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(54) **INTERACTIVE TOY**

(57) An interactive toy is provided. The toy includes a toy body with at least one sensor and an environmental body. The toy body may be placed in the toy environmental body. The at least one sensor may collect at least one physical factor of the toy environment; the toy body is controlled based on the at least one physical factor of the toy environment collected by the at least one sensor.

The toy environmental body changes in response to a change in the toy body as controlled. The toy body provided with the sensor may be placed in a specific environmental body, a special playing experience is produced, and the interactivity and fun of the toy are improved.

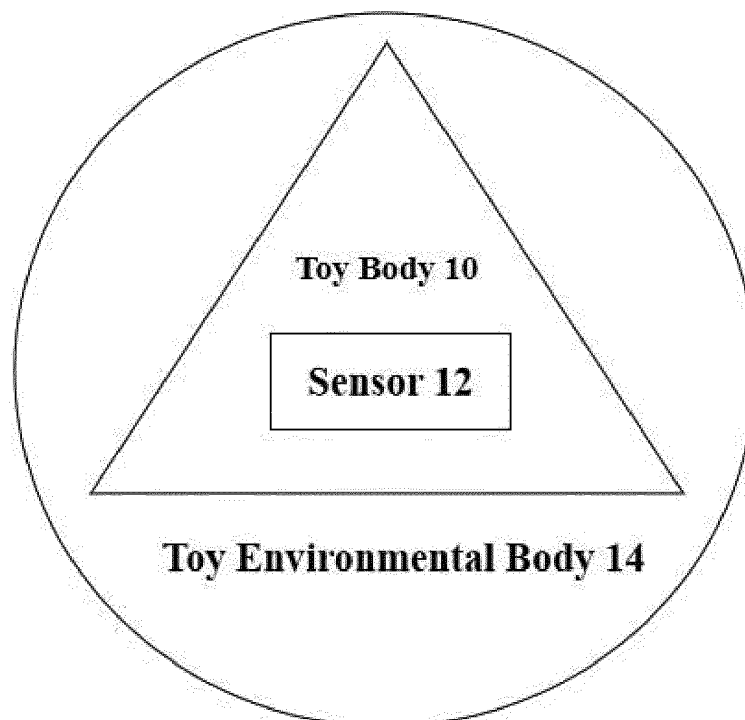


FIG. 1

Description

RELATED APPLICATIONS

[0001] This application claims the benefit of priority of Chinese Application No. 202120553565.8, filed on March 17, 2021, and granted on September 29, 2021, and the content of which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of toys, especially to an interactive toy.

BACKGROUND

[0003] The technologies in the field of toys field have been upgraded quickly with the developments in networks and other new technologies. New toy products and ways of interaction have been developed, and people pay more attention to their interaction experience. Interactive toys refer to toys that can respond to human actions (such as voice, body movements, etc.).

[0004] Currently, the most common interactive toys on the market are for preschool education. However, these toys do not have desirable interactivity. Both the card-type expansion mode and the click-type selection menu only allow a unidirectional control mode for children, and result in simple feedback. The interaction design of toys should be based on the fact that children's learning is based on direct experience, and their cognition of things is perceptual, concrete and visual in order to provide children opportunities to touch, feel, and experience. Interactive toys would be an important way for children to learn and experience.

SUMMARY

[0005] The present disclosure provides an interactive toy, the toy includes a toy environmental body; and a toy body for being placed in the environmental body, including at least one sensor to collect at least one toy environmental physical factor, where the toy body is controlled based on the at least one toy environmental physical factor, and the toy environmental body changes in response to a change of the toy body.

[0006] The present disclosure further provides an interaction method of playing an interactive toy, including: providing a toy environmental body, and a toy body for being placed in the environmental body and including at least one sensor; collecting, by the at least one sensor, at least one toy environmental physical factor; controlling the toy body based on the at least one toy environmental physical factor; and changing the toy environmental body in response to an change of the toy body.

[0007] The present disclosure provides an interactive toy. The toy body may be placed in a specific environment

to have a specific response when the physical environment of the toy is changed by children, thereby providing specific changes in the environment to allow children to feel, operate, and experience, and improving the fun of the toy.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] To clearly illustrate the technical solutions and advantages of the present disclosure, the following is a brief introduction to some exemplary embodiments of the present disclosure. It is obvious that the following descriptions of the attached drawings are only for some exemplary embodiments of the present disclosure. Other drawings can be obtained by a person skilled in the art based on these drawings without creative efforts.

FIG. 1 is a schematic diagram of the structure of an interactive toy according to some exemplary embodiments of the present disclosure; and

FIG. 2 is a schematic diagram of the structure of a toy body of an interactive toy according to some exemplary embodiments of the present disclosure.

DETAILED DESCRIPTION

[0009] The technical solutions in some exemplary embodiments of the present disclosure will be described with reference to the accompany drawings. Obviously, the described exemplary embodiments are only a part of the embodiments of the present disclosure. Based on these exemplary embodiments of the present disclosure, all other embodiments obtained by a person of ordinary skill in the art without creative efforts fall within the scope of the present disclosure.

[0010] It should be noted that the terms "first", "second", etc. in the present disclosure are used to distinguish similar objects and do not indicate a particular order or sequence. It is to be understood that the data so used are exchangeable under appropriate circumstances so that the exemplary embodiments described herein may be implemented in sequences other than those illustrated or described herein.. In addition, the terms "comprise" and "include" and any variations thereof, are intended to cover non-exclusive inclusions, e.g., a process, method, system, product, or server that is described as including a series of steps or units may not be limited to those steps or units listed, rather, it may include other steps or units that are not explicitly listed, as well as those inherent to the process, method, system, product, or server.

[0011] Referring to FIG. 1, which is a structural schematic diagram of an interactive toy provided by some exemplary embodiments of the present disclosure, a toy may include a toy body 10 including at least one sensor 12, and a toy environmental body 14. The toy body is arranged in the toy environmental body 14. The at least one sensor 12 may collect at least one toy environmental physical factor. The toy body 10 may be controlled based

on the at least one toy environmental physical factor collected by the at least one sensor 12, and the toy environmental body 14 changes in response to a change of the toy body 10 as controlled.

[0012] In some exemplary embodiments of the present disclosure, the toy body includes, but is not limited to, a puppet, a doll, an ornament, a building block, a handicraft, a model (e.g., an animal model such as dinosaur or a bird), and a picture(s) of the toy body may or may not be shown on the toy box. The sensor 12 may be a vibration sensor, a light sensor, a temperature sensor, a resistive sensor, an inductive sensor, a capacitive sensor, a piezoelectric sensor, a magneto-electric sensor, an ultrasonic sensor, a thermal sensor, a humidity sensor, a gas sensor, a vacuum sensor, a biosensor, or the like.

[0013] The toy environmental body 14 may be made of particles, powder, paper, liquid, gas, foam or sticky substances, such as bonded sand, soil, powder, etc., cassia seeds or beans, foam particles, PPE (polypropylene) particles, slime, and the like. In the case where the toy environmental body is made of a viscous and/or sticky substance, it may be removed from the toy body without a digging tool. For example, children may remove the sticky substance by hands. In some exemplary embodiments of the present disclosure, the specific shape of the toy environmental body is not limited, which may be in a regular shape (such as sphere, cylinder, quadrangular prism, hexagonal prism, etc.), or an irregular shape (such as a pear, a mountain, an egg, etc.). Alternatively, it may be in a shape naturally formed within a container, a random shape, or a box (the box may be made of plastic, paper, or the like).

[0014] The physical factor of the toy environmental body may be a physical factor of the environment that can be collected by the at least one sensor. The at least one sensor 12 may collect the physical factor of the toy environment in real time, at a preset frequency, or in response to a change of the environment. The toy environmental physical factor may include, but is not limited to, force, displacement, light, temperature, humidity, electromagnet, resistance, inductance, capacitance, sound waves, ultrasonic waves, pressure, gas species information, biological determination information (for determining whether it is a biological substance, or determining the species of the biological substance), vibration, etc. The physical factor may be a specific value, or a range.

[0015] Referring to FIG. 2, which is a schematic diagram of the structure of a toy body of an interactive toy according to some exemplary embodiments of the present disclosure, the toy body of the interactive toy 10 may include at least one of a first sensor 20, or a second sensor 22, and may further include other sensors (not shown). Therefore, the collecting of the at least one toy environmental physical factor by the at least one sensor may include: the first sensor 20 collecting a vibration signal, and/or the second sensor collecting a light signal, and/or a third sensor collecting temperature information, and/or a fourth sensor collecting resistance change in-

formation, and/or a fifth sensor collecting inductance change information, and/or a sixth sensor collecting capacitance change information, and/or a seventh sensor collecting piezoelectric information, and/or an eighth sensor collecting electromagnetic induction information, and/or a ninth sensor collecting ultrasonic information, and/or a tenth sensor collecting thermal information, and/or an eleventh sensor collecting humidity information, and/or a twelfth sensor collecting gas concentration and/or composition information, and/or a thirteenth sensor collecting air pressure information, and/or a fourteenth sensor collecting the biological substance information. Correspondingly, the toy body may be controlled based on the at least one toy environmental physical factor collected by the at least one sensor, which may include: controlling the toy body 10 based on the vibration information, and/or the light information, and/or the temperature information, and/or the resistance change information, and/or the inductance change information, and/or the capacitance change information, and/or the piezoelectric information, and/or the electromagnetic induction information, and/or the ultrasonic information, and/or the thermal information, and/or the humidity information, and/or the gas concentration and/or composition information, and/or the air pressure information, and/or the biological substance information, collected by respective sensors.

[0016] The toy body 10 may include, but is not limited to, at least one of the following effect elements: a vibration motor 24, a light source 25, a buzzer 26, and a speaker 27, and may further include other devices that may cause changes of the toy body 10. The toy body 10 may further include a circuit 28, which may be printed on a printed circuit board. Correspondingly, the toy body may be controlled based on the at least one toy environmental physical factor collected by the at least one sensor, which may include: the vibration information, and/or the light information, and/or the temperature information, and/or the resistance change information, and/or the inductance change information, and/or the capacitance change information, and/or the piezoelectric information, and/or the electromagnetic induction information, and/or the ultrasonic information, and/or the heat information, and/or the humidity information, and/or the gas concentration and/or composition information, and/or the air pressure information, and/or the biology substance information may be transmitted to the circuit 28; the circuit 28 controls the at least one vibration motor 24, and/or at least one light source 25, and/or at least one buzzer 26, and/or at least one speaker 27 to work based on the vibration information, and/or the light information, and/or the temperature information, and/or the resistance change information, and/or the inductance change information, and/or the capacitance change information, and/or the piezoelectric information, and/or the electromagnetic induction information, and/or the ultrasonic information, and/or the heat information, and/or the humidity information, and/or the gas concentration and/or composition in-

formation, and/or the air pressure information, and/or the biology substance information. The effect element operation may include, but is not limited to, one or more of the following: the vibration motor vibrating, the light source emitting lights, the buzzer and/or speaker issuing sounds.

[0017] In some exemplary embodiments, the toy body may be a dinosaur model, the at least one sensor of may be a vibration sensor. The dinosaur model may be provided with a vibration motor. The vibration sensor may collect vibration information, and the vibration motor may be controlled to vibrate based on the vibration information collected by the vibration sensor. When the toy environmental body is a block material formed by gypsum and/or sand; the vibration information may be generated by shaking or breaking of the block material. When the sensor is a light sensor, the dinosaur model may be provided with a light source; the light sensor collects luminosity (light brightness) information; the light source of the dinosaur model may be controlled to emit light based on the luminosity information collected by the light sensor. In some exemplary embodiments, the vibration motor, the light source, the buzzer, and/or the speaker may be respectively controlled by the printed circuit board according to signals from different sensors, thereby improving control accuracy and enriching playing details.

[0018] The first sensor and the second sensor may be one sensor or multiple sensors. The terms "first" and "second" are used herein to distinguish various sensors. In addition, in actual applications, the toy body may be controlled to perform one or more of the vibrating, light emitting, and sounding operations. Moreover, these operations or some of them may be performed in a predetermined order.

[0019] In some exemplary embodiments, the toy environmental body may change in response to a change of the toy body as controlled. This may include: the toy environmental body 14 (not shown in FIG. 2) responding to a physical change of the toy body 10 caused by a vibration control. The physical change may be a spatial movement, such as moving, swaying, shaking, etc. (when the toy environmental body is a block material formed by gypsum or sand, etc.), or may flow naturally under gravity, etc. (when the toy environmental body is a material of cassia sand, sand, etc.).

[0020] The number of the vibration motor 24, the light source 25, the buzzer 26, and the speaker 27 may be one or more. Those elements may be arranged in right positions as needed, so that the vibration motor 24, the light source 25, the buzzer 26, and/or the speaker 27 may be triggered to vibrate, emit light, and/or sounds in response to the vibration signal and/or the light signal collected by the respective sensors, so as to achieve an effect of vibration, light emitting or sounding of a part or the entire toy body. Specifically, for example, the toy body may be dinosaur model, and a vibration motor may be provided on a front paw(s) of the dinosaur model, so that it may be triggered to achieve an effect of the dinosaur

model waving its front paw(s). A speaker may be provided in the mouth of the dinosaur model, which may be triggered to achieve an effect of the dinosaur roaring or greeting.

[0021] In some exemplary embodiments, the toy may further include at least one switch device in a circuit to control the toy to remain in a power-off state, until it is triggered to enter/turn to an power-on state. This may be implemented by removing the switch device from the circuit, or adjusting it to a switch-on state. There may be one or more switch devices to control the on/off state in different ways.

[0022] In some exemplary embodiments, the toy may further include a tool for separating the toy environmental body from the toy body. The tool may be a hand, a hand-shaped tool, or other tool that may facilitate separation of the toy environmental body from the toy body. The toy may further include at least one toy body digging tool, and/or a peripheral tool of the toy. The toy body digging tool includes, but is not limited to, a toy hammer, and/or toy brush, etc. The toy body digging tool may be used to separate the toy environmental body from the toy body, and may also be used as a decoration of the toy body. The peripheral tool may include, but is not limited to, paint, apron/covering (to prevent contamination), goggles, magnifying glasses, etc. The toy body may be decorated by painting the toy body with the toy brush having the paint. The peripheral tool may play a protective role, and improve the sense of participation and the fun to play the toy.

[0023] The present disclosure provides an interactive toy, by placing a doll, etc., in a specific environment, a specific response from the doll may be triggered when physical environment of the toy is changed. Accordingly, the specific environment is changed. It provides children with the opportunities to operate, feel and experience the toy by hands, and improves the fun of the toy.

[0024] Some examples of practical applications of the interactive toy according to the present disclosure will be described below.

[0025] For example, the toy body may be a plastic panda doll with a vibration sensor inside the panda doll. The panda doll may be hidden in the cassia sand in advance. A child may tap the sand, and the vibration sensor in the panda doll may sense the tapping operation, and the panda doll is triggered to vibrate, so that the panda doll is exposed from the sand due to the vibration. Thus the child finds the panda doll. The toy may be played at home or in a children's entertainment venue. That is, it may be played by children with or without adults.

[0026] In another example, the toy body may be a model of a dinosaur (including dinosaur fossils), and the dinosaur model may be installed with a vibration sensor and a light sensor. Two light sources may be installed in dinosaur eyes, and an additional light source may be installed on the forehead or in the mouth of the dinosaur. The toy environmental body may be a block material formed by gypsum or sand. The dinosaur model may be

placed in the block material formed by gypsum or sand. Prior to playing with the toy, a plastic tag for maintaining the toy in a power-off state exposed from the block material is removed. Next, when the block material is played, the vibration sensor senses vibration information and the toy body is triggered to vibrate, which cause the vibration of the block material around the toy body. This may cause a feeling that the animal inside the block material is still alive, and the child may be curious to find what animal it is. Thus, the child may continue to remove the block material with a special archaeological tool(s) such as a toy hammer. In this process, when the eyes of the dinosaur model are exposed, that is, when the light sensor detects the ambient light (lamp light, sunlight, etc.), the light source may be triggered to emit light, thus giving children the feeling that the eyes of the dinosaur are open, increasing the fun of the toy. Finally, the toy hammer may be inserted into the toy environmental body as a decoration (the toy environmental body is broken plaster or scattered sand), which may be placed next to the dinosaur fossils. In addition, the toy may also include paint, aprons, sponges, goggles, magnifying glasses, stickers (stickers with labels or patterns that may be attached to the toy hammer, toy body, etc. as decorations) etc. to increase the fun of the toy.

[0027] The toys described above need the coordination and participation of the children's hands, eyes, and brain, resulting in exercises in both touch sense and vision sense. The interactivity and fun of the toys are improved.

[0028] Some exemplary embodiments of the present disclosure have been described above, and the foregoing description is exemplary, not exhaustive. The present disclosure is not limited to the theses exemplary embodiments. Without departing from the scope and spirit of the embodiments, many modifications and changes may be apparent to a person of ordinary skill in the art. The terminology used herein has been selected to best explain the principles, practical applications, or improvements of the present disclosure, or to enable ordinary person skilled in the art to understand the various exemplary embodiments disclosed herein.

[0029] The present invention provides an interactive toy, comprising: a toy environmental body; and a toy body for being placed in the environmental body, including at least one sensor to collect at least one toy environmental physical factor, wherein the toy body is controlled based on the at least one toy environmental physical factor, and the toy environmental body changes in response to a change of the toy body.

[0030] Preferably, the at least one sensor includes at least one of a vibration sensor, a light sensor, a temperature sensor, a resistive sensor, an inductive sensor, a capacitive sensor, a piezoelectric sensor, a magnetoelectric sensor, an ultrasonic sensor, a thermal sensor, a moisture sensor, a gas sensor, a vacuum sensor, or a biosensor; and the at least one toy environmental physical factor includes at least one of pressure information,

a displacement, a luminosity, or a temperature.

[0031] Preferably, the at least one sensor includes: a first sensor configured to collect vibration information; a second sensor configured to collect light information; a third sensor configured to collect temperature information; a fourth sensor configured to collect resistance change information; a fifth sensor configured to collect inductance change information; a sixth sensor configured to collect capacitance change information; a seventh sensor configured to collect piezoelectric information; an eighth sensor configured to collect electromagnetic induction information; a ninth sensor configured to collect ultrasonic information; a tenth sensor configured to collect thermal information; an eleventh sensor configured to collect humidity information; a twelfth sensor configured to collect at least one of gas concentration information, or gas composition information; a thirteen sensor configured to collect air pressure information; or a fourteenth sensor configured to collect biological substance information.

[0032] Preferably, the toy body further includes at least one effect element to create effects for the interactive toy; and a circuit, wherein the at least one effect element includes at least one of a vibration motor, a light source, a buzzer, or a speaker, the toy body is controlled based on the at least one toy environmental physical factor, the at least one sensor transmits the at least one toy environmental physical factor to the circuit, and the circuit controls the effect element to operate based on the at least one toy environmental physical factor.

[0033] Optionally, the toy further includes at least one switch device disposed in the circuit to control the interactive toy remaining in a power-off state; and removing the switch device from the circuit triggers the interactive toy to turn to a power-on state.

[0034] Optionally, the toy environmental body is made at least one of particles, powder, paper, liquid, gas, foam, or a sticky substance.

[0035] Optionally, the interactive toy further includes at least one of a toy body digging tool, or a toy peripheral tool; the toy body digging tool includes at least one of a toy hammer, or a toy brush; and the toy peripheral tool includes a paint to paint the toy body.

[0036] Optionally, the toy body is an animal model; the at least one sensor is a vibration sensor configured to collect vibration information; and the animal model includes a vibration motor configured to vibrate based on the vibration information collected by the vibration sensor.

[0037] Optionally, the toy environmental body is a block material formed by at least one of gypsum, or sand; and the vibration information is generated based on shaking or breaking of the block material.

[0038] Optionally, the at least one sensor further includes a light sensor configured to collect luminosity information; the animal model includes a light source; and the light source is controlled to emit light based on the luminosity information.

[0039] Our invention further provides an interaction method of playing an interactive toy, comprising: providing a toy environmental body, and a toy body for being placed in the environmental body and including at least one sensor; collecting, by the at least one sensor, at least one toy environmental physical factor; controlling the toy body based on the at least one toy environmental physical factor; and changing the toy environmental body in response to an change of the toy body.

[0040] Preferably, the at least one sensor includes at least one of a vibration sensor, a light sensor, a temperature sensor, a resistive sensor, an inductive sensor, a capacitive sensor, a piezoelectric sensor, a magnetoelectric sensor, an ultrasonic sensor, a thermal sensor, a moisture sensor, a gas sensor, a vacuum sensor, or a biosensor; and the at least one toy environmental physical factor includes at least one of pressure information, a displacement, a luminosity, or a temperature.

[0041] Preferably, the at least one sensor includes: a first sensor configured to collect vibration information; a second sensor configured to collect light information; a third sensor configured to collect temperature information; a fourth sensor configured to collect resistance change information; a fifth sensor configured to collect inductance change information; a sixth sensor configured to collect capacitance change information; a seventh sensor configured to collect piezoelectric information; an eighth sensor configured to collect electromagnetic induction information; a ninth sensor configured to collect ultrasonic information; a tenth sensor configured to collect thermal information; an eleventh sensor configured to collect humidity information; a twelfth sensor configured to collect at least one of gas concentration information, or gas composition information; a thirteen sensor configured to collect air pressure information; or a fourteenth sensor configured to collect biological substance information.

[0042] Preferably, the toy body further includes at least one effect element to create effects for the interactive toy; and a circuit, wherein the at least one effect element includes at least one of a vibration motor, a light source, a buzzer, or a speaker, the toy body is controlled based on the at least one toy environmental physical factor, the at least one sensor transmits the at least one toy environmental physical factor to the circuit, and the circuit controls the effect element to operate based on the at least one toy environmental physical factor.

[0043] Optionally, the toy further includes at least one switch device disposed in the circuit to control the interactive toy remaining in a power-off state; and removing the switch device from the circuit triggers the interactive toy to turn to a power-on state.

[0044] Optionally, the toy environmental body is made at least one of particles, powder, paper, liquid, gas, foam, or a sticky substance.

[0045] Optionally, the interactive toy further includes at least one of a toy body digging tool, or a toy peripheral tool; the toy body digging tool includes at least one of a

toy hammer, or a toy brush; and the toy peripheral tool includes a paint to paint the toy body.

[0046] Optionally, the toy body is an animal model; the at least one sensor is a vibration sensor configured to collect vibration information; and the animal model includes a vibration motor configured to vibrate based on the vibration information collected by the vibration sensor.

[0047] Optionally, the toy environmental body is a block material formed by at least one of gypsum, or sand; and the vibration information is generated based on shaking or breaking of the block material.

[0048] Optionally, the at least one sensor further includes a light sensor configured to collect luminosity information; the animal model includes a light source; and the light source is controlled to emit light based on the luminosity information.

Claims

1. An interactive toy, comprising:

a toy environmental body; and
a toy body for being placed in the environmental body, including at least one sensor to collect at least one toy environmental physical factor, wherein
the toy body is controlled based on the at least one toy environmental physical factor, and
the toy environmental body changes in response to a change of the toy body.

2. The interactive toy according to claim 1, wherein

the at least one sensor includes at least one of a vibration sensor, a light sensor, a temperature sensor, a resistive sensor, an inductive sensor, a capacitive sensor, a piezoelectric sensor, a magnetoelectric sensor, an ultrasonic sensor, a thermal sensor, a moisture sensor, a gas sensor, a vacuum sensor, or a biosensor; and
the at least one toy environmental physical factor includes at least one of pressure information, a displacement, a luminosity, or a temperature.

3. The interactive toy according to claim 2, wherein the at least one sensor includes: a first sensor configured to collect vibration information;

a second sensor configured to collect light information;
a third sensor configured to collect temperature information;
a fourth sensor configured to collect resistance change information;
a fifth sensor configured to collect inductance change information;

a sixth sensor configured to collect capacitance change information;
 a seventh sensor configured to collect piezoelectric information;
 an eighth sensor configured to collect electromagnetic induction information;
 a ninth sensor configured to collect ultrasonic information;
 a tenth sensor configured to collect thermal information;
 an eleventh sensor configured to collect humidity information;
 a twelfth sensor configured to collect at least one of gas concentration information, or gas composition information;
 a thirteen sensor configured to collect air pressure information; or
 a fourteenth sensor configured to collect biological substance information.

4. The interactive toy according to claim 3, wherein

the toy body further includes at least one effect element to create effects for the interactive toy;
 and
 a circuit, wherein
 the at least one effect element includes at least one of a vibration motor, a light source, a buzzer, or a speaker,
 the toy body is controlled based on the at least one toy environmental physical factor, the at least one sensor transmits the at least one toy environmental physical factor to the circuit, and the circuit controls the effect element to operate based on the at least one toy environmental physical factor.

5. The interactive toy according to claim 4, wherein

the toy further includes at least one switch device disposed in the circuit to control the interactive toy remaining in a power-off state; and removing the switch device from the circuit triggers the interactive toy to turn to a power-on state.

6. The interactive toy according to claim 1, wherein the toy environmental body is made at least one of particles, powder, paper, liquid, gas, foam, or a sticky substance.

7. The interactive toy according to claim 1, wherein

the interactive toy further includes at least one of a toy body digging tool, or a toy peripheral tool; the toy body digging tool includes at least one of a toy hammer, or a toy brush; and the toy peripheral tool includes a paint to paint

the toy body.

8. The interactive toy according to claim 1, wherein,

the toy body is an animal model;
 the at least one sensor is a vibration sensor configured to collect vibration information; and
 the animal model includes a vibration motor configured to vibrate based on the vibration information collected by the vibration sensor.

9. The interactive toy according to claim 8, wherein

the toy environmental body is a block material formed by at least one of gypsum, or sand; and the vibration information is generated based on shaking or breaking of the block material.

10. The interactive toy according to claim 9, wherein

the at least one sensor further includes a light sensor configured to collect luminosity information;
 the animal model includes a light source; and
 the light source is controlled to emit light based on the luminosity information.

11. An interaction method of playing an interactive toy, comprising:

providing a toy environmental body, and a toy body for being placed in the environmental body and including at least one sensor;
 collecting, by the at least one sensor, at least one toy environmental physical factor;
 controlling the toy body based on the at least one toy environmental physical factor; and
 changing the toy environmental body in response to an change of the toy body.

12. The method according to claim 11, wherein

the at least one sensor includes at least one of a vibration sensor, a light sensor, a temperature sensor, a resistive sensor, an inductive sensor, a capacitive sensor, a piezoelectric sensor, a magnetoelectric sensor, an ultrasonic sensor, a thermal sensor, a moisture sensor, a gas sensor, a vacuum sensor, or a biosensor; and
 the at least one toy environmental physical factor includes at least one of pressure information, a displacement, a luminosity, or a temperature.

13. The method according to claim 12, wherein the at least one sensor includes: a first sensor configured to collect vibration information;

a second sensor configured to collect light infor-

mation;
 a third sensor configured to collect temperature
 information;
 a fourth sensor configured to collect resistance
 change information; 5
 a fifth sensor configured to collect inductance
 change information;
 a sixth sensor configured to collect capacitance
 change information;
 a seventh sensor configured to collect piezoe- 10
 lectric information;
 an eighth sensor configured to collect electro-
 magnetic induction information;
 a ninth sensor configured to collect ultrasonic
 information; 15
 a tenth sensor configured to collect thermal in-
 formation;
 an eleventh sensor configured to collect humid-
 ity information;
 a twelfth sensor configured to collect at least one 20
 of gas concentration information, or gas compo-
 sition information;
 a thirteen sensor configured to collect air pres-
 sure information; or
 a fourteenth sensor configured to collect biolog- 25
 ical substance information.

14. The method according to claim 13, wherein

the toy body further includes at least one effect 30
 element to create effects for the interactive toy;
 and
 a circuit, wherein
 the at least one effect element includes at least
 one of a vibration motor, a light source, a buzzer, 35
 or a speaker,
 the toy body is controlled based on the at least
 one toy environmental physical factor, the at
 least one sensor transmits the at least one toy
 environmental physical factor to the circuit, and 40
 the circuit controls the effect element to operate
 based on the at least one toy environmental
 physical factor.

15. The method according to claim 11, wherein the toy 45
 environmental body is made at least one of particles,
 powder, paper, liquid, gas, foam, or a sticky sub-
 stance.

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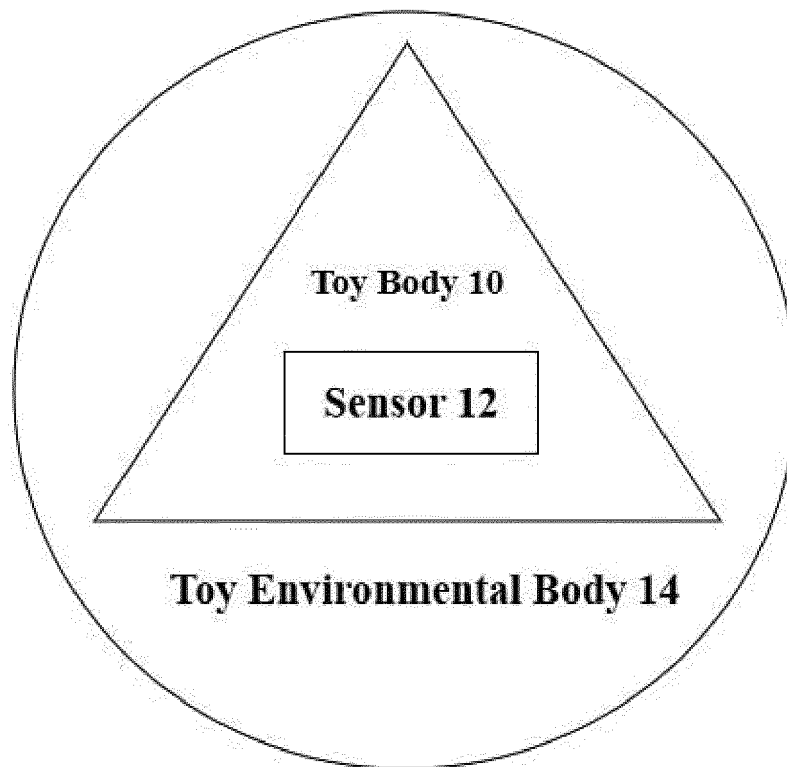


FIG. 1

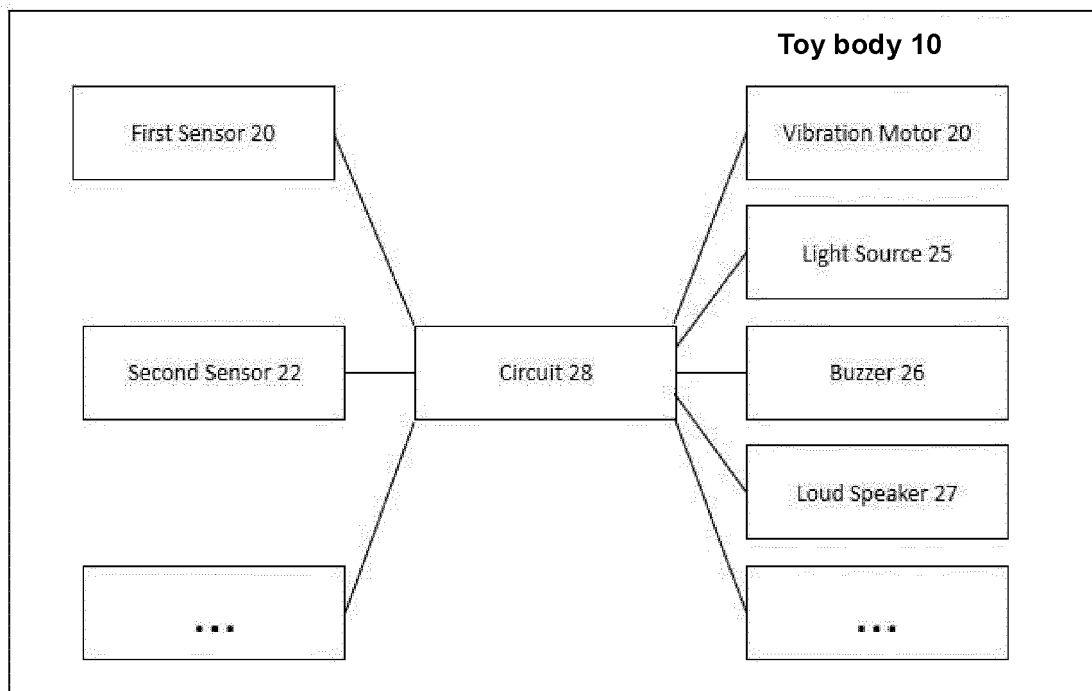


FIG. 2



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 2368

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 10 807 011 B2 (SPIN MASTER LTD [CA]) 20 October 2020 (2020-10-20)	1-8, 11-15	INV. A63H33/00
A	* column 5, line 35 - column 24, line 27; figures *	9,10	A63H3/00 A63H3/28
A	US 2003/176146 A1 (NORMAN CASEY [GB]) 18 September 2003 (2003-09-18) * paragraph [0036] - paragraph [0054]; figures *	1-15	
A	US 4 817 936 A (MATSUDA TAKASHI [JP]) 4 April 1989 (1989-04-04) * column 2, line 63 - column 6, line 24; figures *	1-15	
A	US 2020/094157 A1 (CHOI JONG-ILL [KR]) 26 March 2020 (2020-03-26) * paragraph [0044] - paragraph [0088]; figures *	1-15	
A	JP H02 252485 A (SUMITOMO CEMENT CO) 11 October 1990 (1990-10-11) * the whole document *	9	TECHNICAL FIELDS SEARCHED (IPC) A63H
The present search report has been drawn up for all claims			

2

Place of search

Munich

Date of completion of the search

10 August 2022

Examiner

Lucas, Peter

CATEGORY OF CITED DOCUMENTS

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ON EUROPEAN PATENT APPLICATION NO.

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10-08-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 10807011 B2	20-10-2020	CN 106362409 A	01-02-2017
		CN 111282290 A	16-06-2020
		CN 113368508 A	10-09-2021
		CN 114307179 A	12-04-2022
		CN 206198675 U	31-05-2017
		CN 206252839 U	16-06-2017
		CN 206965123 U	06-02-2018
		EP 3132835 A2	22-02-2017
		EP 3406314 A1	28-11-2018
		EP 3417922 A2	26-12-2018
		EP 3431155 A2	23-01-2019
		EP 3431156 A2	23-01-2019
		EP 3431157 A2	23-01-2019
		EP 3431158 A2	23-01-2019
		EP 3785778 A1	03-03-2021
		EP 3865196 A1	18-08-2021
		EP 4019104 A2	29-06-2022
		ES 2699684 T3	12-02-2019
		ES 2779987 T3	21-08-2020
		ES 2788696 T3	22-10-2020
		ES 2797787 T3	03-12-2020
		ES 2797921 T3	04-12-2020
		ES 2801852 T3	14-01-2021
		ES 2802246 T3	18-01-2021
		PL 3406314 T3	29-06-2020
		US 2017106298 A1	20-04-2017
		US 2017106300 A1	20-04-2017
		US 2017216734 A1	03-08-2017
		US 2018207539 A1	26-07-2018
		US 2019217213 A1	18-07-2019
		US 2021023466 A1	28-01-2021
		US 2021205720 A1	08-07-2021
US 2003176146 A1	18-09-2003	EP 1326690 A1	16-07-2003
		GB 2367766 A	17-04-2002
		US 2003176146 A1	18-09-2003
		US 2005075041 A1	07-04-2005
		WO 0232532 A1	25-04-2002
US 4817936 A	04-04-1989	NONE	
US 2020094157 A1	26-03-2020	CN 110935179 A	31-03-2020
		KR 102030937 B1	10-10-2019
		US 2020094157 A1	26-03-2020
		US 2021370195 A1	02-12-2021

EPO FORM P0459

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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 22 16 2368

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The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-08-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP H02252485	A	11-10-1990	NONE

EPO FORM P0459

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202120553565 [0001]