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(54) MAGNETIC INDUCTION TRIGGER TOY AND CONTROL METHOD THEREOF

(57) The present invention relates to a magnetic induction trigger toy and control method thereof, where the magnetic induction trigger toy includes an external trigger with a magnet inside, and a toy body, which provided with Hall sensors, a controller, switching buttons and a response output module. The controller selects a corresponding group of response files in response to a trigger by the switching button, and according to the order in which the magnet triggers the Hall sensor, selects a cor-

responding response file from the current group of response files and output it to the response output module, thus enables the response output module to make a corresponding response action according to the response file. The solution disclosed herein can achieve a variety of control effects with fewer number of Hall sensors, enable the toy a smaller volume and less cost during manufacture, and the interactive toys' playability is improved.

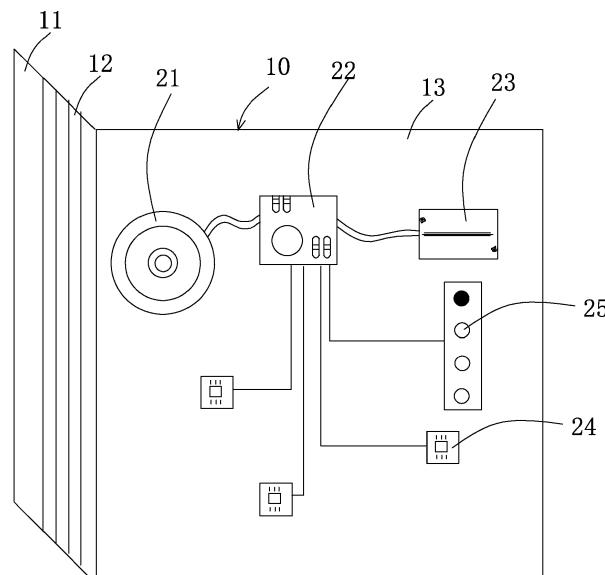


FIG. 1

Description

TECHNICAL FIELD

[0001] The present invention relates to a sound-producing toy, and in particular, to a toy triggered by magnetic induction and control method thereof.

BACKGROUND

[0002] Currently, there are a variety of interactive toys in the market. An interactive toy will make a respond action accordingly at the time of being triggered by a user, and bring fun to the user with a diversity of interaction.

[0003] On the present market, there are also interactive toys that sense magnets through a Hall sensor, thus triggering the induction effect. Usually, one Hall sensor corresponds to one action mode, that is, if a toy is desired to respond different actions, a plurality of Hall sensors is needed, which in fact lead to a larger size of the toy and add up the manufacture cost thereof.

SUMMARY

[0004] The present invention is intended to address at least one of the technical problems in the prior art, herein provided with a magnetic induction trigger toy and a control method thereof.

[0005] The technical solutions used in the present invention are as follows:

According to a first aspect of the present invention, a magnetic induction trigger toy is disclosed, including:

an external trigger with a magnet inside;
a toy body provided with:

a plurality of Hall sensors respectively placed at different positions of the toy body;
a controller stored with a plurality of groups of response files, and each of which includes a plurality of response files;
a response output module connected with the controller and used to make corresponding response actions according to different response files;
a plurality of switching buttons respectively connected with the controller and used to switch the group of response files;
the controller selects a corresponding group of response files in response to a trigger by the switching button, and selects a corresponding response file from the current group of response files according to the order in which the magnet triggers the Hall sensor and output it to the response output module, thus enables the response output module to make a corresponding response action according to the response file.

[0006] The magnetic induction trigger toy provides at least the following beneficial effects that including: switching between different group of response files through the switch buttons, and selecting a corresponding response file from the current group of response files according to the order in which the magnet triggers the Hall sensor, with these two features combined, to achieve a variety of control effects with fewer number of Hall sensors (i.e., the number of Hall sensors are reduced), thus enable the toy a smaller volume and less cost during manufacture, and the interactive toys' playability is improved.

[0007] According to the first aspect of the present invention, the response file is a sound file, and the response output module is a speaker; the controller causes the speaker to make a sound according to the sound file.

[0008] According to the first aspect of the present invention, the response file is a light control command, and the response output module is a plurality of bulbs; the controller causes the plurality of bulbs to turn on/off according to the light control command to generate a graphic pattern.

[0009] According to the first aspect of the present invention, the toy body includes a cover, a plurality of book pages and a bottom, and the cover and the plurality of book pages are connected to a side of the bottom and can rotate vertically relative to the bottom around the side.

[0010] According to the first aspect of the present invention, the plurality of the Hall sensors, the controller and the plurality of switching buttons are provided on the bottom.

[0011] According to the first aspect of the present invention, a mark is provided on the book page corresponding to the position of the Hall sensor.

[0012] According to a second aspect of the present invention, a method for controlling a magnetic induction trigger toy is disclosed, including the following steps:

selecting a corresponding group of response files in response to a trigger by a switching button;
selecting a corresponding response file from the current group of response files according to an order in which a magnet triggers different Hall sensors;
outputting the response file to a response output module;
enabling the response output module to make a corresponding response action according to the response file.

[0013] The method for controlling a magnetic induction trigger toy provides at least the following beneficial effects that including: switching between different group of response files through the switch buttons, and selecting a corresponding response file from the current group of response files according to the order in which the magnet triggers the Hall sensor, with these two features combined, to achieve a variety of control effects with fewer number of Hall sensors (i.e., the number of Hall sensors

are reduced), thus enable the toy a smaller volume and less cost during manufacture, and the interactive toys' playability is improved.

[0014] According to the second aspect of the present invention, selecting a corresponding response file from the current group of response files according to an order in which a magnet triggers different Hall sensors includes:

numbering the Hall sensors;
detecting that the magnet triggers a Hall sensor;
within a limited time period, detecting that the magnet triggers another Hall sensor;
arraying the numbers of the two Hall sensors in the order of being triggered and retrieving a corresponding response file in the current group of response files from a relationship list.

[0015] According to the second aspect of the present invention, the response file is a sound file, and the response output module is a speaker; the response action refers to the speaker making sound according to the sound file.

[0016] According to the second aspect of the present invention, the response file is a light control command, and the response output module is a plurality of bulbs; the response action refers to the plurality of bulbs turning on/off according to the light control command to generate a graphic pattern.

[0017] Additional aspects and advantages of the present invention will be partially given in the following description, and will become apparent from the following description, or be learned through the practice of the present invention.

BRIEF DESCRIPTION OF DRAWINGS

[0018] The present invention will be further described below with reference to the drawings and examples.

FIG. 1 is a schematic structural diagram of a magnetic induction trigger toy according to an embodiment of the present invention;

FIG. 2 is an operation schematic diagram of a magnetic induction trigger toy according to an embodiment of the present invention;

FIG. 3 is another operation schematic diagram of a magnetic induction trigger toy according to an embodiment of the present invention;

FIG. 4 is a schematic flowchart of a method for controlling a magnetic induction trigger toy according to an embodiment of the present invention;

FIG. 5 is a schematic flowchart of step S200.

DESCRIPTION OF EMBODIMENTS

[0019] This section will describe various embodiments of the present invention in detail. The preferred embod-

iments of the present invention are shown in the drawings. The drawings are intended to supplement the description that may not mention in the text, so that a person can directly and visually understand each technical feature and overall technical solution of the invention, but they are not meant to limit the scope of the present invention.

[0020] In the description of the present invention, it should be noted that directions and position relationships indicated by orientation words such as terms "top", "bottom", "front", "rear", "left", "right", and the like are based on directions or position relationships shown by the accompanying drawings, which are used only for describing the present invention and for description simplicity, but do not indicate or imply that an indicated apparatus or element must have a specific orientation or must be constructed and operated in a specific orientation. Therefore, these wording cannot be understood as a limitation on the present invention.

[0021] In the description of the present invention, the term "a plurality of" is a quantifier meaning one or more, and the term "a plurality of" means more than two. The terms "greater than", "less than", "exceeding", etc. are to be construed as excluding the number itself, and the terms "above", "below", "within", etc. are to be construed as including the number itself. The terms "first" and "second" are only for the purpose of distinguishing the technical features, they cannot be understood as indicating or implying relative importance or implicitly indicating the number or sequential order of the indicated technical features.

[0022] In the description of the present invention, unless otherwise clearly defined, the terms such as "install", "dispose" and "connect" should be understood in a broad sense. Those skilled in the art can reasonably determine the specific meaning of the above terms in the present invention in conjunction with the specific content of the technical solution.

[0023] Referring to FIGs. 1 to 3, according to an embodiment of the present invention, a magnetic induction trigger toy is disclosed, which includes:

an external trigger 30 with a magnet 31 inside;
a toy body 10 provided with:

45 a plurality of Hall sensors 24 respectively placed at different positions of the toy body 10;
a controller 22 stored with a plurality of groups of response files, and each of which includes a plurality of response files;

50 a response output module 21 connected with the controller 22 and used to make corresponding response actions according to different response files;

55 a plurality of switching buttons 25, respectively connected with the controller 22 and used to switch the group of response files;
the controller 22 selects a corresponding group

of response files in response to a trigger by the switching button 25, and selects a corresponding response file from the current group of response files according to the order in which the magnet 31 triggers the Hall sensor 24 and output it to the response output module 21, thus enables the response output module 21 to make a corresponding response action according to the response file.

[0024] Specifically, in one embodiment, the response file is a sound file, and the response output module 21 is a speaker; the controller 22 causes the speaker to make a sound according to the sound file.

[0025] Further, the toy body 10 includes a cover 11, a plurality of book pages 12 and a bottom 13, and the cover 11 and the plurality of book pages 12 are connected to a side of the bottom 13 and can rotate vertically relative to the bottom around the side 13. In other embodiments, the toy body 10 may be other types of toys, such as puzzle toys or plush doll toys.

[0026] Further, the plurality of the Hall sensors 24, the controller 22, the speaker and the plurality of switching buttons 25 are provided on the bottom 13. Specifically, the switch button 25 is a membrane switch, which has a thin thickness and a small volume, and can be hidden better.

[0027] Further, a mark is provided on the book page 12 corresponding to the position of the Hall sensor 24.

[0028] Referring to FIG. 2, in this embodiment, the switching button 25 is firstly triggered, and then the book page 12 is turned to a page corresponding to the switching button 25. The book page 12 is provided with a mark, and the position of the mark corresponds to the position of the Hall sensor 24. In addition, pictures and texts are drawn on the book page 12, which can be matched with the sound file group.

[0029] When a user moves the external trigger 30 from a mark "1" to a mark "2", firstly, the magnet 31 triggers the Hall sensor 24 "1" and then the Hall sensor 24 "2". The Hall sensor 24 "1" and the Hall sensor 24 "2" send a signal to the controller 22 successively. The controller 22 arranges the two Hall sensors 24 in a numbering array of "12" according to the order of triggers, and searches for a sound file a corresponding to "12" in the current sound file group from the relationship list. The speaker make the sound contained in the sound file A.

[0030] Similarly, when a user moves the external trigger 30 from a mark "2" to a mark "1", firstly, the magnet 31 triggers the Hall sensor 24 "2" and then the Hall sensor 24 "1". The Hall sensor 24 "2" and the Hall sensor 24 "1" send a signal to the controller 22 successively. The controller 22 arranges the two Hall sensors 24 in a numbering array of "21" according to the order of triggers, and searches for a sound file B corresponding to "21" in the current sound file group from the relationship list. The speaker make the sound contained in the sound file B.

[0031] It should be noted that the magnet 31 of the

external trigger 30 is a permanent magnet.

[0032] Referring to FIG. 3, in another embodiment, the external trigger 30 is a turntable with a rotation axis, the magnet 31 is disposed on the turntable, and a plurality of Hall sensors 24 are disposed on a path through which the magnet 31 rotates.

[0033] In addition, in another embodiment, the response file is a light control command, and the response output module 21 is a plurality of bulbs; the controller 22 causes the plurality of bulbs to turn on/off according to the light control command to generate a graphic pattern. Specifically, the bulbs are disposed on the book page 12.

[0034] A power supply module 23 is further provided within the toy body 10, and the power supply module 23 provides a power source for the controller 22, the response output module 21, the Hall sensors 24, and the switch buttons 25. The power supply module 23 may be a battery or an external plug.

[0035] Referring to FIG. 4, herein disclosed a method for controlling a magnetic induction toy according to another embodiment of the present invention, including the following steps:

Step S100: selecting a corresponding group of response files in response to a trigger by different switching buttons 25;

Step S200: selecting a corresponding response file from the current group of response files according to the order in which a magnet 31 triggers different Hall sensors 24;

Step S300: outputting the selected response file to a response output module 21;

Step S400: enabling the response output module 21 to make a corresponding response action according to the response file.

[0036] Referring to FIG. 5, further, the Step S200 includes the following steps:

Step S210: numbering the Hall sensors 24;

Step S220: detecting that the magnet 31 triggers a Hall sensor 24;

Step S230: within a limited time period, detecting that the magnet 31 triggers another Hall sensor 24;

Step S240: arraying the two Hall sensors 24 according to the order of being triggered and retrieving a corresponding response file in the current group of response files from a relationship list.

[0037] It should be noted that if the magnet 31 is not detected to trigger another Hall sensor 24 within a limited time period, the process returns to step S220. Specifically, the limited time is 10s. In other embodiments, the limited time may be adjusted according to actual needs, for example, 5s.

[0038] Specifically, in one embodiment, the response file is a sound file, and the response output module 21 is a speaker; the controller 22 causes the speaker to

make a sound according to the sound file.

[0039] In addition, in another embodiment, the response file is a light control command, and the response output module 21 is a plurality of bulbs; the controller 22 causes the plurality of bulbs to turn on/off according to the light control command to generate a graphic pattern.

[0040] In the above embodiments, different group of response files may be switched from one to another through switching the switch buttons 25, and selecting a corresponding response file from the current group of response files according to the order in which the magnet 31 triggers the Hall sensor 24, with these two features combined, to achieve a variety of control effects with fewer number of Hall sensors 24 (i.e., the number of Hall sensors 24 are reduced), thus enable the toy a smaller volume and less cost during manufacture, and the interactive toys' playability is improved.

[0041] The foregoing embodiments represent only several implementations of the present invention, and descriptions thereof are relatively specific and detailed, but cannot be construed as a limitation on the scope of the present invention. It should be noted that a person of ordinary skill in the art can further make some improvements and variations without departing from the idea of the present invention, and the improvements and variations shall fall within the protection scope of the present invention.

Claims

1. A magnetic induction trigger toy, comprising:

an external trigger with a magnet inside;
a toy body provided with:

a plurality of Hall sensors respectively placed at different positions of the toy body; a controller stored with a plurality of groups of response files, and each of the plurality of groups of response files including a plurality of response files;

a response output module connected with the controller and used to make corresponding response actions according to different response files;

a plurality of switching buttons respectively connected with the controller and used to switch the group of the response files; wherein the controller selects a corresponding group of response files in response to a trigger by the switching button, and according to an order in which the magnet triggers the Hall sensors, selects a corresponding response file from the current group of response files and output it to the response output module, thus enables the response output module to make a corresponding re-

sponse action according to the response file.

5 2. The magnetic induction trigger toy according to claim 1, wherein the response file is a sound file, and the response output module is a speaker; the controller causes the speaker to make a sound according to the sound file.

10 3. The magnetic induction trigger toy according to claim 1, wherein the response file is a light control command, and the response output module is a plurality of bulbs; the controller causes the plurality of bulbs to turn on/off according to the light control command to generate a graphic pattern.

15 4. The magnetic induction trigger toy according to claim 2 or 3, wherein the toy body includes a cover, a plurality of book pages and a bottom, and the cover and the plurality of book pages are connected to a side of the bottom and can rotate vertically relative to the bottom around the side.

20 5. The magnetic induction trigger toy according to claim 4, wherein the plurality of Hall sensors, the controller and the plurality of switching buttons are provided on the bottom.

25 6. The magnetic induction trigger toy according to claim 5, wherein a mark is provided on the book page corresponding to the position of the Hall sensor.

30 7. A method for controlling a magnetic induction trigger toy, including the following steps:

35 selecting a corresponding group of response files in response to a trigger by a switching button;

40 selecting a corresponding response file from the current group of response files according to an order in which a magnet triggers different Hall sensors;

45 outputting the response file to a response output module;

50 enabling the response output module to make a corresponding response action according to the response file.

55 8. The method according to claim 7, wherein selecting a corresponding response file from the current group of response files according to an order in which a magnet triggers different Hall sensors includes:

numbering the Hall sensors;

detecting that the magnet triggers one of the different Hall sensors;

within a limited time period, detecting that the magnet triggers another Hall sensor;

arraying the numbers of the two Hall sensors in the order of being triggered and retrieving a corresponding response file in the current group of response files from a relationship list.

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9. The method according to claim 8, wherein the response file is a sound file, and the response output module is a speaker; the controller causes the speaker to make a sound according to the sound file.
10. The method according to claim 8, wherein the response file is a light control command, and the response output module is a plurality of bulbs; the controller causes the plurality of bulbs to turn on/off according to the light control command to generate a graphic pattern.

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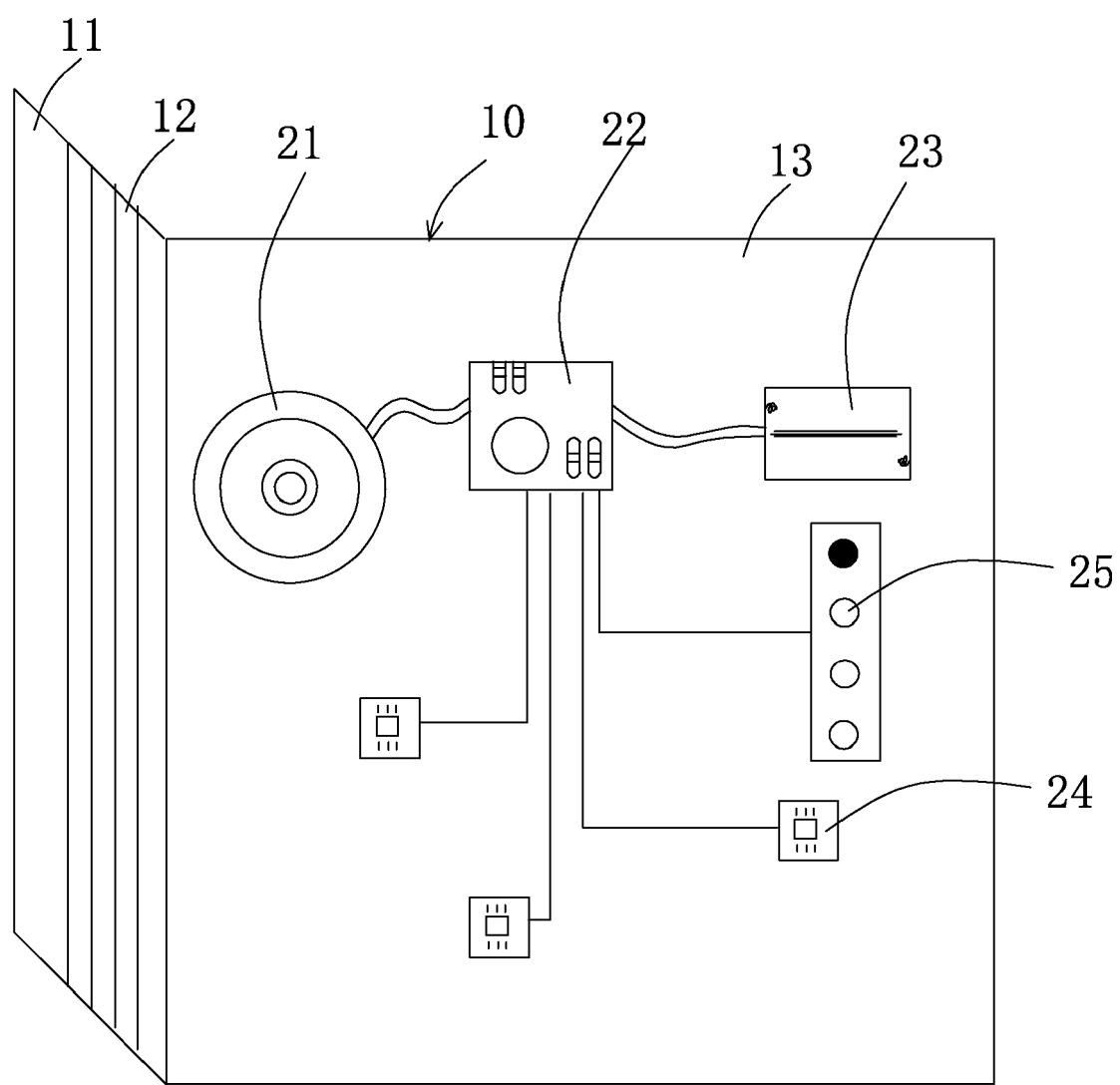


FIG. 1

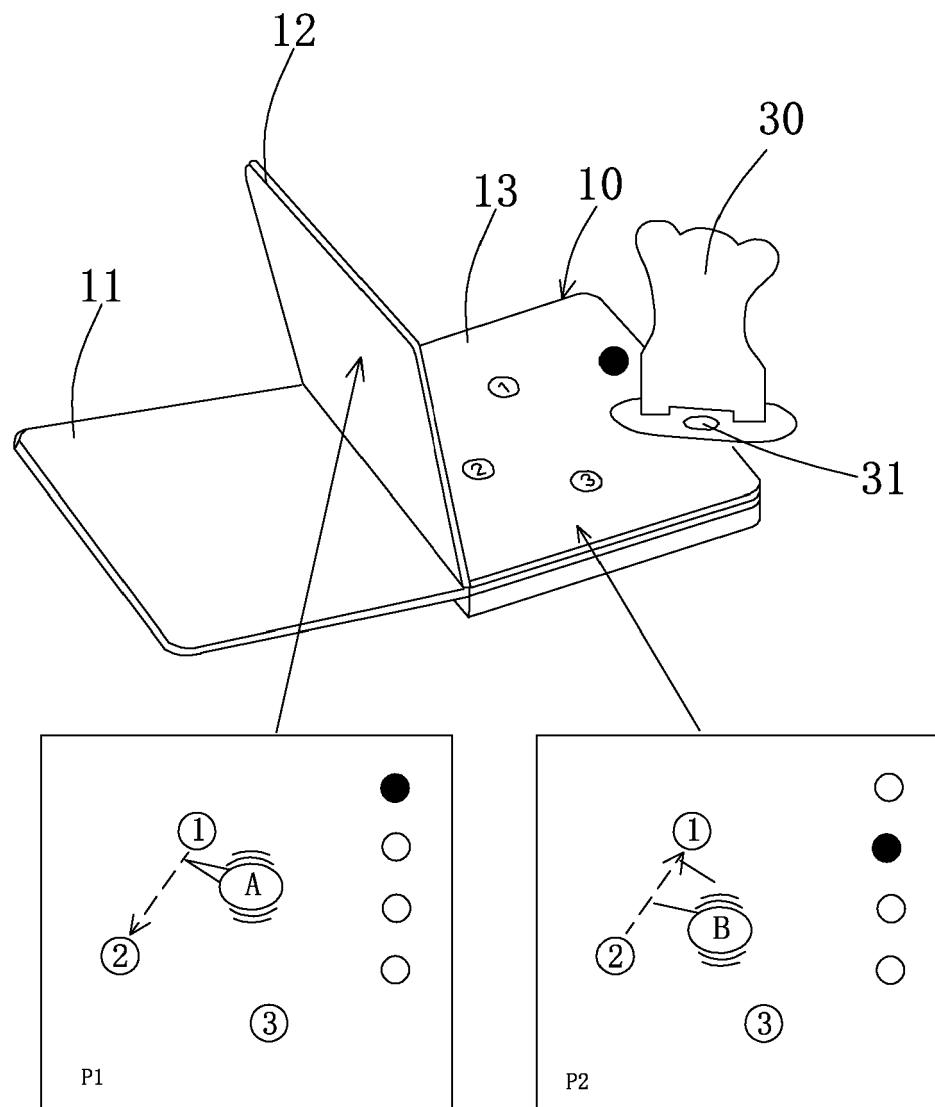


FIG. 2

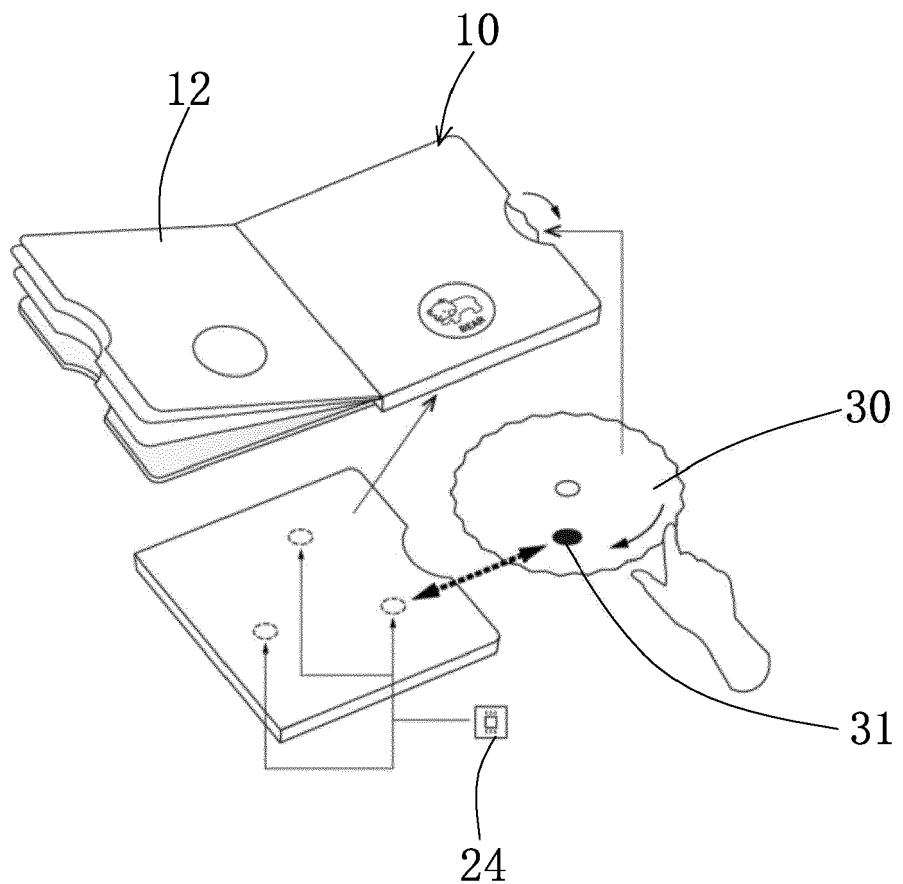


FIG. 3

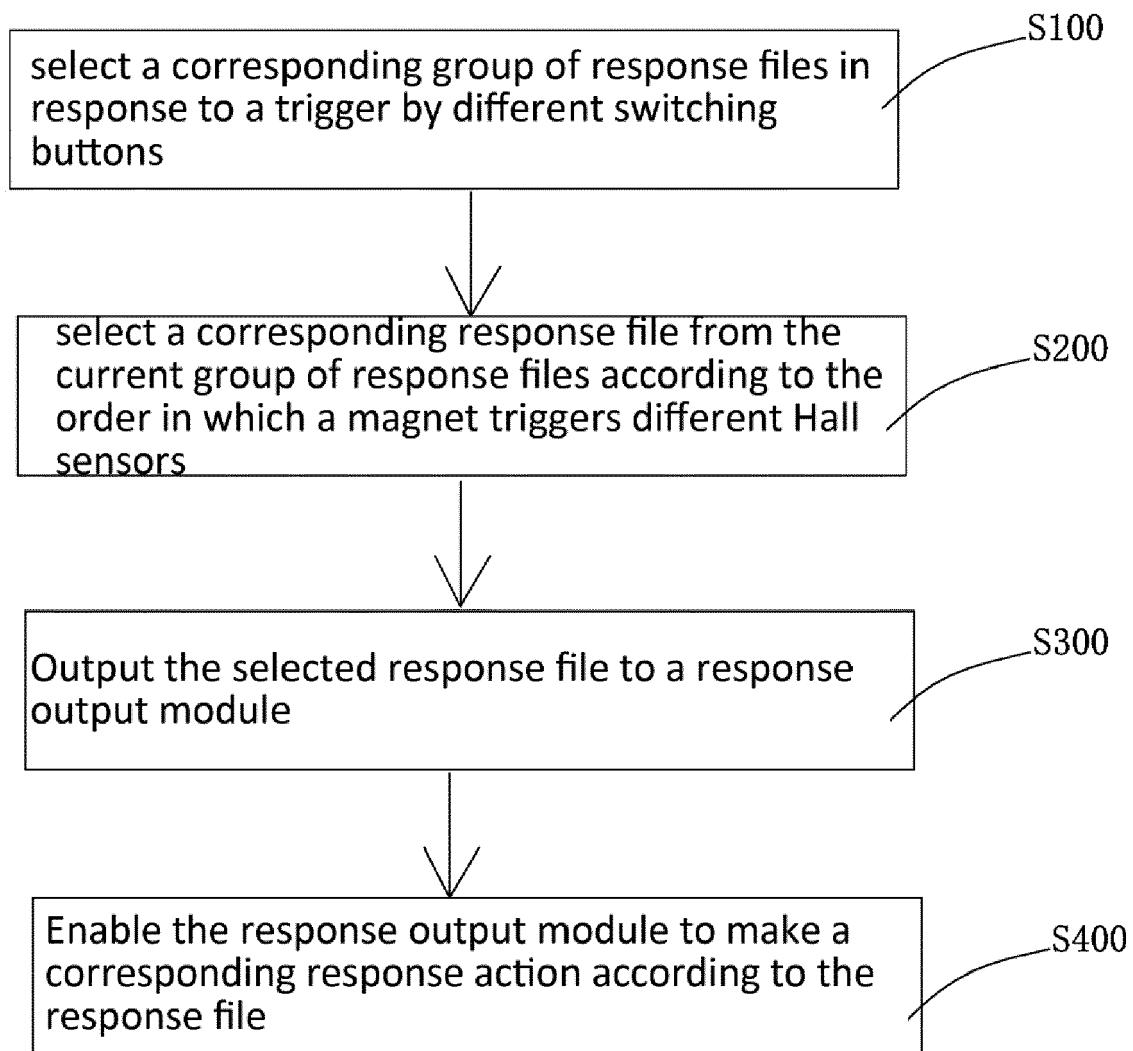


FIG. 4

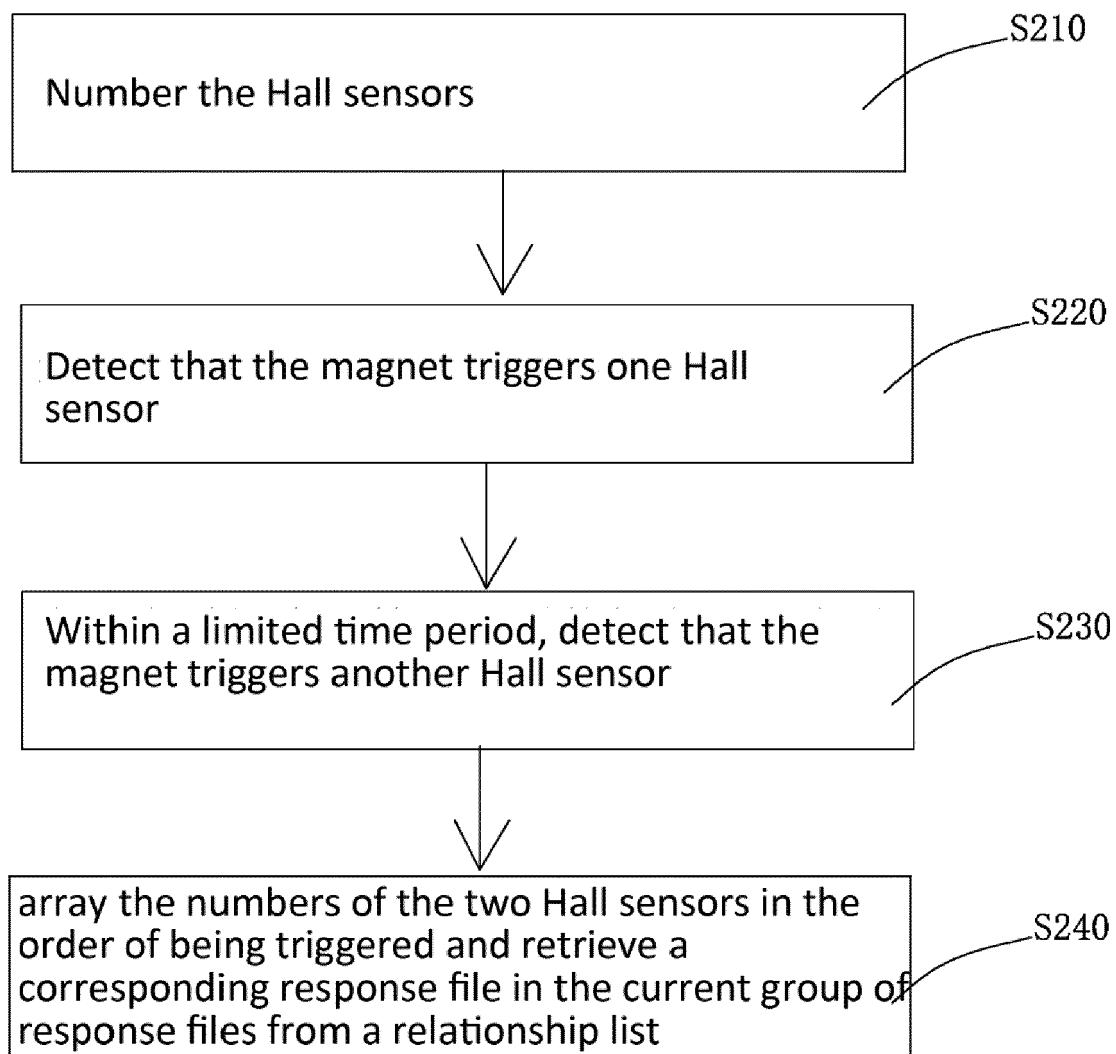


FIG. 5



EUROPEAN SEARCH REPORT

Application Number

EP 20 17 5980

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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)
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15 A	US 6 353 168 B1 (SOSOKA JR JOHN R [US] ET AL) 5 March 2002 (2002-03-05) * column 6, line 40 - column 11, line 13; figures *	1-10	
20 A	US 5 645 432 A (JESSOP RICHARD VERNON [GB]) 8 July 1997 (1997-07-08) * column 2, line 1 - page 8, line 3; figures *	1-10	
25 A	US 2007/093169 A1 (BLASZCZYK ABBEY C [US] ET AL) 26 April 2007 (2007-04-26) * paragraph [0009] - paragraph [0022]; figures *	1-10	
30			TECHNICAL FIELDS SEARCHED (IPC)
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50 1	The present search report has been drawn up for all claims		
55	Place of search Munich	Date of completion of the search 15 October 2020	Examiner Lucas, Peter
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EP 20 17 5980

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. 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.

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10	Patent document cited in search report	Publication date	Patent family member(s)			Publication date
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