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(54) **INTERACTIVE GAME WITH ACTION  
FIGURE IDENTIFICATION**

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(57) **ABSTRACT**

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14, 2003.

**Publication Classification**

(51) **Int. Cl.<sup>7</sup> ..... A63F 3/00**

A game board provided with multiple positions for placing different action figures. The base of each action figure has an arrangement of magnets that individually identify the particular figure, and each position on the game board includes a sensor for "reading" these action figure identities. When an action figure is placed in one of the positions, the corresponding position sensor identifies the figure and prompts an action appropriate to that action figure in that particular position on the board. Actions to be applied to each action figure vary depending upon game board position. Game players can also modify the magnet arrangement of each action figure to change its mood which, in turn, prompts the board to initiate a different action for that figure that suits its present mood.

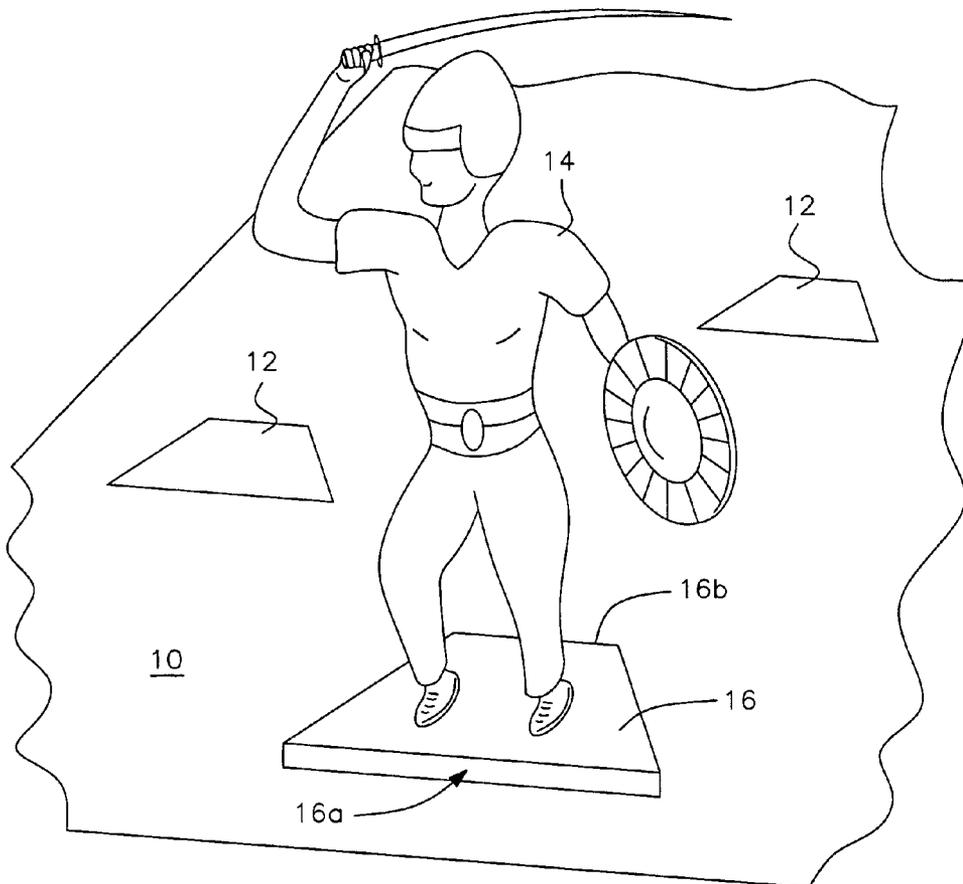


FIG. 1

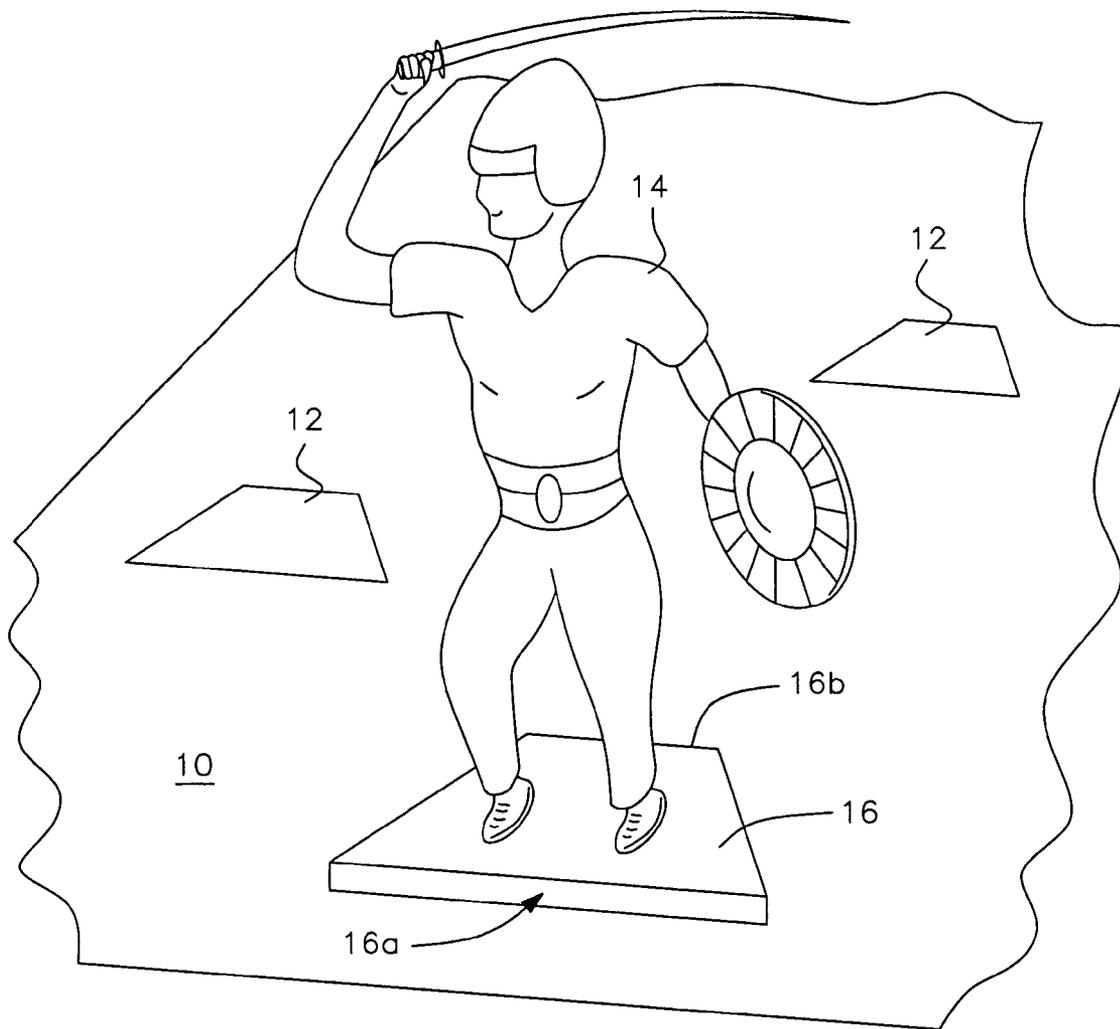


FIG. 2

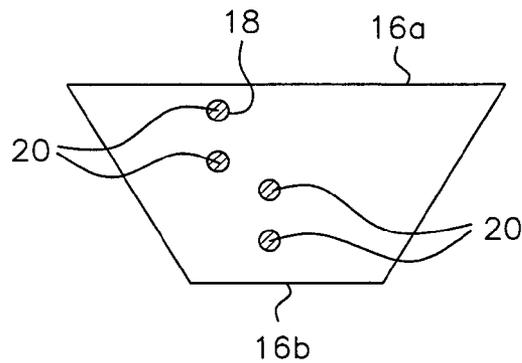


FIG. 3

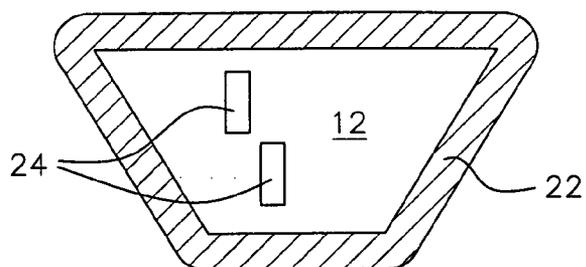


FIG. 4

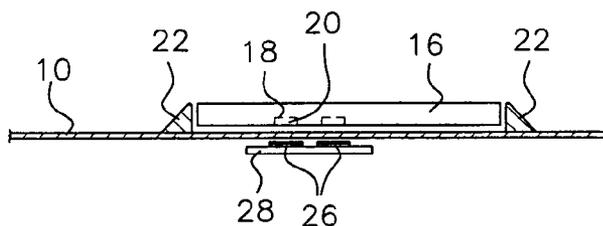


FIG. 6

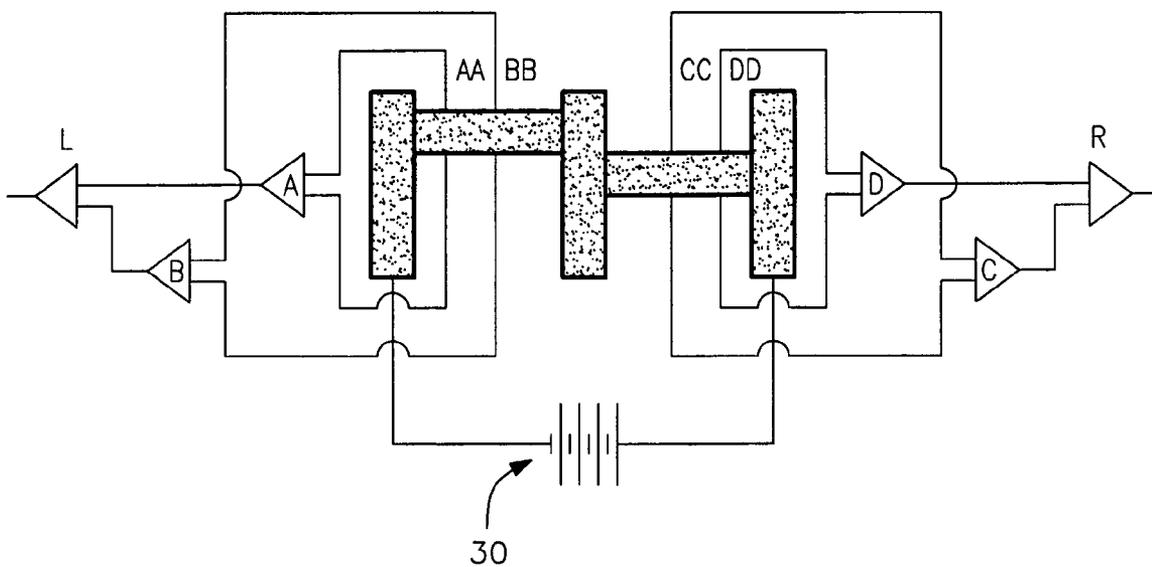
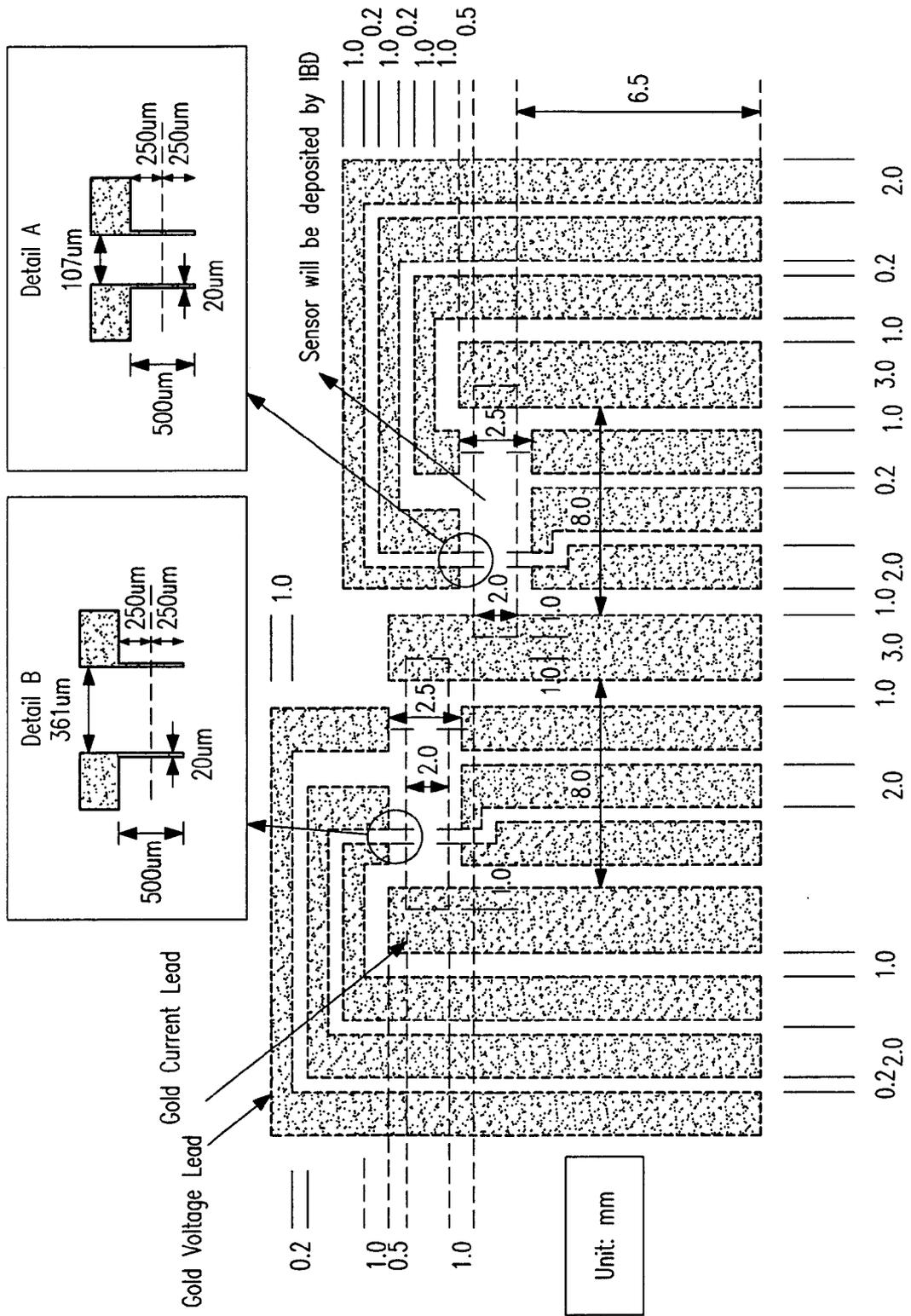


FIG. 5



## INTERACTIVE GAME WITH ACTION FIGURE IDENTIFICATION

[0001] This application is entitled to and hereby claims the priority of co-pending U.S. Provisional application, Ser. No. 60/519,617 filed Nov. 14, 2003.

### BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention is related to the field of interactive games and, more particularly, to an interactive game with action figure identification.

[0004] 2. Description of the Related Art

[0005] With the popularity of video and other interactive computer-based games, traditional board games having limited or no interactive components often seem outdated and less interesting. Accordingly, a need exists for improved board games having increased response and interactivity with the game players.

### SUMMARY OF THE INVENTION

[0006] In view of the foregoing, one object of the present invention is to provide an interactive board-based game having variable actions based on action figure identification and board position.

[0007] Another object of the present invention is to provide a game board having sensors for identifying a particular action figure from within a group of different figures and for providing a response on the basis of the identification.

[0008] Yet another object of the present invention is to provide a game board having multiple positions for receiving an action figure, each position having a sensor for initiating a plurality of action figure responses appropriate to the particular position on the board.

[0009] A further object of the present invention is to provide an individualized action figure having variable mood adjustability that modifies a corresponding game board response.

[0010] In accordance with these and other objects, the present invention is directed to a game board provided with multiple positions for placing action figures and having action figure identification capability. When an action figure is placed in one of the positions, a sensor in the board identifies the action figure and prompts an action appropriate to that action figure in that particular position on the board. At another position on the board the same figure gives a different line of speech appropriate to the story line of the game and to that location. The player of the game can modify the action figure to change its behavior, for example, from "happy" to "sad" and the sensor in the board will detect the altered "mood" of the action figure and prompt a different action for that figure that suits its present mood.

[0011] These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully herein-after described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 shows an action figure in accordance with the present invention.

[0013] FIG. 2 illustrates a bottom view of the base of the action figure of FIG. 1.

[0014] FIG. 3 is a representative board position guide for receiving the base of FIGS. 1 and 2.

[0015] FIG. 4 is a side cross-sectional view of the base of FIG. 2 on a board with underlying magnetic field sensors, in accordance with the present invention.

[0016] FIG. 5 illustrates a Hall sensor configuration appropriate for the game in accordance with the present invention.

[0017] FIG. 6 is a circuit diagram of the Hall sensor circuit for use with the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] In describing a preferred embodiment of the invention illustrated in the drawings, specific terminology will be resorted to for the sake of clarity. However, the invention is not intended to be limited to the specific terms so selected, and it is to be understood that each specific term includes all technical equivalents which operate in a similar manner to accomplish a similar purpose.

[0019] As shown in FIG. 1, according to the present invention a game board 10 is provided with multiple positions 12 for placing an action FIG. 14. Each action figure has a base 16 with a plurality of recesses 18 therein for receiving permanent magnets 20 as shown in FIG. 2. According to the preferred embodiment, each base has four recesses 18 spaced from the front 16a to the back 16b of the base 16 for holding four magnets 20, although fewer or greater numbers of recesses and magnets could also be implemented.

[0020] Each magnet can be placed with either a north (N) or a south (S) pole facing down towards the board 10, which is non-magnetic. When an action FIG. 14 is placed in one of the positions 12 on the board, the orientation of the figure is fixed by ridges or guides 22 on the board, as shown in FIG. 3, so that the magnets 20 are oriented approximately over magnetic field sensors 24 located under each game board position 12, such as Hall sensors 26 on substrate 28 as shown in FIG. 4. The magnetic field configuration of the action FIG. 14 is sensed by the magnetic field sensors 24 in or under the board at each action figure position 12, and an action appropriate to that particular action figure and board position is initiated.

[0021] More particularly, when an action FIG. 14 is placed in one of the positions 12, the sensor 24 in the board 10 identifies the particular action figure and prompts an action appropriate to that action figure in that particular position on the board; the action may, for example, be the playing of a prerecorded line of speech. At another position on the board the same figure gives a different line of speech appropriate to the story line of the game and to that location. For example, a pirate figure at the crow's nest position would say "sail ho" but the same figure when placed near a canon says "ready, aim, fire".

[0022] Hall effect sensors are suitable in this application because the sign of the voltage output by the Hall sensor depends on the orientation of the magnet adjacent to it. That is, a figure with a configuration of four north poles (NNNN) will produce the same sign of Hall voltage on all four Hall sensors, say (++++). If the Hall sensors are numbered sequentially from left to right, the output of the four Hall sensors can be used to identify sixteen different action figures. The magnet configurations are

			NNNN			
SSNN	SNNN	NSNN		NNSN	NNNS	
	NSSN	NNSS		NSNS	SNSN	SNNS
	NSSS	SNSS		SSNS	SSSN	
			SSSS			

[0023] The corresponding signs of Hall voltage from sensors 1, 2, 3 and 4 are:

			+++			
	+++	+++	+++	+++		
+++	+++	+++	+++	+++	+++	+++
	+++	+++	+++	+++	+++	+++
			+++			

[0024] The player of the game can also modify the action FIG. 14 to change its behavior, for example, from “happy” to “sad” and the sensor 24 in the board 10 will detect the altered “mood” of the action figure and prompt a different action for that figure that suits its present mood. According to the preferred embodiment having four magnets per base, each character can be put into one of five moods by removing or retracting one of the magnets in its base. For example, the action figure with the magnet configuration NNNN could have any of the following five “moods”:

- [0025] Neutral (NNNN)
- [0026] Happy (ONNN)
- [0027] Tired (NONN)
- [0028] Angry (NNON)
- [0029] Sad (NNNO)

[0030] where the zero, “0”, indicates the absence of a magnetic field at that sensor location. As an alternative to removing a magnet 20, a shielding material (not shown) can be interposed between the magnet and the Hall sensor in one of the four Hall sensor positions.

[0031] The mood alteration introduces some ambiguity in the identity of the action figure. For example, ONNN could be the character NNNN or SNNN in its “happy” state. Removing the magnet in the “1” position produces the same magnet configuration, ONNN.

[0032] A Hall sensor configuration appropriate for this game is shown by the two track Hall sensor 40.6 mm×16.4 mm) shown in FIG. 5. The device consists of two rectangular patches of Hall sensor material. A preferred Hall sensor material is an amorphous alloy of gadolinium, zirconium and cobalt. Each rectangular patch of Hall sensor

material is connected to a current supply by means of metallic conductor contacts. The conductor contacts are made of a metal with low electrical resistivity such as copper, silver or gold. A current supply is connected to the two end electrodes so that an electrical current flows along the long axis of the rectangular Hall sensor. Hall voltage contacts are connected to the Hall sensor in pairs on either side of the Hall sensor. Two or more pairs of Hall sensors are connected to each rectangular patch. When a magnetic field is applied perpendicular to the surface of the Hall sensor in the region between the Hall voltage contacts, a Hall voltage, a potential difference, occurs at the Hall voltage contacts under the applied magnetic field. The polarity (+ or - and magnitude of the voltage at a particular pair of contacts depends on the polarity (N or S) and magnitude of the magnetic field at that pair of contacts.

[0033] The Hall voltage contacts are connected by means of voltage leads to operational amplifiers (opamp) as shown in the circuit diagram of FIG. 6. The output of the opamp depends on the sign and magnitude of the Hall voltage. The opamps for Hall sensors AA and BB are connected to a third opamp (L) that serves as a differential amplifier. The Hall sensors CC and DD are similarly connected to a differential amplifier (R). The sum of outputs L and R and the difference of outputs L and R are sufficient to identify the sixteen characters in their neutral state. The output of the opamps is sent to a logic circuit that turns on an actuator for the programmed action which may be, for example, speech from a selection of digitally stored lines or action by a mechanical actuator.

[0034] Hall sensors AA, BB, CC and DD have a common DC power supply 30 so the same current flows through them. The voltage leads of sensor AA are connected to opamp A, BB to opamp B, CC to opamp C and DD to opamp D. The outputs of the opamps A and B are connected as inputs to opamp L. The outputs of the opamps C and D are connected as inputs to opamp R. The opamp power supply is not shown.

[0035] The game board can be replaced with a track and the action figure replaced with a toy car. Hall sensors are located in the track and magnets are attached to the car. As the car is moved along the track, the magnets in the car trigger appropriate actions, for example, opening a gate, sounding a horn or changing a traffic light from red to green. Alternatively, the Hall sensors can be located in a toy structure such as a castle or a pirate ship.

[0036] The foregoing descriptions and drawings should be considered as illustrative only of the principles of the invention. The invention may be configured in a variety of shapes and sizes and is not limited by the dimensions of the preferred embodiment. Numerous applications of the present invention will readily occur to those skilled in the art. Therefore, it is not desired to limit the invention to the specific examples disclosed or the exact construction and operation shown and described. Rather, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed is:

1. An interactive board game comprising:
  - a board with a plurality of positions, each position having a sensing element;

an action figure for placement on said board in at least one of said plurality of positions, said action figure including an identification element readable by said sensing element to indicate an identity of said action figure;

said sensing element, upon reading said identification element, initiating an action based on the identity of said action figure.

2. The game as set forth in claim 1, wherein said sensing element initiates an action based on both the identity of the action figure and a particular one of said plurality of positions in which said action figure has been placed.

3. The game as set forth in claim 1, further comprising a plurality of action figures, each of said action figures having a different identity as indicated by a difference in a respective identification element.

4. The game as set forth in claim 1, wherein said identification element includes a plurality of magnets.

5. The game as set forth in claim 4, wherein said identity is set by a north-south orientation of each of said plurality of magnets.

6. The game as set forth in claim 5, wherein said plurality of magnets are arranged in a corresponding plurality of positions in a base of said action figure, an absence of magnetic field in one of said positions indicating a particular mood of said action figure.

7. The game as set forth in claim 6, wherein said sensing element initiates an action based on the identity and the mood of the action figure.

8. The game as set forth in claim 6, wherein said sensing element initiates an action based on the identity and the mood of the action figure and on a particular one of said plurality of positions in which said action figure has been placed.

9. The game as set forth in claim 8, wherein changing said identity, said mood or said board position changes the action to be initiated.

10. The game as set forth in claim 5, wherein said sensing element includes a Hall sensor.

11. The game as set forth in claim 10, wherein said Hall sensor is mounted under the board and generally aligned with one of said plurality of positions so as to read an action figure identity based on said north-south magnet orientation thereof when said figure is placed in said position.

12. An interactive board game comprising:

a board with a plurality of positions, each position having a magnetic sensor;

a plurality of action figures for placement on said board in said plurality of positions, each of said action figures having a base with a plurality of magnetic elements readable by said magnetic sensors to indicate a respective identity of said action figures; and

each of said magnetic sensors, upon determining the identity of an action figure placed in a particular position, initiating an action based on the identity and position of said action figure.

13. The game as set forth in claim 12, wherein said identity is set by a north-south orientation of each of said plurality of magnetic elements.

14. The game as set forth in claim 13, wherein said plurality of magnets are arranged in a corresponding plurality of positions, an absence of magnetic field in one of said positions indicating a particular mood of said action figure.

15. The game as set forth in claim 14, wherein said action initiated by said magnetic sensors is adjusted according to the mood of the action figure.

16. The game as set forth in claim 15, wherein changing said identity, said mood or said board position changes the action to be initiated.

17. The game as set forth in claim 12, wherein said magnetic sensors include Hall sensors.

18. The game as set forth in claim 17, wherein said action figure identities are set by a north-south orientation of each of said plurality of magnetic elements, said Hall sensors being mounted under the board and generally aligned with respective positions so as to read the identities of action figures in said positions based on said north-south magnet orientations.

19. The game as set forth in claim 18, wherein said plurality of magnets are arranged in a corresponding plurality of positions, an absence of magnetic field in one of said positions indicating a particular mood of said action figure, said actions initiated by said magnetic sensors being adjusted according to said mood.

20. The game as set forth in claim 19, wherein said actions include playing a recorded line of speech.

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