United States Patent Application Publication	20250256202
Kind Code	A1
Publication Date	August 14, 2025
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ILLUMINATING PUZZLE APPARATUS

Abstract

An illuminating puzzle apparatus includes a puzzle base and a puzzle piece removably placed on the puzzle base. The apparatus further includes a light sensor disposed on the puzzle base that emits an activation signal when the light sensor transitions from a light receiving state to a darkness state. The apparatus further includes a light disposed on the puzzle base and in proximity to the light sensor. The apparatus additionally includes a processor that obtains the activation signal from the light sensor when the puzzle piece is placed on the puzzle base above the light sensor and transmits a command signal to the light to illuminate the light, responsive to obtaining the activation signal.

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Family ID: **1000007684976**

Appl. No.: **18/438960**

Filed: **February 12, 2024**

Publication Classification

Int. Cl.: **A63F9/10** (20060101); **A63F9/24** (20060101)

U.S. Cl.:

CPC **A63F9/10** (20130101); **A63F9/24** (20130101); A63F2009/1083 (20130101); A63F2009/2451 (20130101)

Background/Summary

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention generally relates to a puzzle apparatus, and more particularly to an illuminating puzzle apparatus configured to output lights and music when the puzzle is completed.

Description of the Related Art

[0002] Puzzles and games for children (and adults) have not changed much for decades. Most conventional puzzles follow the same old design and structure, which may not be liked by many children and adults. In modern times, children and adults seek more excitement, which the conventional puzzles fail to provide.

[0003] Therefore, a puzzle apparatus is required that offers a new design and/or structure that provides excitement and an enriching experience to children and adults.

SUMMARY OF THE INVENTION

[0004] The following presents a simplified summary of the present disclosure in a simplified form as a prelude to the more detailed description that is presented herein.

[0005] In accordance with embodiments of the invention, there is provided an illuminating puzzle apparatus. The apparatus may include a puzzle base and a puzzle piece configured to be removably placed on the puzzle base. The apparatus may further include a light sensor disposed on the puzzle base. The light sensor may be configured to emit an activation signal when the light sensor transitions from a light receiving state to a darkness state, i.e., when light transmission to the light sensor is interrupted. In some aspects, the light sensor may be configured to receive ambient light when the light sensor may be in the light receiving state, and not receive ambient light when the light sensor may be in the darkness state. The apparatus may additionally include a light emitting diode (LED) element disposed on the puzzle base and in proximity to the light sensor, and a processor electrically coupled with the light sensor and the LED element. In some aspects, the processor may be configured to obtain the activation signal from the light sensor when the puzzle piece is placed on the puzzle base above the light sensor, and transmit a first command signal to the LED element to illuminate the LED element, responsive obtaining the activation signal.

[0006] In certain embodiments, the puzzle piece may include a printed image on a puzzle piece top surface. Furthermore, the apparatus may additionally include a speaker configured to output sound. The processor may be configured to transmit a second command signal to the speaker to output music, responsive obtaining the activation signal. In some aspects, the music output by the speaker responsive to obtaining the second command signal from the processor and a light pattern emitted by the LED element responsive to obtaining the first command signal are associated with the printed image.

[0007] The apparatus may further include a puzzle base cover configured to cover and be secured with the puzzle base.

[0008] The present disclosure discloses an illuminating puzzle apparatus that is more exciting, rewarding and satisfying than conventional puzzles. The illuminating puzzle apparatus offers a new way to experience puzzles with light and music, thereby bringing more excitement to children and/or adults who play with the apparatus.

[0009] These and other features, aspects, and advantages of the present invention will become better understood with reference to the following description and appended claims.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Illustrative embodiments of the present invention are described herein with reference to the accompanying drawings, in which:

[0011] FIG. **1** is a perspective view of an illuminating puzzle apparatus in accordance with

embodiments of the invention.
[0012] FIG. **2** is an exploded perspective view depicting the components of the illuminating puzzle apparatus of FIG. **1**.
[0013] FIG. **3** is an enlarged detail view thereof.
[0014] FIG. **4** is a sectional view thereof.
DETAILED DESCRIPTION OF INVENTION
[0015] For a further understanding of the nature and function of the embodiments, reference should be made to the following detailed description. Detailed descriptions of the embodiments are provided herein, as well as the best mode of carrying out and employing the present invention. It will be readily appreciated that the embodiments are well adapted to carry out and obtain the ends and features mentioned as well as those inherent herein. It is to be understood, however, that the present invention may be embodied in various forms. Therefore, persons of ordinary skill in the art will realize that the following disclosure is illustrative only and not in any way limiting, as the specific details disclosed herein provide a basis for the claims and a representative basis for teaching to employ the present invention in virtually any appropriately detailed system, structure, or manner. It should be understood that the devices, materials, methods, procedures, and techniques described herein are presently representative of various embodiments. Other embodiments of the disclosure will readily suggest themselves to such skilled persons having the benefit of this disclosure.
[0016] Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numerals are used in the drawings and the description to refer to the same or like parts.
[0017] FIG. **1** depicts a perspective view of an illuminating puzzle apparatus **10** (or apparatus **10**) in accordance with embodiments of the invention. FIG. **1** will be described in conjunction with FIGS. **2**, **3** and **4**. Specifically, FIG. **2** depicts an exploded perspective view of the components of the apparatus **10**, and FIG. **3** depicts an enlarged and detailed perspective view of the apparatus **10** showing emitted light and music. Further, FIG. **4** depicts a cross-sectional view and a schematic diagram of the wiring of the apparatus **10**.
[0018] The apparatus **10** may be configured to output lights and music when a user completes the puzzle associated with the apparatus **10**. The apparatus **10** may include a plurality of units including, but not limited to, a puzzle base **12**, one or more puzzle pieces **14** (illuminated puzzle pieces are shown as puzzle pieces **14**A in FIGS. **1** and **4**), printed images **16** on the puzzle pieces **14**, puzzle base cover **18**, light emitting diode (LED) elements **20**, light sensors **22**, electric wiring **26**, one or more batteries **28**, one or more speakers **30**, a power switch **32**, a computer chip/controller/processor **34**, and/or the like. The power switch **32** may enable a user to switch the apparatus **10** ON or OFF, i.e., to activate power to the LED elements **20** and the speakers **30**. The puzzle pieces **14** may be configured to be removably placed on the puzzle base **12**, specifically on the puzzle base cover **18**.
[0019] When the apparatus **10** is switched ON and the user inserts or puts a puzzle piece **14** on its designated area/place on the puzzle base **12**/puzzle base cover **18**, the LED elements **20** underneath the puzzle piece **14** and its designated area may light up, as shown in FIG. **3**, as emitted light **24**A. Further, music may be emitted when the puzzle piece **14** is inserted on its designated area/place, shown in FIG. **3** as emitted sound **24**B. In an example, when the user places a puzzle piece having a picture of a light source printed on it in its designated place on the apparatus **10**, that piece lights up and music is emitted. Once all the puzzle pieces are inserted in their designated places on the puzzle base cover **18**, light shows through specific puzzle pieces (for example, the star and the moon) from the puzzle base **12** and music is played. According to a specific embodiment of the apparatus **10**, the lights may flicker or change colors along with playing music. When completed, the puzzle base **12** may be hung on a wall.
[0020] In some aspects, the puzzle base **12** may be made of wood, plastic, acrylic, and/or the like,

and may house all the electric components of the apparatus **10** (including the electric wiring **26** that connects all apparatus components). The bottom side of the puzzle base **12** may include an opening in the back for the battery **28** or an opening on the side to charge a rechargeable battery of the apparatus **10**. In further aspects, the puzzle base **12** may include one or more openings in proximity to the speaker **30** to enable sound waves to propagate out of the apparatus **10** from the speaker **30**. The puzzle base **12** may further include one or more openings for nails to hang the puzzle base **12** and the complete apparatus **10** on a wall. Furthermore, the LED elements **20** and the light sensors **22** may be positioned on the puzzle base **12** according to where the light source is on the final artwork (puzzle pieces). Stated another way, the LED elements **20** and the light sensors **22** may be positioned on the puzzle base **12** underneath the corresponding puzzle piece **14**. As shown in FIGS. **2** and **4**, the light sensors **22** may be disposed adjacent to or in proximity to the LED elements **20**.

[0021] The puzzle base cover **18** may also be made of wood, plastic, acrylic, and/or the like, and configured to cover and be secured with the puzzle base **12**. During manufacturing of the apparatus **10**, holes may be drilled through the puzzle base cover **18** to enable/allow the LED elements **20** and the light sensors **22** to poke out.

[0022] Further, the puzzle pieces **14** may be made of acrylic, and may have printed artwork (e.g., the printed image **16**) on the puzzle piece top surface. In some aspects, the printed image **16** may not substantially obstruct the light emitted by the LED elements **20**, and may allow the light (emitted by the LED elements **20**) to effectively spread out or emanate from the puzzle piece top surface.

[0023] In some aspects, most of the apparatus components, e.g., the LED elements **20**, the light sensors **22**, the electric wiring **26**, the battery **28**, the speaker **30**, the processor **34**, etc., may be disposed in the puzzle base **12**. During operation, when the user inserts a puzzle piece (e.g., the puzzle piece **14**) in its designated place on the apparatus **10**/puzzle base **12** over a light sensor (e.g., the light sensor **22**) exposed to light, the light sensor **22** detects a transition from light to darkness over the previously empty slot on the apparatus **10** (since the puzzle piece **14** may be disposed over the light sensor **22**, thereby obstructing light input to the light sensor **22**). Responsive to detecting the transition from a “light receiving state” to a “darkness state”, the light sensor **22** may output an activation signal to the processor **34**. In some aspects, the light sensor **22** may be configured to receive ambient light when the light sensor **22** is in the light receiving state, and not receive ambient light when the light sensor **22** is in the darkness state.

[0024] Responsive to obtaining the activation signal from the light sensor **22**, the processor **34** may transmit a first command signal to an LED element (e.g., the LED element **20**) associated with the light sensor **22**. Specifically, the LED element **20** may be disposed adjacent to the light sensor **22** and underneath the inserted puzzle piece **14**. The LED element **20** may illuminate/activate responsive to obtaining the first command signal. In this manner, the LED element **20** underneath the puzzle piece **14** lights when the user inserts the puzzle piece **14** in its designated place in the apparatus **10**.

[0025] In further aspects, responsive to obtaining the activation signal from the light sensor **22**, the processor **34** may transmit a second command signal to the speaker **30**. The speaker **30** may output sound/music associated with the light sensor **22** responsive to obtaining the second command signal. In some aspects, the light (or light pattern) produced/emitted by the LED element **20** (responsive to obtaining the first command signal) and/or the sound/music emitted by the speaker **30** (responsive to obtaining the second command signal) may correspond to or be associated with the printed image **16** on the puzzle piece **14**. For example, if the printed image **16** is associated with a candle, the emitted light may flicker. As another example, if the printed image **16** is associated with Christmas lights, the emitted lights may change colors.

[0026] In some aspects, the processor **34** may be programmed to control the light show from the LED elements **20** and play music with the speaker **30** when the puzzle is completed (i.e., when the puzzle piece **14** is inserted in its correct/designated position in the apparatus **10**). The processor **34**

may be specifically programmed to recognize the shift of light to dark using the light sensor **22** (e.g., by obtaining the activation signal from the light sensor **22**) and then control the light show with the LED elements **20** and play music with the speaker **30** when the puzzle is completed.
[0027] To use the apparatus **10**, the user may work on the puzzle, get a light feedback on specific puzzle pieces when placed in the correct position, and complete the puzzle to enjoy the light show and music. In some aspects, the apparatus **10** may be additionally used for a music game and/or art. For example, the intensity of the light emitted from the LED elements **20** may be made to change, and the changing of the light colors may be synchronized with the music emitted from the speaker **30** (which may accordingly change).
[0028] Except as may be expressly otherwise indicated, the article “a” or “an” if and as used herein is not intended to limit, and should not be construed as limiting, the description or a claim to a single element to which the article refers. Rather, the article “a” or “an” if and as used herein is intended to cover one or more such elements, unless the text expressly indicates otherwise.
[0029] This invention is susceptible to considerable variation within the spirit and scope of the appended claims.

Claims

1. An illuminating puzzle apparatus, comprising: a puzzle base; a puzzle piece configured to be removably placed on the puzzle base; a light sensor disposed on the puzzle base, wherein the light sensor is configured to emit an activation signal when the light sensor transitions from a light receiving state to a darkness state; a light emitting diode (LED) element disposed on the puzzle base and in proximity to the light sensor; and a processor electrically coupled with the light sensor and the LED element, wherein the processor is operative to: obtain the activation signal from the light sensor when the puzzle piece is placed on the puzzle base above the light sensor; and transmit a first command signal to the LED element to illuminate the LED element, responsive to obtaining the activation signal.
2. The illuminating puzzle apparatus of claim 1, wherein the puzzle piece comprises a printed image on a puzzle piece top surface.
3. The illuminating puzzle apparatus of claim 2, wherein the LED element is operative to illuminate with a light pattern correlated to the printed image.
4. The illuminating puzzle apparatus of claim 1, further comprising a speaker configured to output sound, wherein the processor is further configured to transmit a second command signal to the speaker to output sound, responsive to obtaining the activation signal.
5. The illuminating puzzle apparatus of claim 4, wherein the sound is output in a pattern forming music.
6. The illuminating puzzle apparatus of claim 4, wherein the puzzle piece comprises a printed image on a puzzle piece top surface and the sound output by the speaker responsive to obtaining the second command signal from the processor is correlated to the printed image.
7. The illuminating puzzle apparatus of claim 1, wherein the light sensor exhibits the light receiving state upon receiving ambient light, and wherein the light sensor exhibits the darkness state upon not receiving the ambient light.
8. The illuminating puzzle apparatus of claim 1, further comprising a puzzle base cover operative to cover and be secured to the puzzle base, wherein the puzzle base cover is configured to receive the puzzle piece.
9. The illuminating puzzle apparatus of claim 1, further comprising one or more additional light sensors configured to emit the activation signal upon transitioning to the darkness state and one or more additional puzzle pieces corresponding to the one or more additional light sensors, wherein the processor is further operative to transmit one or more additional command signals indicating completion of a puzzle pattern when the one or more additional light sensors emit the activation

signal.

10. The illuminating puzzle apparatus of claim 1, wherein the puzzle base further comprises an aperture formed thereon, operative to accept a nail for hanging, and wherein the puzzle base, the puzzle piece, the light sensor, the LED, and the processor are configured to maintain position when the illuminating puzzle apparatus is hung against a surface.