is retrieved from the ball. In step 25, the toy processes a ball removal event.

Figure 12 is a representation of account creation steps for a game play out to create an account on the Internet server. In step 31, the player connects the toy to the PC in order to use toy data in the game play and for adding data relating to the toy into the account. In step 32, data pertaining to updating software in the toy is requested from the toy by the PC, software version information is sent to the PC in step 33. In step 34, account data is entered into the PC, which account data are sent to the server in step 35. In step 36 an acknowledge is returned from the server to the PC. Data pertaining to the account is stored in the database in step 37.

In figure 13, a flow chart regarding data accumulation by the balls is shown. The method starts in step 40. In step 41, the activity of the ball is measured by its sensors. Examples thereof are the measurement of the movement by an inductive device or a movement sensor, measurement of heat or cold by a temperature sensitive device, or measurement of light by a light sensitive device, as is described in the above. In step 42, the measured data are stored into a memory. Either the method returns in step 41 for more measurements or the method continues in step 43 when the ball is connected to the toy. In step 44 the accumulated data is read out and transmitted to the

toy. In step 45, the memory storage is to be sent and the method returns to step 41 for new measurements or the method is ended in step 46.

In figure 14, a flow chart is shown regarding a more high-level navigation through gameplay managing options. In step 51, the method starts. In step 52, it is determined whether the user is logged in already. In step 57 it is determined whether the user has an account. In case the user has no account, the user is requested to create an account in step 59, after which the user is added to the database in step 60. Upon creation of an account in step 59, the user logs in in step 58. In step 53, the personal screen is shown to the user.

In step 54, it is determined whether the player and played a certain module, also designated as island in the above, before. In case the user is new to the said module, information regarding the module is entered into the database in a user personalized manner. Herewith, it is taken into account what the parameters of the toy and/or the balls possessed by the user are. In step 55, personal Island information is retrieved from the database there are starts in step 56 the start screen of the specific game relating to this island is started. Again, use is made of all information regarding the toy and the balls the user possesses and that are relevant for the specific module that is played.

A further illustration of four exemplary components of reconnectable toy units, also indicated as a ball, and a connection to a device, also indicated as a toy, a computer with installed files for representing on screen gameplay 4;

A further illustration of the gameplay experience attainable is that the physical toy looks similar to the virtual character that is represented in on screen gamep-

lay. A character is available as real physical toy and also created as a virtual character which can be used for navigating in virtual world.

A further illustration of the gameplay experience attainable is by means of children connected with each other through interconnection toy device and the respective virtual characters inside a community in the internet. The gameplay experience is that children have with this system may be made interactive with that of other children by means of the central server via the Internet.

Further to previously described preferred embodiments of reconnectable toy units, a number of distinctly definable preferred embodiments of such reconnectable toy units will be described below. Under the umbrella of the present invention, a large number of game experiences may be performed, in which balls with a specific function may be used for gathering data, inputting data or outputting data. The way in which such activities are performed is different for each ball and provides a unique game experience. Below, the balls will be described with the technical features that are specific to each ball in conjunction with possible game experiences that each ball helps provide.

The balls to be described referring to Fig.15 and Fig. 16, are dockable in the docking unit 100 according to the present invention. To this end, the docking characteristics may be the same as with previously described balls. For the purpose of conciseness of this description, only the functional parts that are different from previously described balls are described in order to provide disclosure as to the function of the specific embodiment.

Fig.15 A shows a dockable ball with a soft shell 701 that is compressible in the direction of the arrows A. In case a person squeezes the ball, the shell will be compressed and the interior of the ball will be smaller

than without the ball being compressed. The outer shell is air tight, which means that the interior pressure of the ball rises under compression. A consequence is that a pressure sensor 702 is sensing a higher pressure. Even if
5 the seal of the ball is somewhat porous, the pressure will rise during squeezing of the ball. A processor 705 and/or counter inside the ball make and the number of times the ball is being squeezed and/or the total amount of squeezing pressure that has been applied by a number of squeez-
10 ing actions. To this end, the pressure sensor may be connected to the processor 705, a memory 706 and a battery or other power supply 708, such as a capacitor.

The results of this squeezing action may be reflected during gameplay by means of actions of characters
15 or avatars in the game. Several examples of these comprise e.g. actions charging a mechanically chargeable pocket light such as by means of squeezing a dynamo, a form of hugging between characters, and or a representation of how deep the ball is underwater. This last example may be em-
20 bodied by an assignment emanating from the game to hold the ball in a body of water, thereby letting the pressure squeeze the ball and increasing the pressure in the ball. One rationale behind this concept is teaching how water exerts pressure on an object. Such a sensor may be called
25 an SMD sensor

In figure 15 B., a similar ball is shown with a soft shell 701. Inside the ball, a similar body of electronics with a processor 705, a battery 708 and a memory 706 is. Instead of a pressure sensor, a bending sensor embodied as a piezoelectric element 709 is arranged in the
30 ball. As the shell of the ball was soft, this element can be squeezed, thereby generating a signal indicating the extent of the bending of the piezoelectric element. An example of such a piezoelectric element functions such that

the resistance changes depending on the bending force or bending shape of the element. The resistance decreases when the element is bent. An exemplary element has a length of e.g. 4 and 1/2 inch.

5 In figure 15 C., a similar ball according to Fig. 15 B is shown. This ball has a soft outer shell and a hard inner shell with a top opening and a bottom opening. The hard inner shell provides a firmness to the ball and provides an indication as to where the ball should be pinched
10 in order to achieve the effect of activating the piezoelectric element 709 that is arranged between the hard shell and the soft shell of the ball. The piezoelectric element 709 may also be arranged on the inside of the hard shell.

15 A further preferred embodiment, Fig. 15 D is the designed in order to be able to register movements of the ball. During gameplay, is ball maybe used for simulating shaking, throwing and catching, or bouncing of a ball. In order to achieve this, inside the ball a tube is arranged
20 that is closed at two ends with a spring 713 arranged at both ends on the inside of the tube. Around substantially the middle of the cube, a coil is arranged, which coil is connected to a similar body of electronics as described before in conjunction with e.g. figure 15 A. Inside the
25 cube, a magnet 715 is arranged. When the magnet is being tossed about between the 2 ends of the tube, a signal is being induced in the coil for e.g. taking movement measurements or generating electrical power or both. Instead of applying springs, opposing magnets to the middle magnet
30 may be used at the end of the tube.

A further embodiment as shown in figure 15 E may comprise a dynamo that is activated by rotating halves of the ball with respect to each other. The intended gameplay aspect of this one is that the twisting on the ball may

simulate a water whirl or the rotation of a person dancing. The ball is embodied by 2 halves 716, 717 that are interconnected by means of an edge profile comprising a ridge 718 that fits into a groove 719. The dynamo is embodied in such a way that it functions within this ball wherein one functional part of the dynamo is connected to the half 716 and the other functional part of the dynamo is connected to the half 717. In this embodiment, the magnet 727 of the dynamo is connected to the upper half that is rotatable with respect to the lower half. The coil 726 of the magnet is connected to the lower half. The halves are rotatable along the arrows C. and D. indicated adjacent to the ball. The resulting signal from the coil may be taken in by a rotation counter or an energy store for use in the game play and feed back to the hub and the computer at some point. In case the energy store has a relatively high energy loss, the energy count needs to be fed into the hub relatively soon after the action. In case the energy store is capable of storing the charge for longer periods of time, such as days, weeks or months, the ball may be used for longer accumulative measurements. In case a counter for rotations is included, these measurements may be used in the game play at any time. In case a processor for processing data regarding the measurements or rotation is included, the data may be digitized in a way known by the expert and the digitized information may be transferred to the hub and or computer.

In a similar manner, the dynamo ball is formed from 2 halves 721, 722 of a ball that are mutually connected by means of an axle 723, by means of which the both halves are rotatable with respect to each other along the arrows C. and E. also in this embodiment each half of the ball comprises a part of a dynamo. Both of these rotating embodiments may be used for measuring a number of rota-

tions and or for producing electrical energy. Both the number of rotation and the amount of electrical energy generated may be used as input for a game to play, e.g. for creating points.

5 In figure 16 A., a ball is shown that is suitable for measuring a number of movements of the ball, however in a different way than in ball 15 D. In this ball, a so-called reed sensor 731 is arranged. This reed 734. When the ball is being shaken, the magnet will move along the
10 reed sensor thereby introducing the sensor to connect and disconnect at every pass by. The signal that can be derived therefrom by means of an already described body of electronics may be used for counting the number of times the ball is shaken for the purpose of using this informa-
15 tion during gameplay.

It is possible to shake the ball when it is not connected to the hub and later use the measurements or to have the ball connected to the hub by means of a wire. The ball may be used as a step counter. The speed at which the
20 shaking of the ball is performed maybe influencing the gameplay experience as well in order to guide the magnet, the magnet may be arranged inside a tube inside the ball which makes sure the ball is passing by the reed sensor at close range.

25 This ball may also be used for sensing whether the ball is close to an e.g. iron surface, in which case the magnet may be pulled away from the reed sensor. A reed sensor may be present near the surface of the ball and may react to the presence of the magnet when the ball is at-
30 tached to a steel surface by means of the magnet. During game play, a child may have to find a number of metal surfaces and subsequently attaching the ball by means of the magnetic force to each of the surfaces, the number of surfaces scored leading to a high score in the game play.

Another game play of such a ball may be that a certain rhythm is indicated by the computer that has to be replayed by the game player.

In Fig. 16 B, the ball is provided with a microphone 741 connected to a processor, power source and memory. This arrangement is programmed to detect a certain way of using one's voice, such as a tone of voice for negotiation, discussion, singing and or for detecting emotions such as being happy, being angry or being sweet. During game play, a person can be instructed to use this voice in order to emulate such tones of voice as indicated. In case the insurgents are performed well, points are gained during such use, the ball may be permanently connected to the hub.

Another game play experience that maybe obtained by using such a ball is instructing a person to shout or scream, to which the appropriate volume has to be obtained. Also sounds may be produced during game play which needs to be emulated by the person, the microphone being instrumental in picking up the emulation in order for the body of electronics to send the results to the hub. This process, the ball may be attached to the hub or maybe attached later to the hub.

Another game play experience provisioned by the present invention is providing the ball with a timer or assigning a time to a number of twists of a ball according to the embodiments of Fig. 15 E. and F. One form of game play may be that certain actions have to be performed within that specific time period. Another form of game play may be that a certain amount of time is shown to pass after which the game player has to perform a number of rotations indicative of the same time.

The embodiment of figure 15 E. provides means for measuring of a trajectory in which the ball is moved. The

ball comprises a ring or oval ring 745 in which a ball 746 is arranged. At one or more locations of the ring, a coil is arranged around the ring for sensing a pass through of the ball 746 through the coil. When the user moves the ball in such a way that the ball 746 keeps circling the ring high game points can be achieved.

A further embodiment, figure 15 D., provides a ball with a coil 748. This ball is intended for sensing magnetic fields, in case the user moves the ball relative to a device and making a magnetic field, this will be sent and information that will be stored in a body of electronics in the ball. When the ball is being reattached to the hub, information as to the magnetic Fields detecting score will be transferred to the hub can be used in the game play. Preferably, the ball is being equipped with a speaker device for providing feedback on the sensed intensity of the magnetic field. Sources of magnetic field that may be used our televisions, microwave devices, speaker device is and other electrical devices. The person using this ball may learn what kind of devices are emanating magnetic fields and whether those magnetic fields are strong or weak.

A further embodiment is shown in figure 15 E., in which the ball is provided with 2 holes for blowing air in and through the ball, which flow is registered by means of a sentence or 752, which may be a flow sensor or a microphone. And the fact of this that may be used during game play is that a number of blows provides for blowing away leaves on a path for cleaning that path or for advancing a sailboat in the wind. The microphone may be a piezo microphone.

The embodiment of Fig. 15 F. comprises an already described body of electronics as well as a color sensor at the surface of the ball. During game play is sensor may be

used for holding the ball adjacent a surface that has an indicated color. During game play the instruction may be to hold the ball close to a blue surface in order for the game player to prove its knowledge of colors, the affected being achieved in the game e.g. being that a door opens that has the specific color that was indicated. Moving the ball along a surface with a certain color may provide the fact that in the game another surface is being painted that same color.

10 In a further embodiment, the balls are provided with RFid transponders for allowing the balls to intercommunicate. During game play, these may be used for sharing information about each other's balls thereby creating so-called friends. Another objective is that certain characteristics as obtained game powers may be shared among each others.

The present invention is described on the basis of several embodiments, the different aspects of which can be readily varied by the skilled person within the concept of the present invention. Specifically, several components like processor, memories and energy storages may be used in all sorts of reconnectable toy units in ways that are derivable from this document. The embodiments are not limiting for the scope of protection of this text. The rights sought are defined by the appended claims.

CLAIMS

1. Game system for providing several kinds of game experiences, the game system comprising:

5 - at least one interconnection toy device, the interconnection toy device comprising:

- an interconnection toy device body,
- a data processing unit connectable to a computer and/or network, and

10 - a downward connection member for interconnecting with a reconnectable toy unit;

- the reconnectable toy unit for repeated interconnection with the interconnection toy device, the reconnectable toy unit comprising:

15 - a reconnectable toy unit body,
 - an upward connection member for interconnecting with at least one of the interconnection toy devices,

20 - identification means for identifying an individual reconnectable toy unit and/or a appearance features for recognizing a type of reconnectable toy unit;

 - such that many reconnectable toy units may be brought in connection with many interconnection toy devices, wherein a combination of a connection provides parameters of a game experience for providing at least one of
25 the game experiences to a gamer.

2. An interconnection toy device for use in a game system according to claim 1, the interconnection toy device comprising:

30 - an interconnection toy device body,
 - a data processing unit connectable to a computer and/or network, and

- a downward connection member for interconnecting with a reconnectable toy unit.

3. A reconnectable toy unit for repeated interconnection with the interconnection toy device for use in a game system according to claim 1, the reconnectable toy unit comprising:

- a reconnectable toy unit body,
- an upward connection member for interconnecting with a reconnectable toy unit,
- identification means for uniquely identifying an individual reconnectable toy unit and/or recognition means for recognizing a type or group of reconnectable toy units.

15

4. Reconnectable toy unit according to claim 3 comprising a micro computing device for storing and processing information, comprising a processor, a memory, and/or a power storage device.

20

5. Game system according to one or more of the preceding claims in which the interconnection toy device and the reconnectable toy unit comprise communication means for wired communications, such as by means of electrically conductive contact means.

25

6. Game system according to one or more of the preceding claims in which the interconnection toy device and the reconnectable toy unit comprise communication means for wireless communications, such as Bluetooth, passive RFID, or near field communications.

30

7. Game system according to one or more of the preceding claims in which the interconnection toy device

and the reconnectable toy unit comprise physical connection means, such as magnetic connection means, clickable connection means, or snap on connection means.

5 8. Game system according to one or more of the preceding claims in which physical contact means that during the reconnectable toy unit and the interconnection
10 plate the size provide for 'always right' connections, such as coaxial circular connectors or connectors that are shaped for one specific physical interconnection.

 9. Game system according to one or more of the preceding claims, in which the reconnectable toy unit comprises physical recognition means, such as a predefined
15 shape, a logo, a predefined character scheme, a predefined color scheme and/or a predefined coding scheme.

 10. Game system according to one or more of the preceding claims, in which the reconnectable toy unit comprises sensors for making measurements of gamer activity,
20 such as movement e.g. by means of an inductive device, related to the content of the game experience and/or environmental parameters, such as time, light and temperature.

25 11. Game system according to one or more of the preceding claims, in which the interconnection toy device comprises communication means for wireless communication, such as wi-fi, and or wired communication, such as USB,
30 with the computer and/or computer network.

 12. Game system according to one or more of the preceding claims, in which at least one kind of the reconnectable toy units comprises softened components, such as plastic and or rubber components.

13. Game system according to one or more of the preceding claims, in which a number of reconnectable toy units are defined as forming a complete set of reconnectable toy units, each having distinct physical recognition means which are designed for recognizing that the reconnectable toy unit are part of the complete set.

14. Game environment definer for defining at least one environment for one or more interconnection toy devices according one or more of the preceding claims and/or reconnectable toy units according one or more of the preceding claims; the game environment definer comprising computer readable code stored on a computer accessible medium for:

- executing a game environment creating computer program for rendering a visible or multimedia game environment to a gamer;
- executing program code for interconnecting with one or more of the interconnection toy devices and optionally thereto connected reconnectable toy unit having an association with the gamer;
- executing adaptive game creation steps for adapting the game experience based on data received during the interconnection step.

15. Game environment definer according to claim 14 further comprising means for providing at least one virtual item for association with at least one reconnectable toy unit and/or at least one interconnection toy device within the game environment, in which the virtual items are equipable with game experience features, such as appearance features, sound features and or point gaining capabilities.

16. Game environment definer according to claim 14 or 15, comprising character, such as an avatar, defining and manipulation means for defining and manipulation of characters that are either based on interconnection toy devices or on the definitions provided by a game player.

17. Game environment definer according to claim 14, 15 or 16 further comprising means for advancing the game experience by means of influencing the game experience features of the virtual items based on features or variable values of connected or earlier connected reconnectable toy units.

18. Game environment definer according to any of the claims 14 through 17, in which the game environment comprises environment divisions, such as islands, each capable of providing a distinct game experience based on game experience variables.

19. Game environment defined our according to any of the claims 14 to 18 comprising computer recreated renderings of the interconnection toy device according to one or more of the preceding claims and/or the reconnectable toy unit.

20. Method for executing a game environment definer for defining at least one environment for one or more interconnection toy devices according one or more of the preceding claims and/or reconnectable toy units according one or more of the preceding claims; the method comprising steps for:

- executing a game environment creating computer program for rendering a visible or multimedia game environment to a gamer;

5 - executing program code for interconnecting with one or more of the interconnection toy devices and optionally thereto connected reconnectable toy unit having an association with the gamer;

10 - executing adaptive game creation steps for adapting the game experience based on data received during the interconnection step.

21. Computer program product storeable on a computer readable medium for providing a game environment according to one or more of the claims 14 to 19.

15

22. A reconnectable toy unit for repeated interconnection with the interconnection toy device for use in a game system according to claim 1, the reconnectable toy unit comprising:

20

- a reconnectable toy unit body,
- an upward connection member for interconnecting with a reconnectable toy unit,

25 - identification means for uniquely identifying an individual reconnectable toy unit and/or recognition means for recognizing a type or group of reconnectable toy units.

23. A reconnectable toy unit according to claim 1, in which the reconnectable toy unit is substantially
30 shaped like a ball for providing a form factor for use during game play.

24. A reconnectable toy unit according to claim 1 or 2 comprising an energy transformation element, such as

a sensor, an electric signal generator or an electric current generator, for providing collectible information as to the use of the reconnectable toy unit.

5 25. A reconnectable toy unit according to claim 3
in which the energy transformation element comprises a
pressure sensor, a bending sensor, such as a piezo ele-
ment, a temperature sensitive element, a temperature capa-
citive element, a movement sensor, such as a coil and
10 suitably movably arrange able magnet, a solid-state move-
ment sensor or a gyroscope, and electric generator, such
as comprising 2 coils with a centrally arranged magnet, a
shock sensor, such as comprising a Reed switch, a micro-
phone, such as a Piezo based microphone, a trajectory sen-
15 sor, a magnetic field sensor, such as comprising a coil, a
magnetic field deformation sensor and/or a color sensor,
such as comprising a photographic diode and an optical
filter.

20 26. A reconnectable toy unit according to any of
the preceding claims comprising an RFid sending and or re-
ceiving unit.

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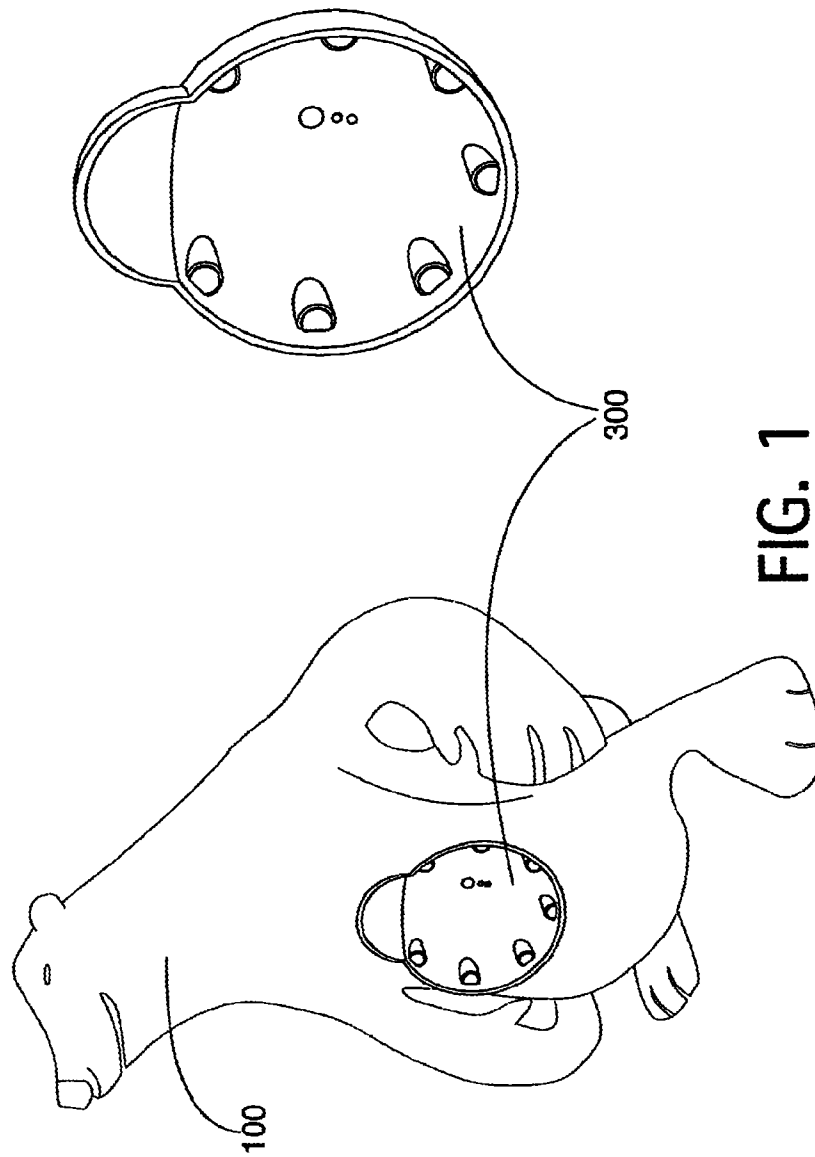


FIG. 1

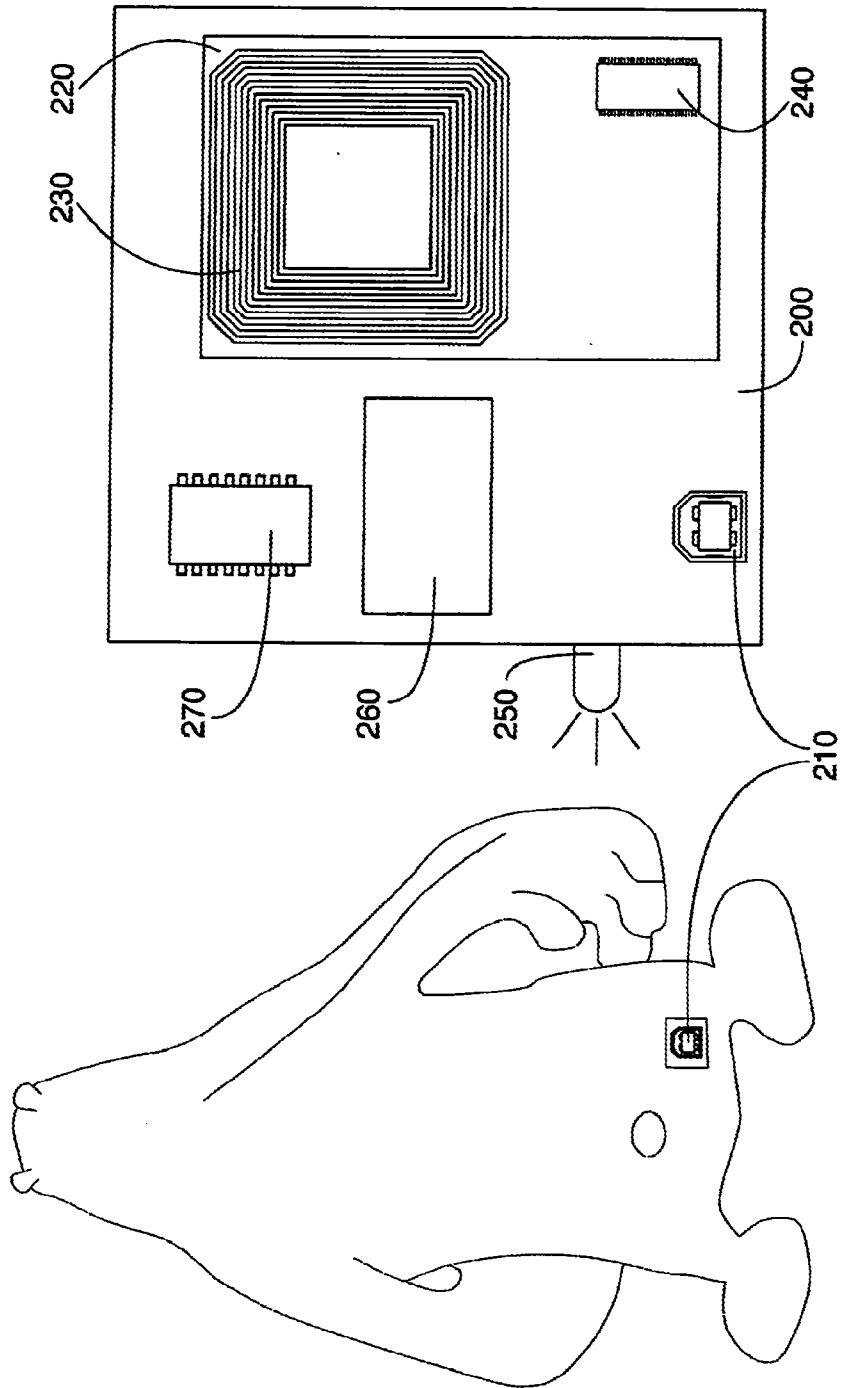


FIG. 2B

FIG. 2A

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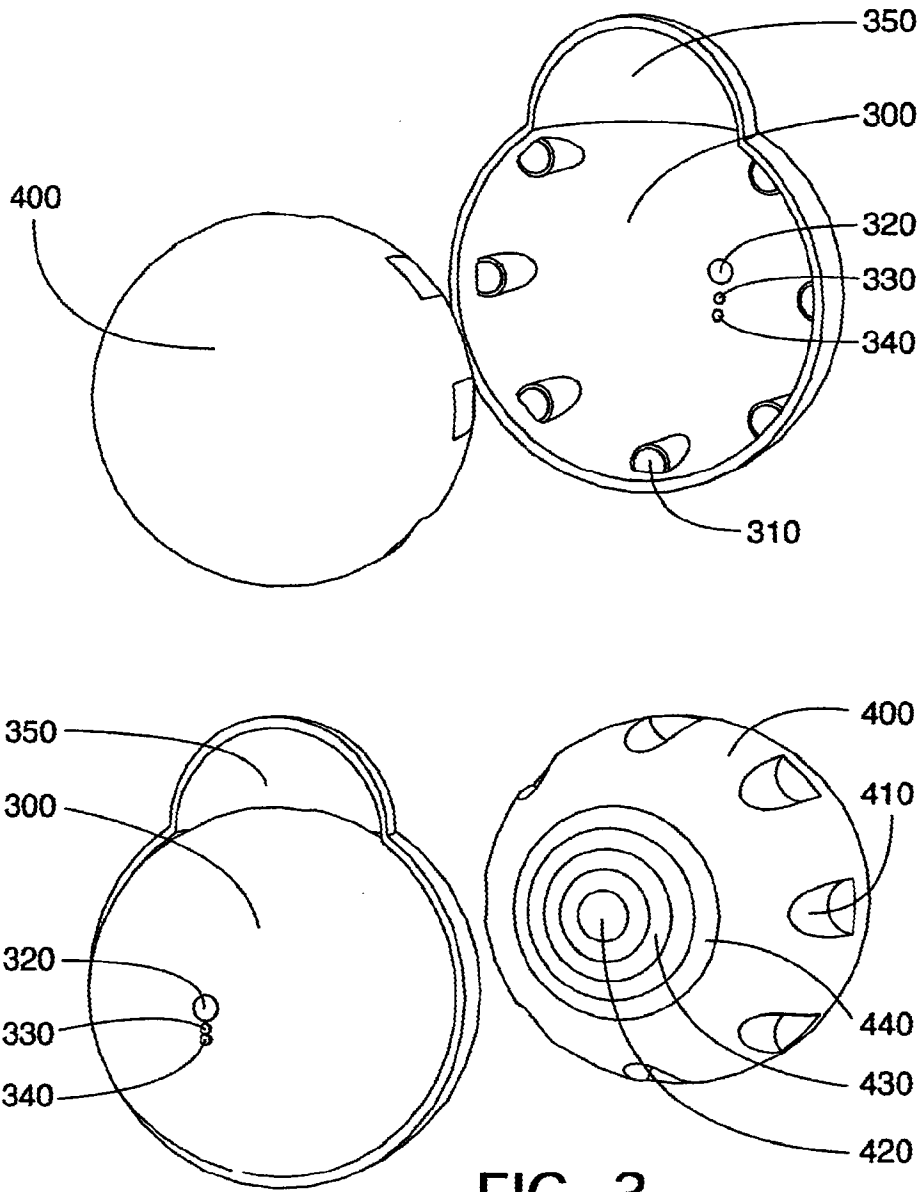


FIG. 3

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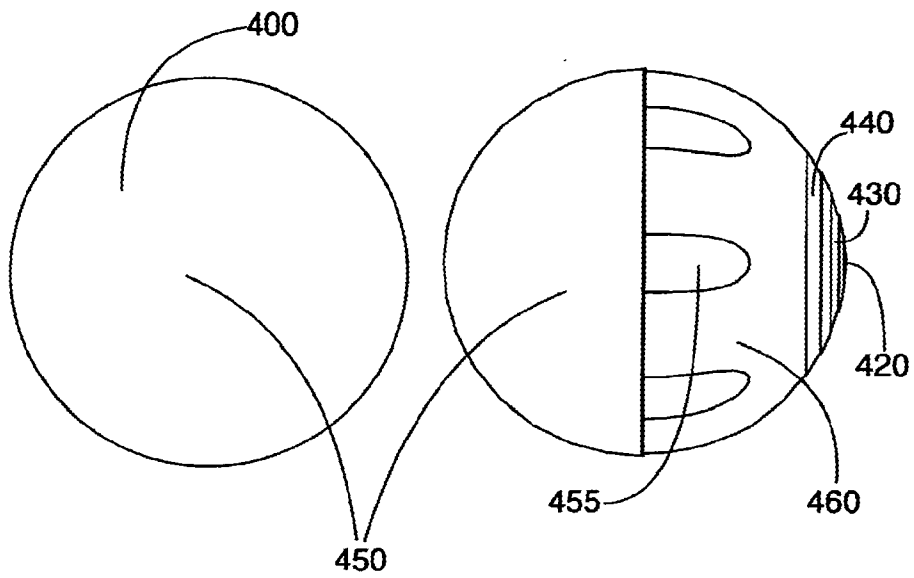


FIG. 4

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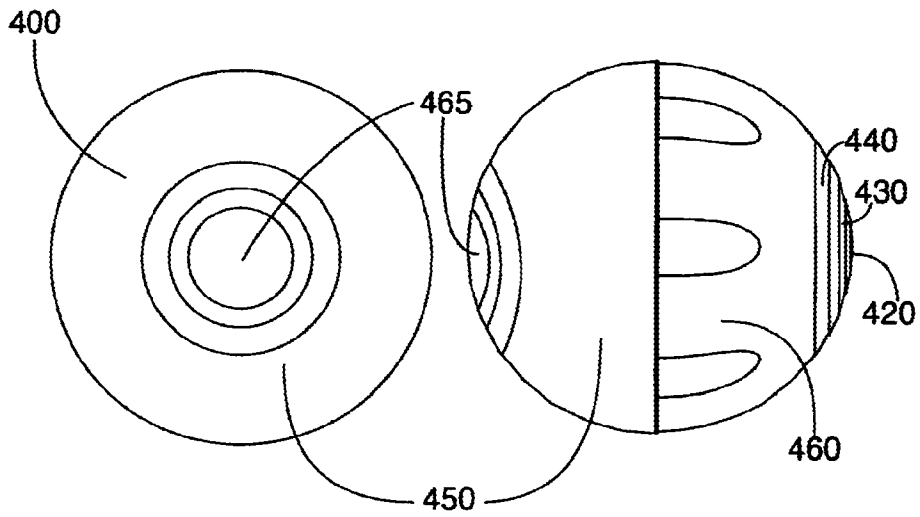


FIG. 5

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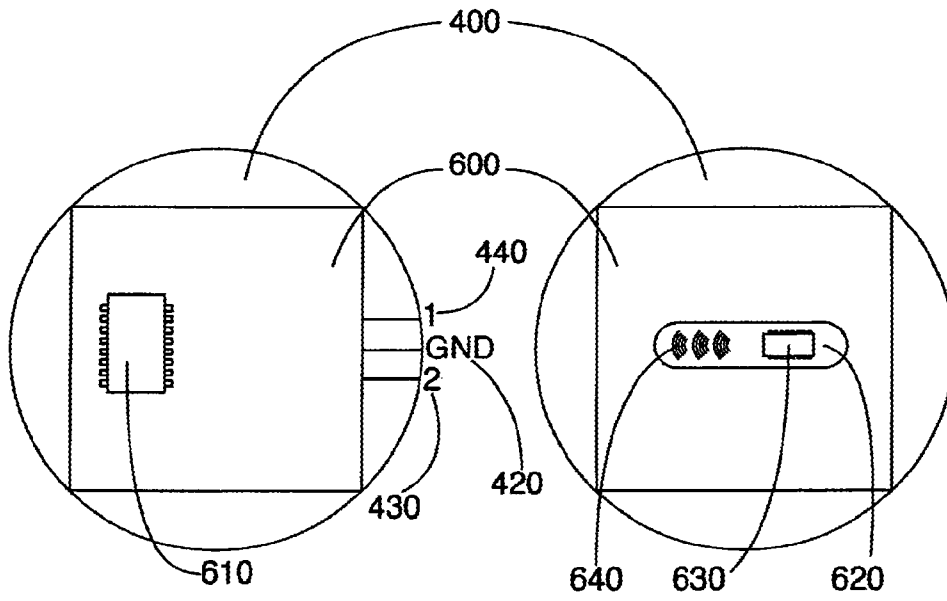


FIG. 6

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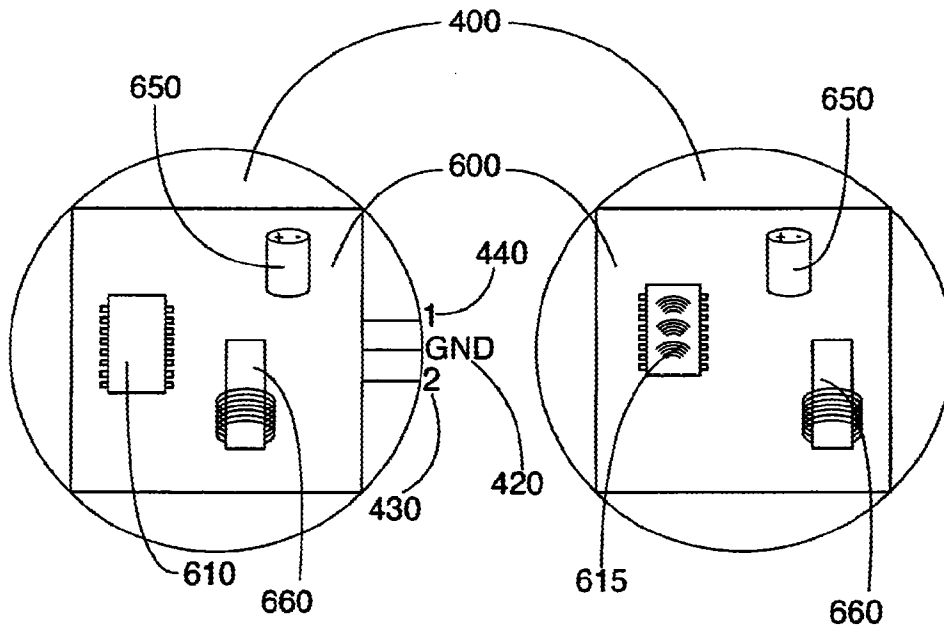


FIG. 7

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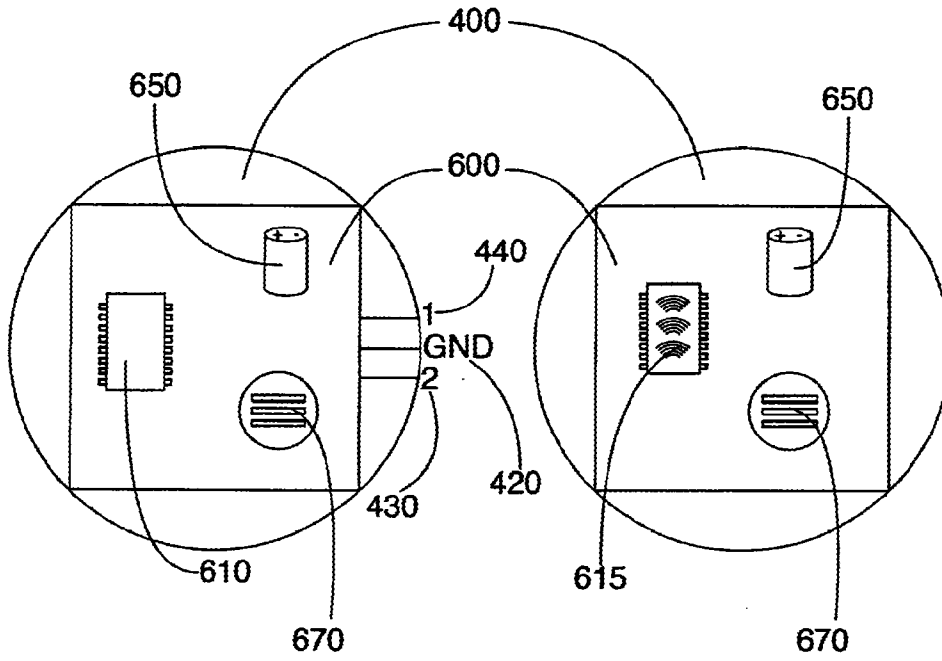


FIG. 8

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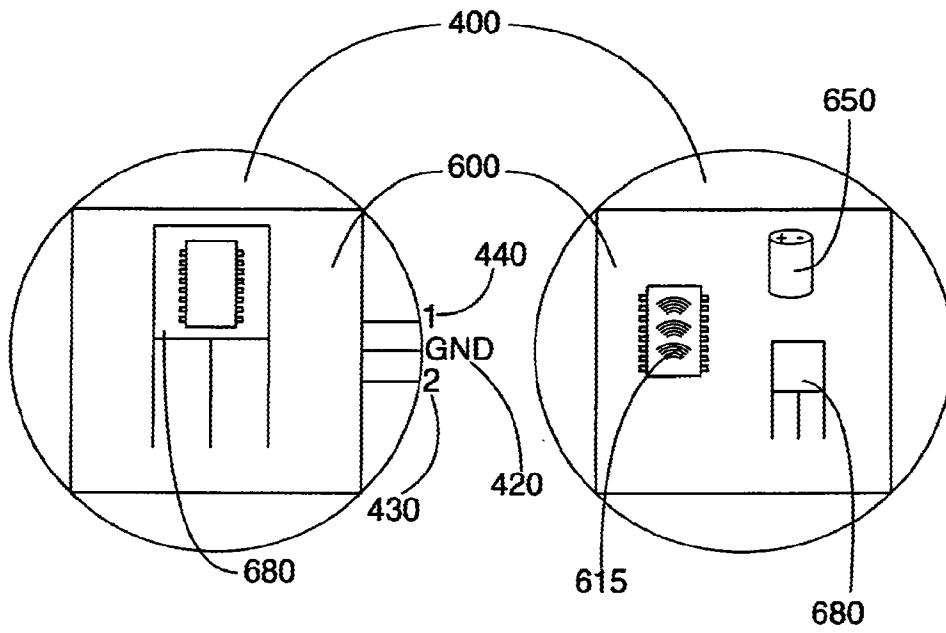


FIG. 9

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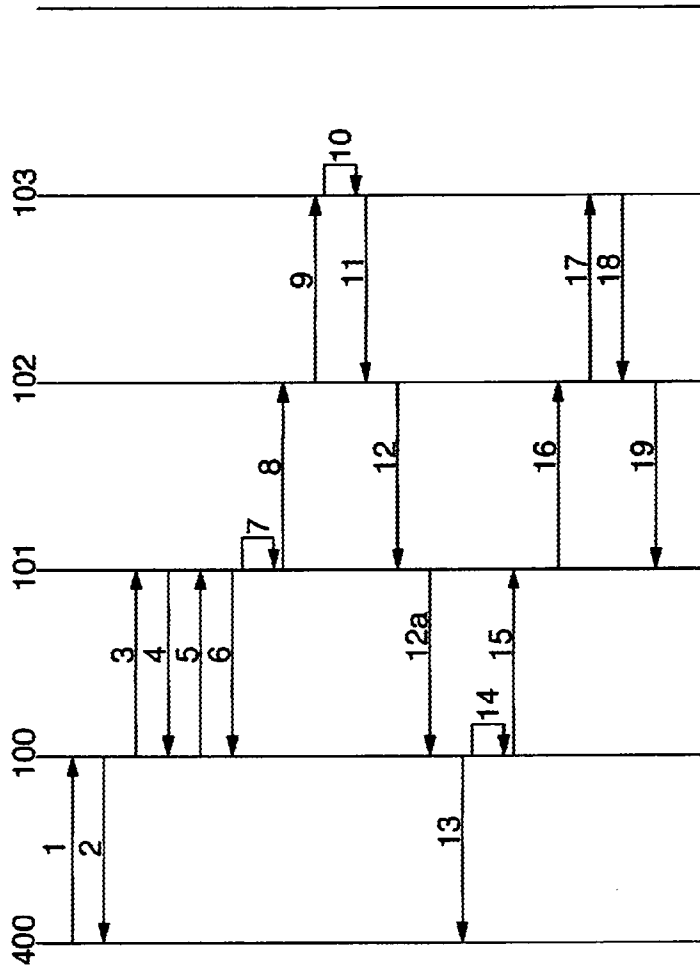


FIG. 10

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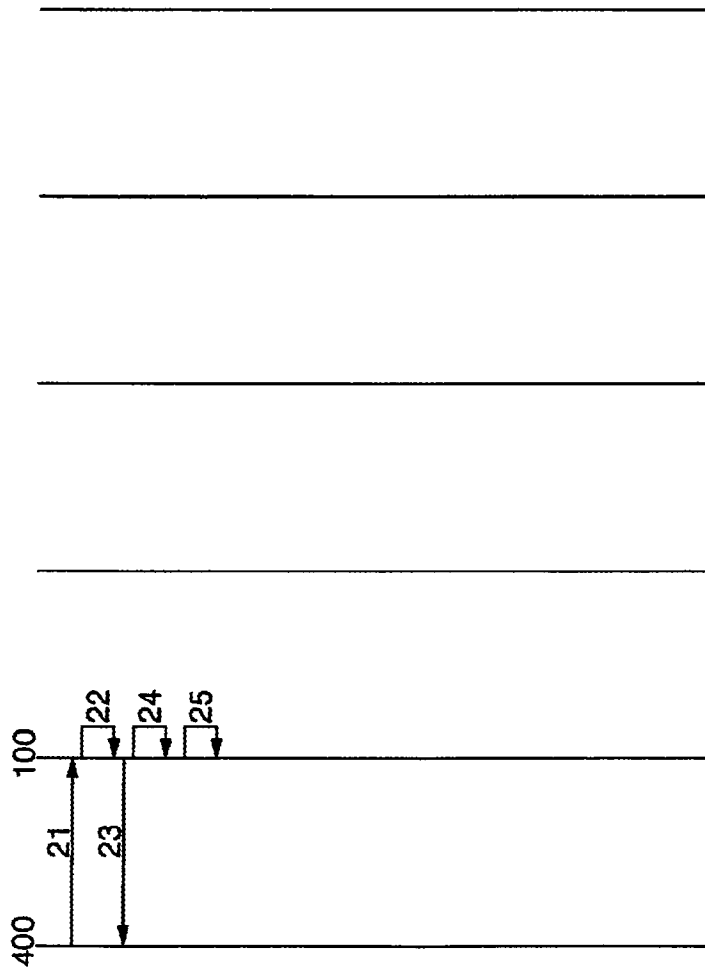


FIG. 11

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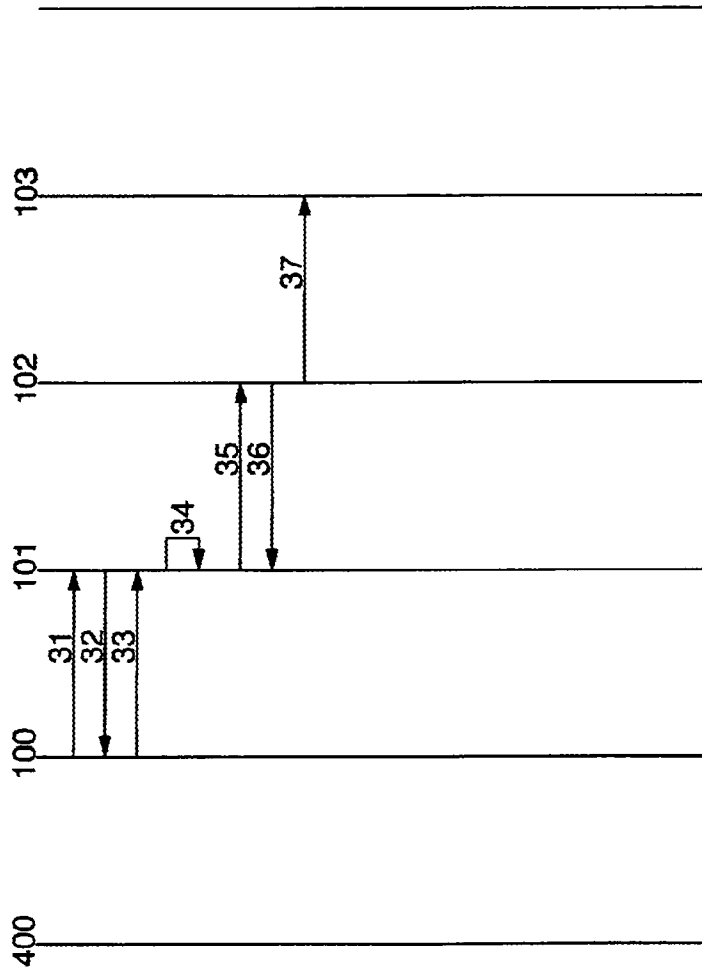


FIG. 12

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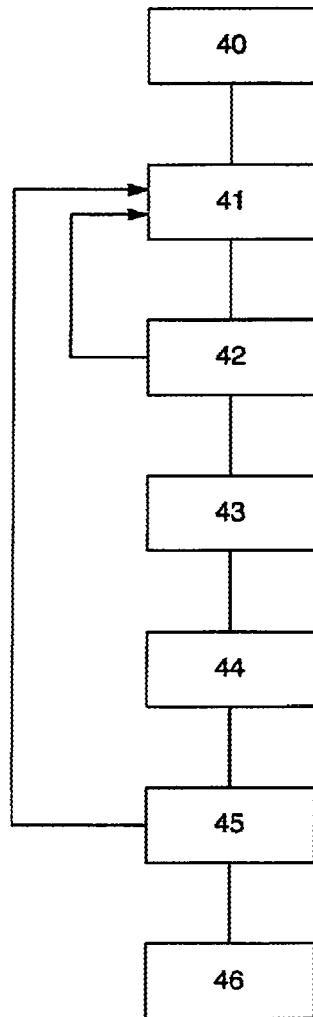


FIG. 13

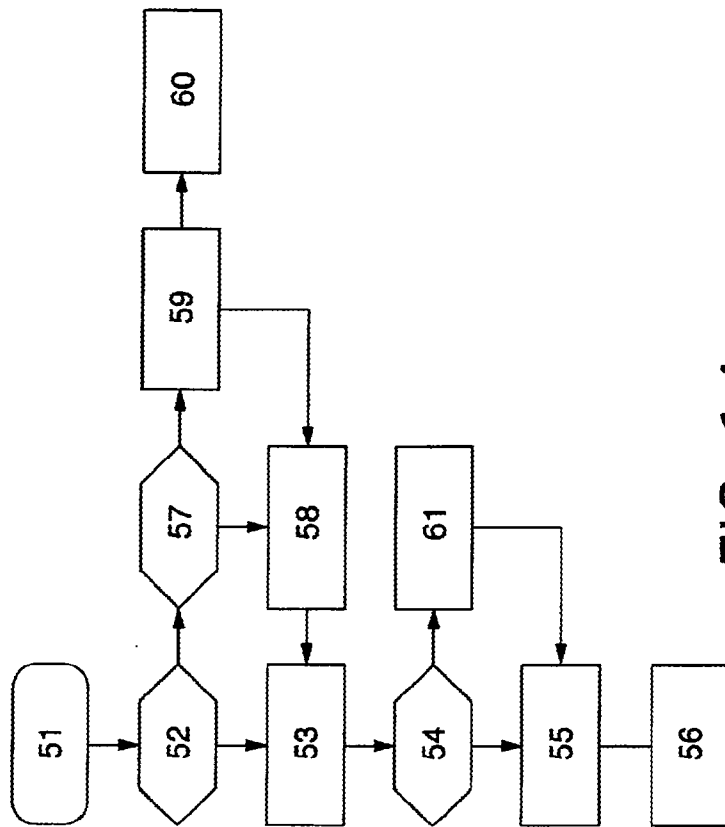


FIG. 14

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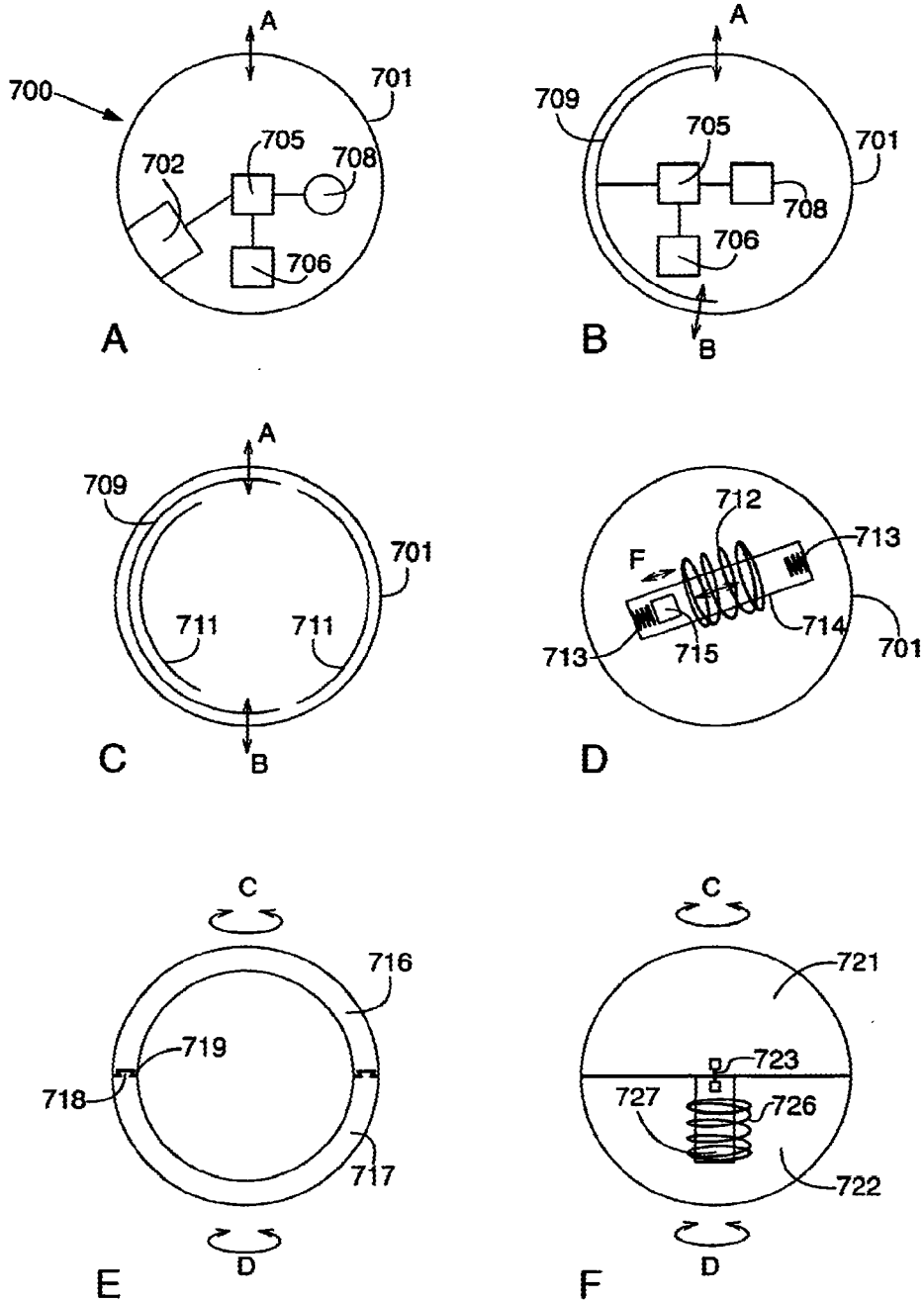


FIG. 15

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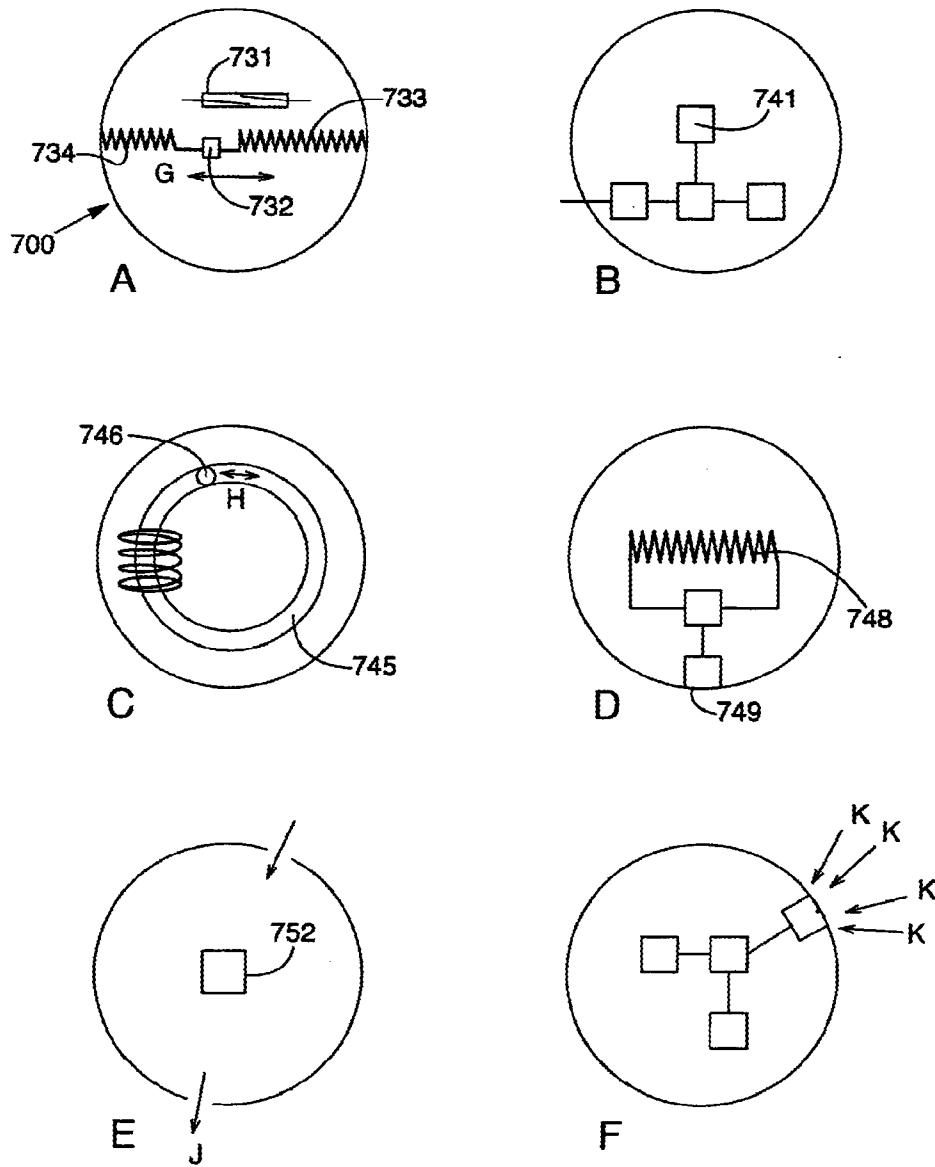


FIG. 16

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2010/050045

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A63F9/24 A63F13/02 A63H3/36
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 G06F A63F A63H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/139080 A1 (ZHENG YU BRIAN [US]) 12 June 2008 (2008-06-12) figures 8,9,10A,10B,15 paragraph [0005] - paragraph [0008] paragraph [0064] - paragraph [0072] paragraph [0081] - paragraph [0085] paragraph [0112] - paragraph [0118] -----	1-26
X A	US 6 290 565 B1 (GALYEAN III TINSLEY A [US] ET AL) 18 September 2001 (2001-09-18) the whole document -----	3,22-26 1,2,4-21
A	US 2004/214642 A1 (BECK STEPHEN C [US]) 28 October 2004 (2004-10-28) the whole document -----	1-26

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier document but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 17 August 2010	Date of mailing of the international search report 23/08/2010
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer van der Meulen, E
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2010/050045

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008139080 A1	12-06-2008	WO 2009014545 A1	29-01-2009
US 6290565 B1	18-09-2001	NONE	
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