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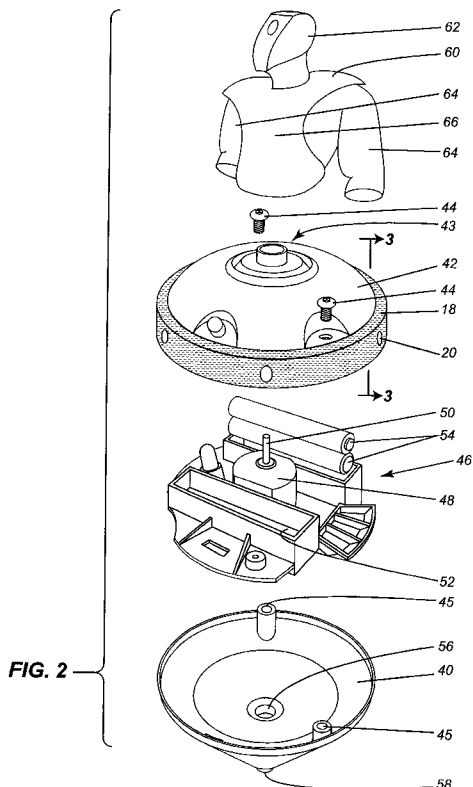
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[Continued on next page]

(54) Title: REMOTE-CONTROLLED TOY WITH BUMPER SENSOR



(57) Abstract: A remote-controlled toy is controllable by an application executing on a wireless communications device. The toy includes a wireless receiver for receiving a wireless control signal from the wireless communications device, a motor for moving the toy in response to receiving the wireless control signal, and a contact sensor disposed on an outer portion of the toy, the contact sensor generating a contact signal in response to physical contact on the contact sensor. The toy may be a wheeled vehicle such as a car, truck, etc. or a spinning top. The spinning top may include a detachable droid-shaped upper portion. The device may be used not only to control the toy and display contact data, but also to view and reconfigure performance characteristics of the toy. In one implementation, the toy includes an elastomeric bumper extending around the toy for accommodating a plurality of contact sensors.

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## **REMOTE-CONTROLLED TOY WITH BUMPER SENSOR**

### **TECHNICAL FIELD**

**[0001]** The present invention generally relates to a toy and, more particularly, to a remote-controlled toy such as a remote-controlled car or spin-droid that may be controlled using a wireless communications device.

### **BACKGROUND**

**[0002]** Most remote-controlled toys use radiofrequency signals to control movement of the toy, for example, radio-controlled cars, trucks, boats, aircraft, robots, plush animals, etc.

**[0003]** It is also known to use Bluetooth® technology to radio-control a toy car, as disclosed in U.S. Patent Application Publication 2005/0054450.

**[0004]** Remote-controlled spinning tops, which are disclosed in U.S. Patent 7,063,589 and U.S. Patent 7,427,225, are toy tops that may be controlled by respective players to battle each other in a small stadium.

**[0005]** Recently, applications for wireless communication devices or handheld mobile devices have been developed to enable a user to remotely control a toy, such as a vehicle or aircraft, using radiofrequency signals transmitted from the mobile device.

**[0006]** Due to the popularity of such toys, further improvements and enhancements on these technologies remain highly desirable.

### **SUMMARY**

**[0007]** In general, the present invention provides a novel toy that is remotely controlled using a wireless communications device or other mobile device. The toy includes one or more contact sensors disposed in an outer portion of the toy such as, for example, in an elastomeric bumper extending around a perimeter of the toy. When the contact sensor is physically contacted, a contact signal is generated. This signal is transmitted back to the wireless communications device and/or to an opponent's device. Contact data may be used for keeping score. In other

embodiments, which will be elaborated below, the contact data may be used to activate toy features. As will also be described below, the application may be used to manage games, view standings, create leagues, manage tournaments, invite players, view replays, share photos, videos and blogs about the games, toys, players, etc. The application may also be used to view and reconfigure performance characteristics of the toy. Many other features may be implemented, as will be described below in greater detail.

**[0008]** The toy may be a wheeled vehicle like a car, truck, boat, aircraft, etc. or it may be a spinning top. In one embodiment, a spin droid includes a spinning top and a detachable upper portion that resembles a robot or droid.

**[0009]** As will be appreciated, this novel toy provides a number of significant enhancements relative to the prior art. These enhancements will be elucidated in the detailed description below.

**[0010]** Accordingly, one aspect of the present invention is a remote-controlled toy comprising a movable toy body comprising a bumper having one or more contact sensors disposed on the bumper, a motor for moving the toy body, and a wireless receiver for receiving a wireless control signal from a wireless controller to control motion of the toy body.

**[0011]** Another aspect of the present invention is a remote-controlled toy controllable by an application executing on a wireless communications device, the toy comprising a wireless receiver for receiving a wireless control signal from the wireless communications device, a motor for moving the toy in response to receiving the wireless control signal, and a contact sensor disposed on an outer portion of the toy, the contact sensor generating a contact signal in response to physical contact on the contact sensor.

**[0012]** Yet another aspect of the present invention is a computer-readable medium comprising instructions in code which, when loaded into a memory and executed by a processor of a wireless communications device, causes the wireless communications device to receive contact signals from contact sensors of a remote-controlled toy that are transmitted wirelessly from the remote-controlled toy to the

wireless communications device and display contact data based on the contact signals.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

5 [0013] Further features and advantages of the present technology will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

10 [0014] FIG. 1 is an isometric view of a remote-controlled wheeled vehicle and a remote-controlled spin droid that may be controlled using a wireless communications device in accordance with two specific embodiments of the present invention;

[0015] FIG. 2 is an exploded view of a transformable spin droid with a detachable droid-like upper body portion;

[0016] FIG. 3 is a cross-sectional view of an outer portion of the toy body of a spinning top showing the bumper and contact sensor in one embodiment;

15 [0017] FIG. 4 is schematic depiction of a wireless communications device and a remote-controlled toy having a transceiver for sending and receiving signals to the wireless communications device;

[0018] FIG. 5 depicts an application executing on a wireless communications device that is used to interact with the remote-controlled toy;

20 [0019] FIG. 6 depicts a game management screen of the application; and

[0020] FIG. 7 depicts a reconfiguration screen of the application for reconfiguring performance characteristics of the toy.

[0021] It will be noted that, throughout the appended drawings, like features are identified by like reference numerals.

### 25 **DETAILED DESCRIPTION**

[0022] By way of general overview, the present invention provides a remote-controlled toy that may be controlled wirelessly by a wireless controller such as a

wireless communications device executing an application that provides a software-implemented control interface for the toy. The remote-controlled toy includes one or more contact sensors in or on the body of the toy, such as, for example, in the bumper, that generate a contact signal when physically contacted.

5 **[0023]** Two such toys, a wheeled vehicle 10 and a spin droid 12, are depicted by way of example in FIG. 1. The vehicle 10 and the spin droid 12 may be operated on a play surface such as a stadium 14, which may be a generally circular, oval or elliptical surface surrounded by a low wall 16 or parapet designed to confine the vehicle or spin droid within the stadium. It will be appreciated that the stadium is  
10 optional and that the toys may be operated on the floor, on a tabletop, or any other suitable surface. The stadium 14 may be used as a forum for battles between toys. A battle typically involves two toys bumping into one another with the objective being to hit the opponent's toy at the opponent's contact sensors to register hits or points. As will be explained, the contact signals may be transmitted to one or more wireless  
15 communications devices for keeping score. In other embodiments, when the number of hits reaches a certain threshold, a winner may be declared. In some embodiments, the toy may activate a feature (e.g. cause an LED to blink, a sound to be played, a hood or trunk to open, etc.) to signify that the toy has sustained too many hits and has lost the battle.

20 **[0024]** In the embodiments depicted in FIG. 1, each toy has a bumper 18 and a plurality of contact sensors 20 each of which generates a contact signal when the sensor is physically contacted. The contact sensors may be disposed within the bumper 18 or disposed within any other outer portion 18 of the body of the toy. The contact sensors may be embedded or surface-mounted.

25 **[0025]** To illustrate the inventive concepts, FIG. 1 shows only two examples of remote-controlled toys: a wheeled vehicle and a spin droid, i.e. a spinning top having a detachable droid-shaped upper portion. It is to be emphasized that these two toys are presented solely by way of example and it should therefore be understood that many other shapes or types of toys may be utilized to implement  
30 the inventive concepts presented herein. For example, the toy may be shaped like a car, truck, off-road vehicle, all-terrain vehicle, dune buggy, tank or other military vehicle, boat, ship or other watercraft, plane, helicopter or other aircraft, hovercraft,

spacecraft, plush animal, dinosaur, action figure, dragon or other mythical creature, robot, droid, alien, monster, etc. Each of these toys may be remotely controlled to move using wheels, e.g. in its base or feet, propellers, rotors or by using any other suitable means of locomotion.

5 **[0026]** In one set of embodiments, the toy, such as the illustrated spin droid, may have a transformable body. The transformable body may take may other shapes and forms other than the one illustrated. A spin droid is but one example of the concept. Any foldable or detachable mechanism may be employed to create a transformable body. The toy thus has dual play value, first as a droid with a name,  
10 character/personality, fictitious biography, special powers, technical specifications, performance characteristics, etc., and then as a spin top that can be remotely controlled to battle with another spin top or with another type of toy, such as a vehicle.

**[0027]** The toy body may be formed or moulded integrally from plastic  
15 (polymers) or composites, although the toy or any components thereof may be made of other materials such metal or wood, for example. The toy body may be monocoque or assembled from components. The toy body may be sold in the form of a kit and assembled by the player prior to use from various blocks, parts, or components. Decals, paints, accessories and the like may be provided to  
20 customize the bodywork of the toy.

**[0028]** The radio-controlled vehicle 10 shown in FIG. 1 may be constructed with an electric motor that drives one or more of the wheels and with a steering servo for steering the front wheels. The motor may be unidirectional or bidirectional (reversible) to permit the vehicle to travel forward and backward. As shown in FIG.  
25 1, the contact sensors 20 may be disposed within the bumper 18 of the wheeled vehicle 10. Bumpers may be provided only at the front and rear of the vehicle or, alternatively, around the entire vehicle as shown in FIG. 1. In one embodiment, contact sensors are provided only in a front bumper or only in a rear bumper. The bumper may be made of rubber or rubberized material, any suitable elastomer or  
30 elastomeric material, or any other elastic or shock-absorbent material.

**[0029]** In the embodiment depicted by way of example in FIG. 1, the spin droid 12 may include a spinning top (also known as a “toy top”) which may be similar to the types shown by way of example in U.S. Patent 7,063,589 and U.S. Patent 7,427,225, which are hereby incorporated by reference, but with one or more contact sensors disposed in the body of the top or in a bumper that includes the one or more contact sensors.

**[0030]** Although spinning tops and vehicles are presented as the main implementations of this technology, it should be appreciated that the toy may be any other type of remote-controlled toy including, but not limited to, remote-controlled boats, aircraft, robots (droids), action figures, animals, etc. Regardless of the shape of the toy and its means of locomotion, the toy includes at least one contact sensor that registers hits, bumps or any such form of physical contact.

**[0031]** Each one of the two illustrated remote-controlled toys 10, 12 is controlled by its own respective wireless controller 30. This wireless controller may be a dedicated handheld controller with control sticks (joysticks) or a control wheel or knob or it may be a generic wireless communications device running a dedicated application for interacting with the toy. The wireless communications device may be any mobile device, cell phone, smart phone, PDA, tablet, notebook, palmtop, laptop, etc. having a processor operatively coupled to a memory and further including a wireless radiofrequency transmitter for transmitting control signals to a wireless receiver in the toy. Communication may be unidirectional, i.e. one-way (from controller to toy only) or it may be bidirectional. For unidirectional communication, the wireless controller requires only a transmitter and the toy requires only a receiver. For bidirectional communication, each of the wireless controller and the toy includes an RF transceiver. In the latter instance, contact signals may be transmitted back to the wireless controller to enable various functionalities that will be described below.

**[0032]** In one specific embodiment, as illustrated in FIG. 1 and in greater detail in FIG. 2, the spinning top 12 may be adapted to connect to a droid-shaped upper portion having elements that resemble a head, arms and an upper torso. The toy is thus transformable between a droid or robot and a spinning top by mounting



and dismounting the droid-shaped upper portion. This provides dual play value as an assembled droid and also as a spin top.

**[0033]** As depicted in FIG. 2, the spin droid may be constructed of a generally conical lower body 40 and a top cap 42. The top cap may be connected to the lower body by threaded fasteners 44 such as small screws sized to fit into respective internally threaded holes 45. Other fastening means may be employed such as clips or snap-in tabs. Inside the conical lower body and top cap is installed a motor subassembly 46 that includes an electric motor 48, a drive shaft 50 and battery receptacles 52 for receiving disposable or rechargeable batteries 54. In the illustrated embodiment of FIG. 2, the drive shaft extends through a hole 56 in the lower conical body such that the shaft contacts the surface in operation. The hole 56 extends to the conical tip 58 of the conical lower body. Rotation of the shaft in either a same direction or an opposite direction as the body of the spinning top enables the top to be steered. The bumper 18 with the contact sensors 20 may be press-fitted, bonded, fastened or otherwise attached around the perimeter of the top cap and lower conical body at the interface or junction thereof as shown in FIG. 2 or it may be attached to only one of the top cap or conical lower body. The bumper should constitute the most radially outward extension of the toy so that the bumper absorb all of the bumps and collisions from other toys during the battle. The contact sensors may be disposed at regular intervals around the perimeter of the body or bumper, as depicted in FIG. 2, or the contact sensors may be disposed in any other arrangement.

**[0034]** As further depicted by way of example in FIG. 2, the droid-shaped upper portion 60 may be detachably mounted to the upper surface of the top cap by a press-fit connection between a circular protrusion 43 and a correspondingly sized bore in the bottom on the droid-shaped upper portion. This enables the droid-shaped upper portion to be easily snapped on or off. Any other suitable connecting means may be employed. The droid-shaped upper portion 60 may have elements that resemble a head, arms and torso as illustrated. The droid-shaped upper portion comprises a head portion 62, arm portions 64 and a torso portion 66 which may be moulded in one integral component as shown by way of example in this figure. The circular protrusion may be uniquely mated to the bore in the bottom of the droid-

shaped upper portion so that only that particular droid-shaped upper portion may be affixed to that particular spin top. Alternatively, all protrusions and bores for all toys in the class or collection may be identical to permit mixing and matching.

5 **[0035]** Due to the asymmetry of the droid-shaped upper portion, it is generally the case that the spin top will only spin properly when the droid-shaped upper portion is detached. However, a symmetrical droid-shaped upper portion may be provided to enable this droid-shaped upper portion to remain on the spin droid during spinning. Alternatively, if the droid-shaped upper portion is sufficiently light, the top, if it has sufficient rotational inertia, may be able to spin properly even if with  
10 the upper portion attached.

**[0036]** On larger toys, such as radio-controlled cars, aircraft or boats, the toy may include other equipment or components such as an onboard digital camera. The camera may be used to take photos or videos. Data may be stored in a memory chip on the toy for transfer and playback after the game and/or relayed in  
15 real-time wirelessly back to the mobile device or to any other device (e.g. a spectator's device) or broadcast or multicast, e.g. by web-streaming.

**[0037]** FIG. 3 is a cross-sectional view of an outer portion of the toy body of a spinning top showing the bumper 18 and contact sensor 20 in one embodiment. This cross-section is taken along the section shown in FIG. 2. FIG. 3 shows the  
20 bumper 18 mounted to an outer surface of the toy body. In this case, it is mounted at the junction or interface of the conical lower body 40 and the top cap 42. Inside or embedded within the bumper 18 is the contact sensor 20 with wires 70 surrounded by protective wire sheaths 72 leading to an onboard programmable logic circuit.

25 **[0038]** FIG. 4 is schematic depiction of a wireless communications device 30 and a remote-controlled toy 10 having a wireless (RF) transceiver 80 for sending and receiving signals to the wireless communications device 30. FIG. 4 also shows a schematic depiction of the onboard programmable logic circuit 90. This circuit 90 may be a small microprocessor or microcontroller disposed inside the toy for  
30 receiving the contact signals and for instructing the wireless transceiver 80 to transmit the contact signals to the mobile device 30. The programmable logic circuit

(or microprocessor) 90 may also be used to process the control signals received from the transceiver 80 and to control the motor 48 or other any onboard steering servo 84. The toy includes one or more contact sensors 20 and optionally also a memory 92 coupled to the logic circuit or microprocessor. A Bluetooth® transceiver 82 may be provided in addition or in lieu of the RF transceiver 80. In one embodiment, the toy may be configurable to switch between the RF transceiver and the Bluetooth® transceiver. In another embodiment, the toy may receive control signals using one transceiver and provide contact sensor data and/or live video feed from the onboard camera using the other transceiver.

10 **[0039]** The wireless communications device 30 may be any mobile device, personal communications device, smart phone, cell phone, PDA, tablet, notebook, palmtop or any functionally equivalent device. As shown in FIG. 5, the device 30 includes a microprocessor 100, a memory 102, an RF transceiver 104, and a user interface 106 including a display 108 that may be touch-sensitive or a keypad/keyboard 110. A Bluetooth® transceiver 112 and/or an accelerometer (tilt sensor) 114 may optionally be provided.

**[0040]** As described above, each contact sensor 20 in the toy is adapted to generate a contact signal upon physical contact. In main embodiments, the sensitivity of the contact sensor is factory preset and not adjustable by the user. In other embodiments, however, the sensitivity of the contact sensor may be adjustable so that only substantial physical contact above a certain predetermined force threshold will register as contact. In yet other embodiments, the contact sensor may be a force transducer that senses the actual force applied to the contact sensor. The contact signal may thus indicate the actual force sensed by the contact sensor whereas in other (simpler) implementations the contact sensor merely indicates that there was some physical contact without specifying the force of the collision. Force transducers may be used to award differential points based on the force of the impact. For example, a hard hit may be worth 3 points, a middle hit may be worth 2 points and a soft hit may be worth only 1 point.

30 **[0041]** In one embodiment, registering a hit or bump on a contact sensor causes the toy to react in some discernible way. For example, if the front bumper of a toy car is hit a certain number of times, this will trigger the opening of the hood.

Hitting the rear bumper may cause the trunk of the car to open. In other examples, the car may be intentionally broken apart, disabled, lights may flash or sound effects played. These effects may additionally or alternatively be displayed in a virtual rendition or replay of the crash on the display of the device.

5 **[0042]** In another embodiment, registering a bump on a contact sensor may cause the mobile device to vibrate in the user's hands to provide real-time tactile feedback to the user.

**[0043]** In one embodiment, the performance/motion/speed/controllability of the toy may be varied as a function of the contacts (bumps it has received). For  
10 example, if the toy is bumped at a sensor, the device may be "stunned" or "slowed down" for a short period of time. The device may react to hits or bumps (contact) by improving, degrading or modifying behaviour or performance. The performance modification may be predictable or unpredictable (i.e. a random effect).

**[0044]** The application may be used to display information ("specs") on the  
15 toys in a given class or collection of toys. That way, if a first player's toy is battling a second player's toy, the first and second players can view their opponent's toy's strengths and weaknesses. For example, a collection or class of transformable droid spin tops may offer Droids A, B and C with different character caps, different strengths and weaknesses. These strengths and weaknesses (and any character  
20 information, history, traits, etc) can be viewed on the mobile application before the battle. The mobile application could also report wins, losses, ties, etc. of the player with whom one is playing. The mobile application may enable players to create and join a league with standings. The mobile application may interact with a web site that hosts the player stats, standings, etc., with a variety of web-enable  
25 functionalities such as player-to-player chat, player invitations (challenges) to play, posting photos, videos, blogs of the games that have been played, etc.

**[0045]** In one implementation, the toy may be a programmable toy where strengths and weaknesses can be programmed using the mobile application prior to the battle. For example, a programmable toy may permit the player to allocate a  
30 maximum of 10 points, for example, between various characteristics such as speed, robustness, and agility. For example, a player could choose to program a droid by

allocating 5 points to speed, 3 points to robustness and 2 points to agility whereas another player might choose to program his droid by allocating only 2 points to speed, but 4 points to robustness and 4 points to agility.

**[0046]** The mobile application may also provide upgrades for the application that links to your car. Upgrades may be purchased, won or provided free of charge. The upgrades may, for example, unlock new features or enhance the performance of the vehicle or these may enable the player to customize his vehicle. Customization may involve mechanically retrofitting the toy with pre-designed aftermarket components (such as special tires, wheels, tail pipes, decals, bodywork, etc. for an RC car). Customization may also involve customizing the responsiveness of the control algorithm, e.g. adjusting steering sensitivity.

**[0047]** Another aspect of the present invention is the application (software) that is loaded on a computing device such as, for example, a mobile phone and which is configured to interact remotely with the toy. The mobile phone application enables the user to remotely control the toy. In addition, the mobile phone application receives contact sensor data transmitted wirelessly from the toy to the mobile device using any suitable wireless connection. A Bluetooth® connection may be utilized, although any other short-range wireless data transmission standard or protocol may be used.

**[0048]** A computer-readable medium comprises instructions in code which, when loaded into a memory and executed by a processor of a wireless communications device, causes the wireless communications device to receive contact signals from contact sensors of a remote-controlled toy that are transmitted wirelessly from the remote-controlled toy to the wireless communications device and display contact data based on the contact signals.

**[0049]** In one embodiment, the code causes the device to compute and display a real-time score based on the contact data wherein different points are awarded based on different locations of the contact sensors.

**[0050]** In one embodiment, the code causes the device to display motion cues on a display of the wireless communications device. User input received via the user interface of the wireless communications device can then be transmitted as

control signals from the wireless communications device to the remote-controlled toy, e.g. using a Bluetooth® transceiver. For Bluetooth® implementations, the toy and wireless communications device may be paired using any pairing protocol whether it requires a passkey or not. Bluetooth® implementations may utilize  
5 concepts disclosed in U.S. Patent Application Publication 2005/0054450 which is hereby incorporated by reference.

**[0051]** In one embodiment, the control signals are modified as a function of the contact data to modify the motion performance of the toy in response to contact signals being received. For example, the device may receive contact signals  
10 indicating that the device has been hit. This may cause the device to modulate a default control signal to generate a modified or modulated control signal that instructs the toy to perform in a lessened capacity. For example, instead of transmitting a full speed signal, the device may transmit a middle speed signal. Performance modulation may be implemented by the onboard programmable logic  
15 circuit or by the wireless device.

**[0052]** FIG. 5 depicts an application executing on a wireless communications device that is used to interact with the remote-controlled toy. The main toy-controlling user interface 200 illustrated in FIG. 5 shows control cues 202 for  
20 controlling the toy. These control cues may be arrows for moving forward and reverse and for steering. The device may be a touchscreen device in which case the user's control input is provided by touching the screen e.g. touching the control cues. The cues may alternatively indicate which keys of a keyboard or keypad of a mobile device are to be used to control the toy. The control cues may blink, change  
25 colour or otherwise graphically indicate a confirmation when valid control input is provided by the user. As shown by way of example in FIG. 5, the screen or UI 200 may display points on a scoreboard 204 and may provide various user interface elements 206 to pause the game, end the game, activate an HD camera, enter a messaging module (e.g. to send messages and view received messages) or a game manager module (e.g. go to a game management screen).

**[0053]** FIG. 6 depicts a game management screen 300 of the application. For example, this screen or UI 300 may enable a user to invite another player, start  
30 a game, end a game, view points (hits registered by the contact sensors). Other

features or options may be provided on this screen. As will be appreciated, there may be multiple linked screens or menus to access various features or functions. The UI depicted in FIG. 6 is solely by way of example. The UI 300 of FIG. 6 may include, for example, user interface elements 302 to view a toy's specs, customize  
5 the toy, view leagues, invite players, etc. These user interface elements may be buttons, menus, toggles, etc. These may be touch sensitive buttons or menus for a touch screen device or, alternatively, they may be displayed on a non-touch LCD screen. FIG. 6 presents a graphical rendition 304 of the toy, in this case a radio-  
10 controlled car. The application may enable the toy to be rotated or viewed from different angles, to remove components to view the internal workings or mechanisms of the toy, to run diagnostics, etc. Further user interface elements 306 may be provided to send messages, to create blogs, send photos, view standings, create leagues, etc.

**[0054]** FIG. 7 depicts a reconfiguration screen 400 of the application for  
15 reconfiguring performance characteristics of the toy. The user (player) may use adjustable sliders 410 to adjust the performance characteristics of the toy. Performance characteristics 430 may be graduated and qualified using labels 420, words, symbols (e.g. minimal, fair, good, excellent) or they may alternatively be configured by allocating numerical values in prescribed fields. Any other graphical,  
20 symbolic or numeric system may be implemented to enable the user to reconfigure the performance characteristics. The toys may thus be configured by the players prior to a battle. This provides for a strategy by allocating resources/strengths to certain characteristics. The game-specific allocation of performance characteristics may be made visible or invisible to the player's opponent.

**[0055]** Although battles are generally one-on-one battles between two toys,  
25 the battles may also involve more than two toys. Teams of toys may be formed by grouping toys together. The teams may be managed using the application on each player's mobile device. Computing the aggregate points earned by all of the players on one team as compared to another team enables the devices to declare  
30 one team a winner.

**[0056]** The software application embodied by the computer-readable medium may be executed on any computing device such as a mobile device, smart phone,

cell phone, wireless communications device, personal digital assistant, tablet, notebook, laptop, etc. The device requires a processor, a memory and a radiofrequency transceiver for communicating with the toy. The toy requires a radiofrequency transmitter and either a microprocessor, microcontroller or a control  
5 circuit to convert control signals into a drive signals for the toy's motor(s), actuator(s), steering mechanism, braking mechanism, etc.

**[0057]** The steps, acts, procedures, routine, subroutines, or operations of the application may be programmed or coded as computer-readable instructions and recorded electronically, magnetically or optically on a non-transitory computer-  
10 readable medium, computer-readable memory, machine-readable memory or computer program product.

**[0058]** A computer-readable medium can be any means that contain, store, communicate, propagate or transport the program for use by or in connection with the instruction execution system, apparatus or device. The computer-readable  
15 medium may be electronic, magnetic, optical, electromagnetic, infrared or any semiconductor system or device. For example, computer executable code to perform the methods disclosed herein may be tangibly recorded on a computer-readable medium including, but not limited to, a floppy-disk, a CD-ROM, a DVD, RAM, ROM, EPROM, Flash Memory or any suitable memory card, etc. The method  
20 may also be implemented in hardware. A hardware implementation might employ discrete logic circuits having logic gates for implementing logic functions on data signals, an application-specific integrated circuit (ASIC) having appropriate combinational logic gates, a programmable gate array (PGA), a field programmable gate array (FPGA), etc.

**[0059]** The embodiments of the invention described above are intended to be exemplary only. As will be appreciated by those of ordinary skill in the art, to whom this specification is addressed, many obvious variations, modifications, and refinements can be made to the embodiments presented herein without departing  
25 from the inventive concept(s) disclosed in this specification. The scope of the exclusive right sought by the applicant is therefore intended to be limited solely by  
30 the appended claims.



**CLAIMS:**

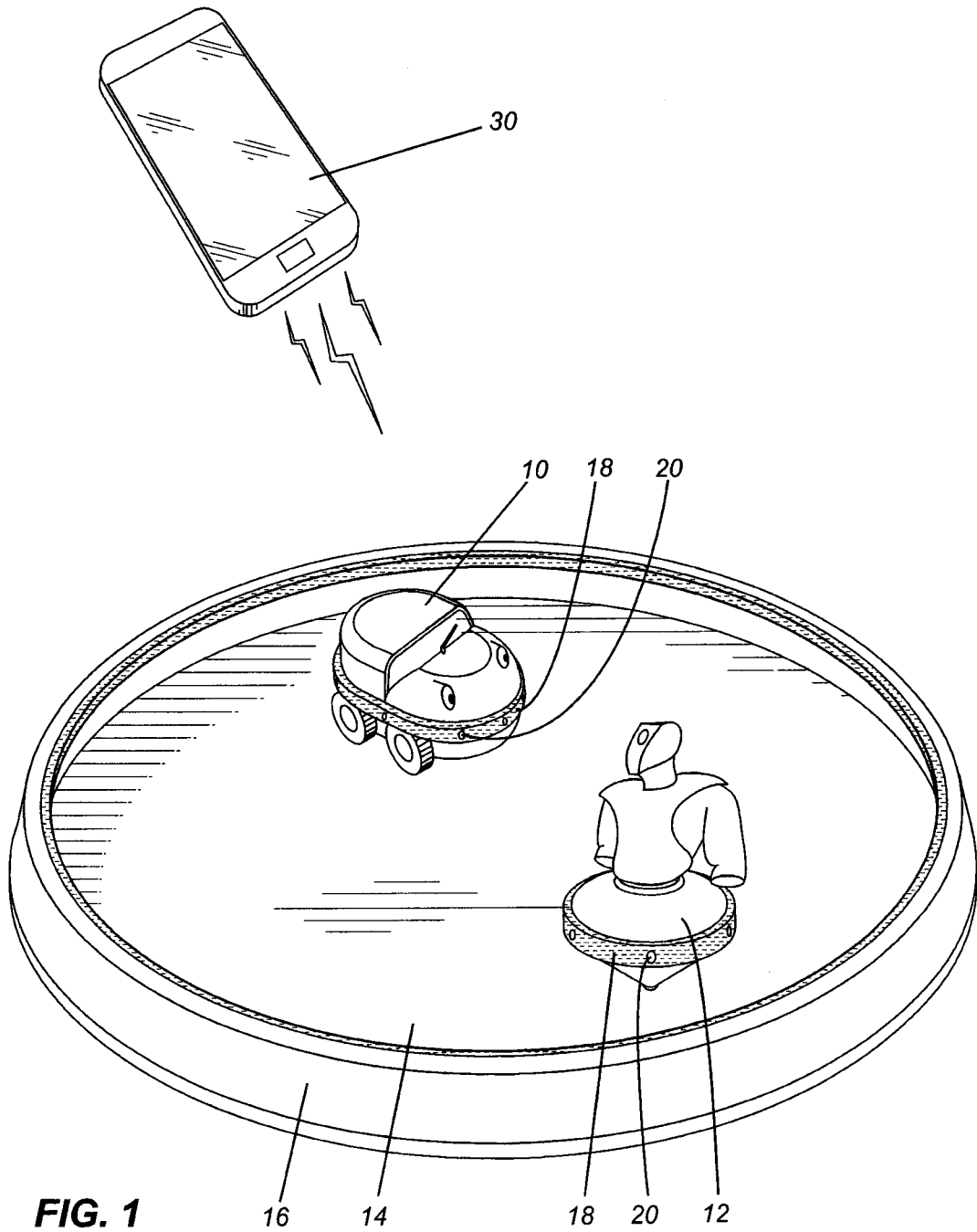
1. A remote-controlled toy comprising:  
a movable toy body comprising a bumper having one or more contact sensors disposed on the bumper;  
a motor for moving the toy body; and  
a wireless receiver for receiving a wireless control signal from a wireless controller to control motion of the toy body.
2. The toy as claimed in claim 1 wherein the wireless controller is a wireless communications device.
3. The toy as claimed in claim 1 wherein the toy body is a wheeled vehicle wherein the motor drives the vehicle forward and wherein the vehicle further comprises a servo for steering the vehicle.
4. The toy as claimed in claim 1 wherein the toy body is a spinning top and wherein the motor steers the top.
5. The toy as claimed in claim 4 wherein the spinning top comprises a detachable upper portion shaped like a droid or robot.
6. The toy as claimed in claim 5 wherein the detachable upper portion of the spinning top has character-like elements that resemble a head, arms and a torso.
7. The toy as claimed in claim 1 comprising a wireless transmitter for transmitting contact signals received by the contact sensors in the bumper to the wireless controller.
8. The toy as claimed in claim 7 wherein the wireless controller is a wireless communications device having a processor operatively coupled to a

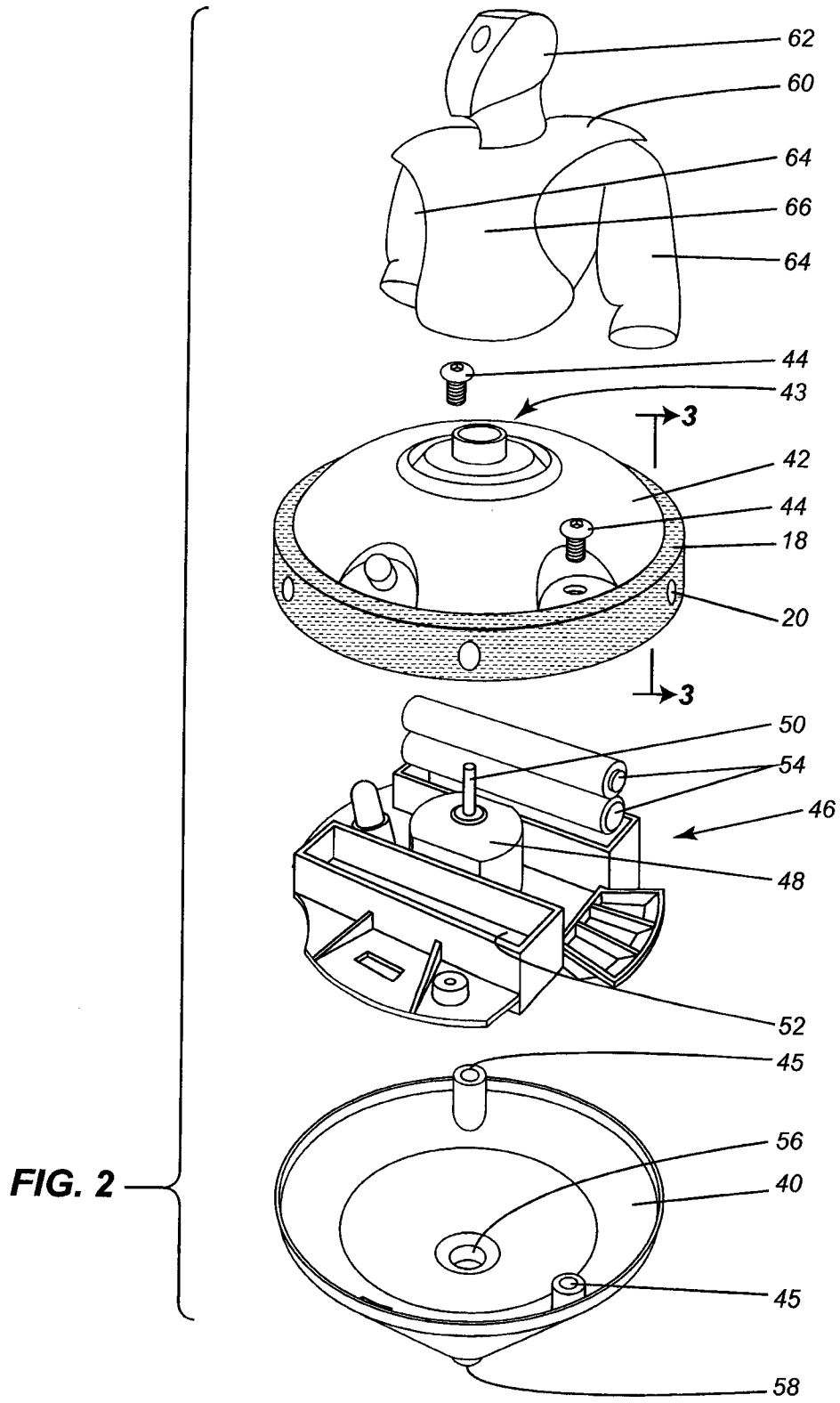
- memory for executing an application that displays contact data based on the contact signals received from the wireless transmitter.
9. The toy as claimed in claim 1 wherein the bumper comprises a plurality of contact sensors, and wherein the contact signals transmitted to the wireless controller indicate which contact sensor was contacted.
10. A remote-controlled toy controllable by an application executing on a wireless communications device, the toy comprising:  
a wireless receiver for receiving a wireless control signal from the wireless communications device;  
a motor for moving the toy in response to receiving the wireless control signal; and  
a contact sensor disposed on an outer portion of the toy, the contact sensor generating a contact signal in response to physical contact on the contact sensor.
11. The toy as claimed in claim 10 comprising a bumper disposed on the outer portion of the toy.
12. The toy as claimed in claim 11 wherein the bumper is an elastomeric bumper comprising a plurality of contact sensors embedded within the bumper.
13. The toy as claimed in claim 12 wherein the bumper extends around an entire perimeter of the toy.
14. The toy as claimed in an claim 12 wherein the bumper extends around only a portion of the toy.
15. The toy as claimed in claim 10 comprising a wheeled vehicle body.
16. The toy as claimed in claim 10 comprising a spinning top shaped like a droid.

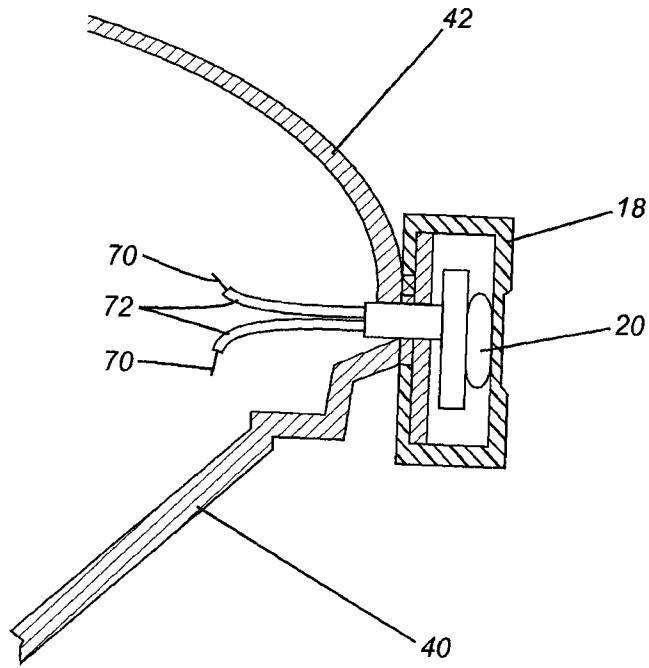
17. The toy as claimed in claim 16 wherein the spinning top is a transformable spinning top having a detachable upper droid body that may be detached from the spinning top.
18. The toy as claimed in claim 10 comprising an onboard programmable logic circuit that may be remotely programmed using the application executing on the wireless communications device to reconfigure one or more performance characteristics of the toy.
19. The toy as claimed in claim 10 comprising an onboard programmable logic circuit that may be remotely and automatically programmed by the application executing on the wireless communications device to automatically reconfigure one or more performance characteristics of the toy in response to receiving contact data from the toy.
20. The toy as claimed in claim 10 comprising an onboard programmable logic circuit that is programmed to activate a toy feature if a number of contact signals exceeds a predetermined threshold.
21. A computer-readable medium comprising instructions in code which, when loaded into a memory and executed by a processor of a wireless communications device, causes the wireless communications device to:  
  
receive contact signals from contact sensors of a remote-controlled toy that are transmitted wirelessly from the remote-controlled toy to the wireless communications device; and  
  
display contact data based on the contact signals.
22. The computer-readable medium as claimed in claim 21 further comprising computing and displaying a real-time score based on the contact data wherein different points are awarded based on different locations of the contact sensors.
23. The computer-readable medium as claimed in claim 21 further comprising displaying motion cues on a display of the wireless communications device,

receiving user input via the user interface of the wireless communications device, and transmitting control signals from the wireless communications device to the remote-controlled toy using a Bluetooth® transceiver.

24. The computer-readable medium as claimed in claim 21 further comprising generating modified control signals in response to the contact data to thereby modify the performance characteristics of the toy in response to the contact signals received by the wireless communications device.







**FIG. 3**

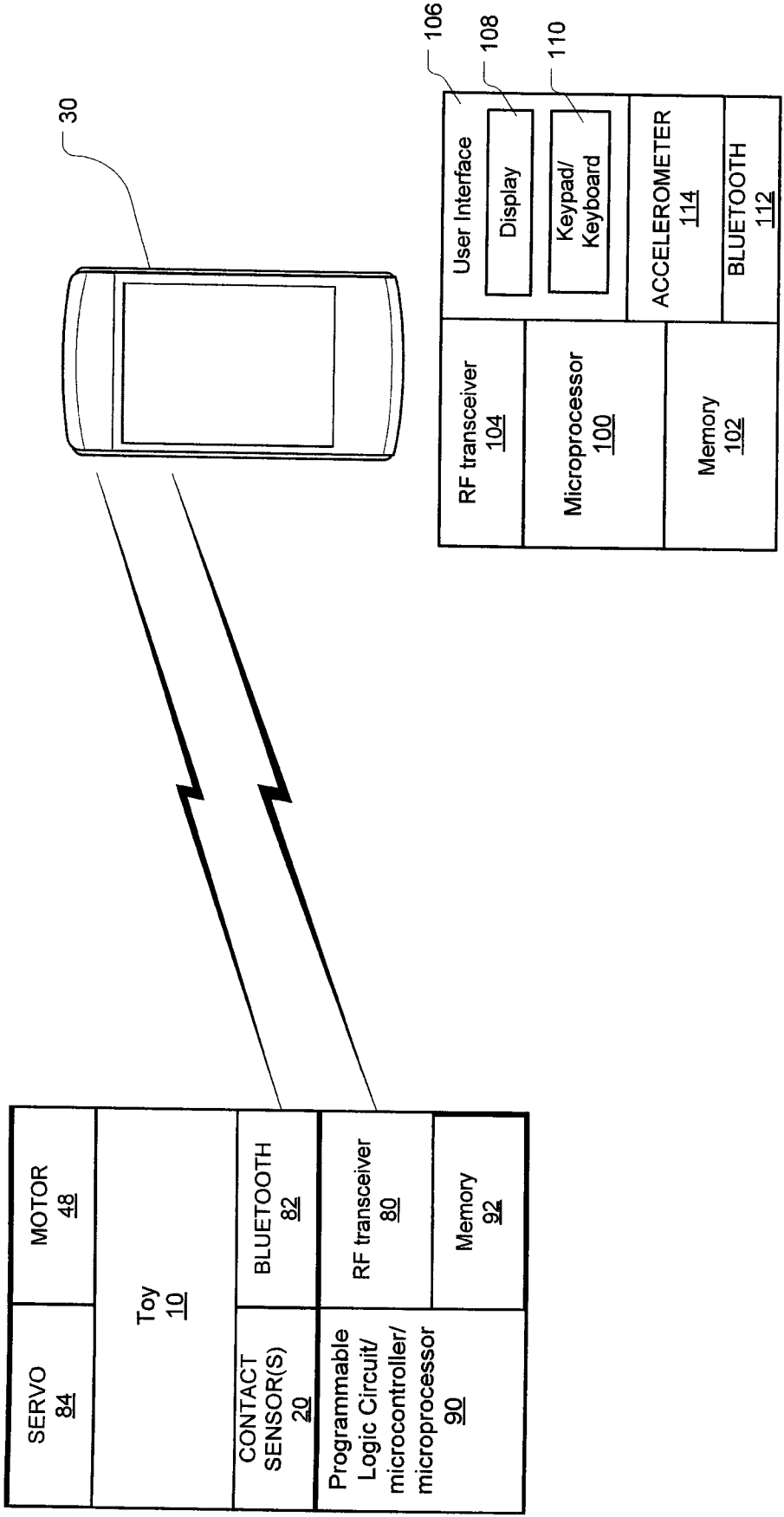
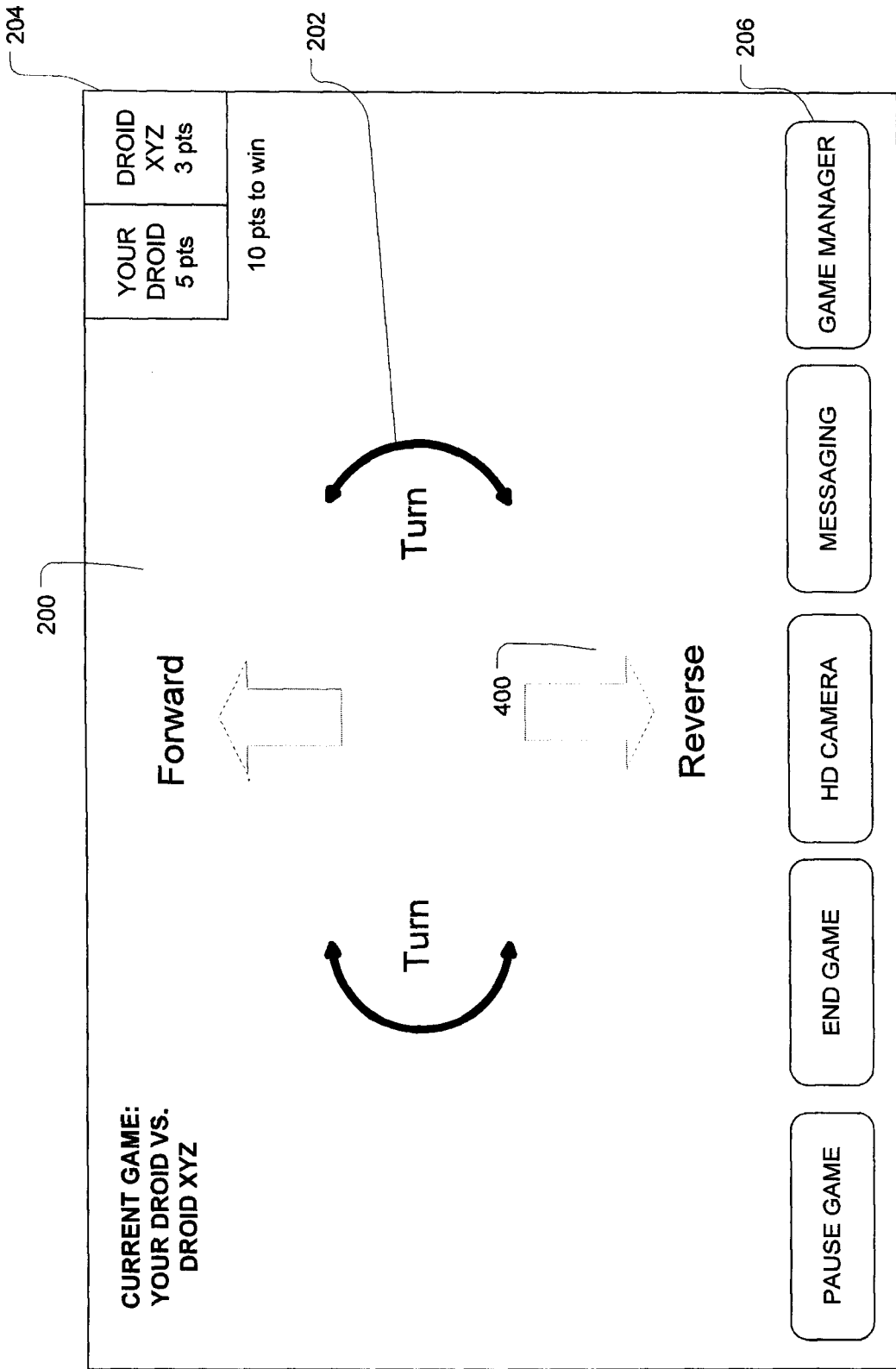


FIG. 4





**FIG. 5**

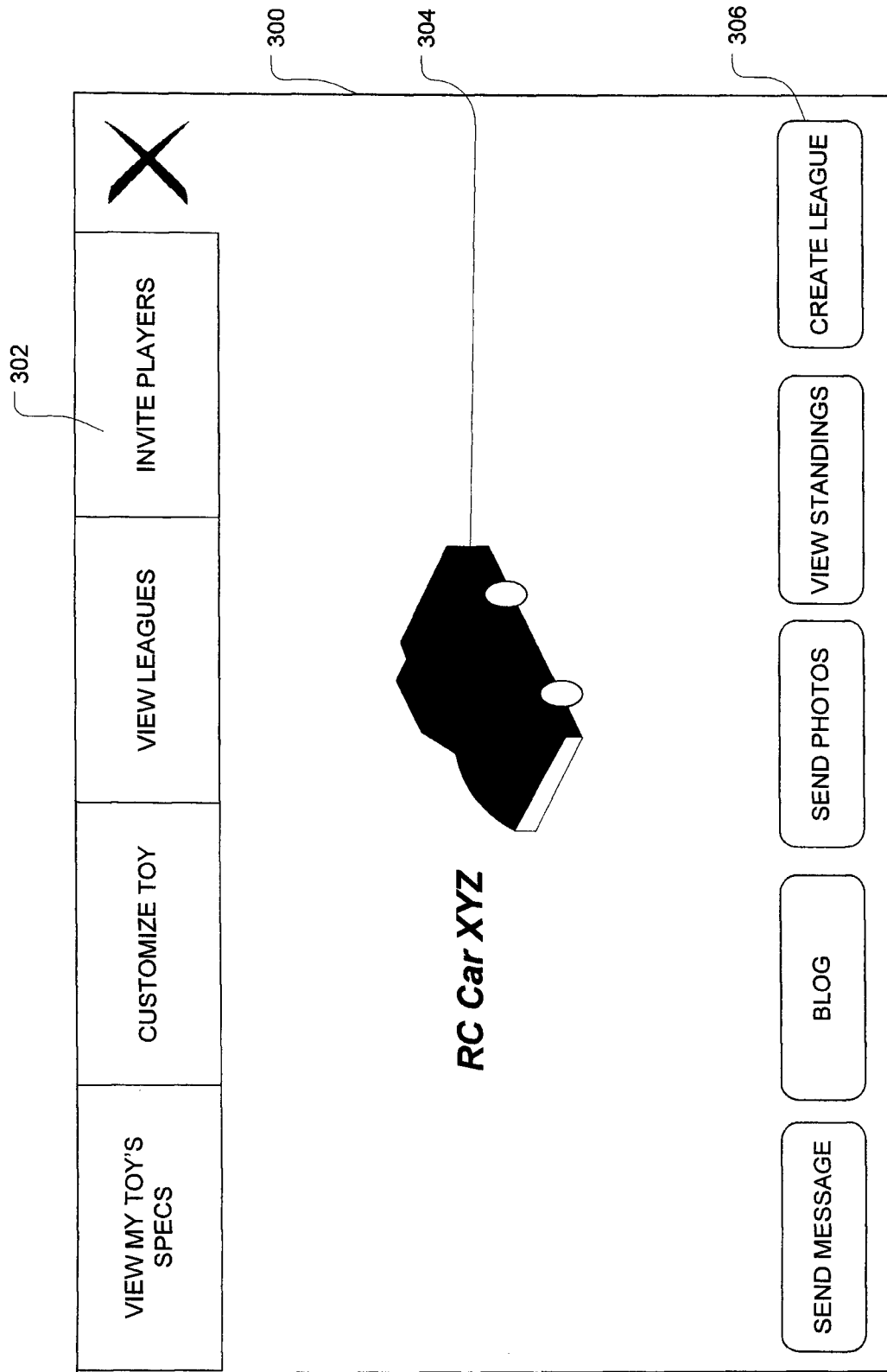


FIG. 6

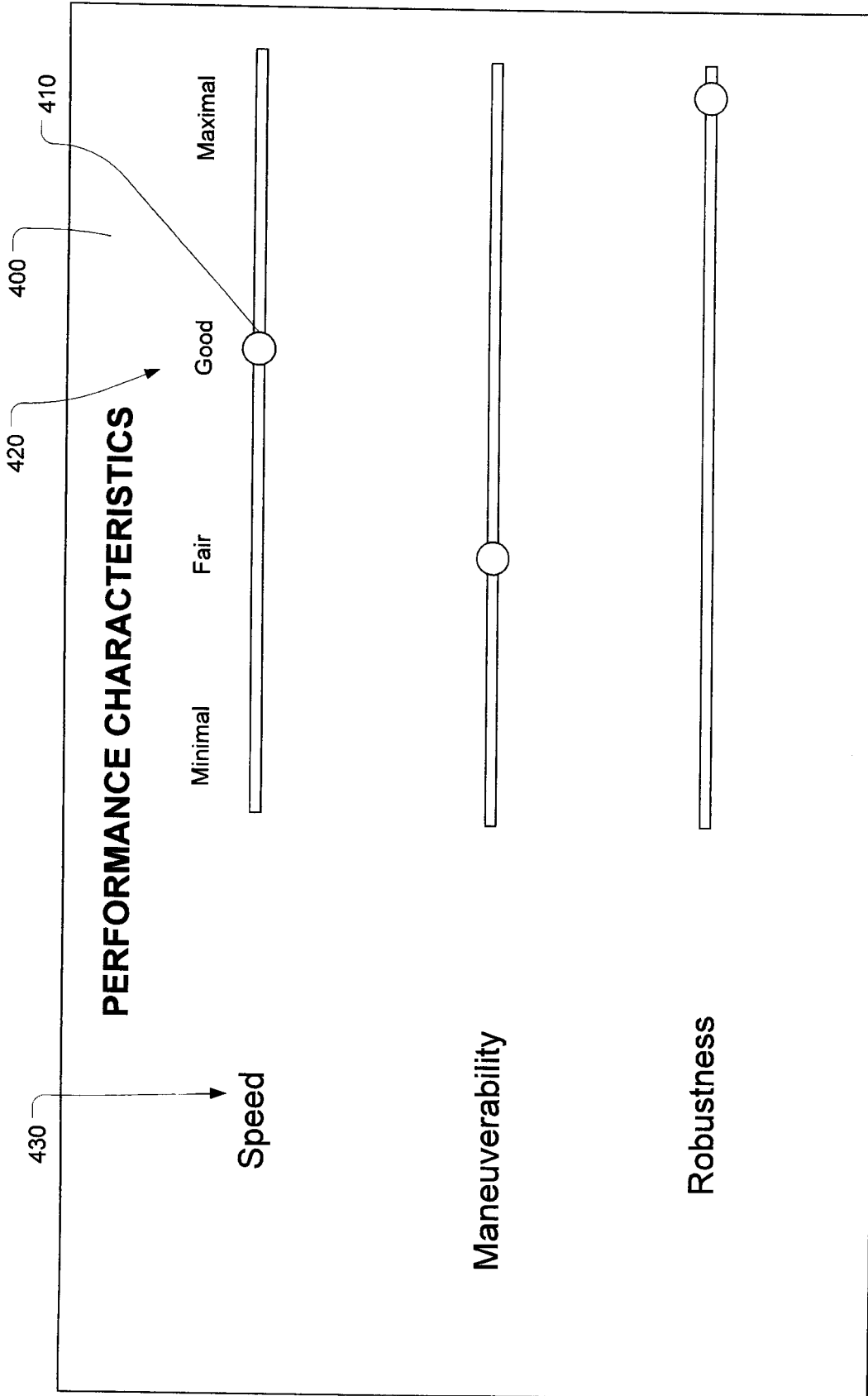


FIG. 7

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2013/000405

A. CLASSIFICATION OF SUBJECT MATTER IPC: <i>A63H 30/04</i> (2006.01) , <i>A63F 13/02</i> (2006.01) , <i>A63F 9/24</i> (2006.01) , <i>A63H 17/26</i> (2006.01) , <i>A63H 17/39</i> (2006.01) , <i>A63H 29/22</i> (2006.01) 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) IPC: A63H 30/04, A63F 13/02, A63F 9/24, A63H 17/26, A63H 17/39, A63H 29/22. USC: 463/40; 446/376; 446/465; 272/34; 446/484		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used) Keywords: toy, sensors, wireless communication device, bumper, processor, motor, body. Databases: TotalPatent, Epoque, USPTO, and Canadian Patent Database.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US2009/0005167A1 (ARRASVUORI et al.) 1 January 2009 (01-01-2009) *whole document*	1-3, 7-15, 18-24
Y		4-6, 16, 17
Y	US6949003B2 (HORNSBY et al.) 27 September 2005 (27-09-2005) *whole document*	4-6, 16, 17
A	US7927171B2 ((GOSZEWSKI et al.) 19 April 2011 (19-04-2011) *whole document*	1-24
A	US8075364B2 (WAI et al.)_13 December 2011 (13-12-2011) *whole document*	1-24
A	US5052680A (MALEWIKI et al.) 1 October 1991 (01-10-1991) *whole document*	1-24
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"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 18 June 2013 (18-06-2013)	Date of mailing of the international search report 31 July 2013 (31-07-2013)	
Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Authorized officer <b>Ciprian Galasiu (819) 953-0639</b>	

**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1.  Claim Nos. :  
because they relate to subject matter not required to be searched by this Authority, namely :
  
2.  Claim Nos. :  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :
  
3.  Claim Nos. :  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows :

Group A: Claims 1-20 refer to a remote-controlled toy.

Group B: Claims 21-24 refer to a computer-readable medium.

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

- Remark on Protest**  The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/CA2013/000405**

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2009005167A1	01 January 2009 (01-01-2009)	US2009005167A1 WO2006056231A1	01 January 2009 (01-01-2009) 01 June 2006 (01-06-2006)
US6949003B2	27 September 2005 (27-09-2005)	AU9637701A US2002123297A1 US2002049021A1 US7033243B2 US2002177383A1 US7131887B2 WO0226338A1	08 April 2002 (08-04-2002) 05 September 2002 (05-09-2002) 25 April 2002 (25-04-2002) 25 April 2006 (25-04-2006) 28 November 2002 (28-11-2002) 07 November 2006 (07-11-2006) 04 April 2002 (04-04-2002)
US7927171B2	19 April 2011 (19-04-2011)	CA2608617A1 US2009075549A1	19 March 2009 (19-03-2009) 19 March 2009 (19-03-2009)
US8075364B2	13 December 2011 (13-12-2011)	EP2193829A1 FR2950263A1 GB0921017D0 GB2465886A US2010144234A1	09 June 2010 (09-06-2010) 25 March 2011 (25-03-2011) 13 January 2010 (13-01-2010) 09 June 2010 (09-06-2010) 10 June 2010 (10-06-2010)
US5052680A	01 October 1991 (01-10-1991)	None	