

DESCRIPTION

Title of Invention: COMMODITY PACKAGING BOX

Technical Field

[0001]

The present invention relates to a product packaging box including a lower box component, and an upper box component that is coupled to the lower box component through a hinge for swinging movement between an opened position and a closed position and contains a product when placed on the lower box component.

Background Art

[0002]

Between close male and female friends, jewelry is often given as a present from a man to a woman. The man visits a jewelry store together with the woman to buy jewelry. For example, as disclosed in Japanese Patent Application No. 2019-195405, a jewelry store packages jewelry in a specially prepared packaging box when delivering the jewelry.

Citation List

Patent Literature

[0003]

Patent Literature 1: Japanese Patent Application No. 2019-

195405

Patent Literature 2: Japanese Utility Model Registration
No. 3050705

Summary of Invention

Technical Problem

[0004]

A photograph can record various moments in time. Looking at the photograph can bring back memories of that moment. If a purchase scene of jewelry can be captured in a photograph, a woman can vividly re-live the joy of that moment every time she looks at the photograph. However, in an era like today where the photograph can be captured so easily with a smartphone, a photographic image ends up buried among a vast amount of image data. Accordingly, an opportunity to recall the joy felt when receiving the present is lost.

[0005]

An object of the present invention is to provide a product packaging box that can create an opportunity to recall the joy felt when receiving a present.

Solution to Problem

[0006]

According to an aspect of the present invention, there is provided a product packaging box includes: a lower box component; an upper box component coupled to the lower box component through a hinge for swinging movement between an

opened position and a closed position and having a recess on an upper surface; a transparent plate member fitted to a contour of the recess and fixed within the recess, and configured to cover an instant film placed within the recess; and an enclosure having a wall surface erecting from a horizontal plane including a front surface of the plate member along the contour of the recess and surrounding a space above the front surface of the plate member.

[0007]

The instant film can be developed on the spot to preserve a purchase scene. The transparent plate member covers the instant film within the recess. The plate member is fixed within the recess and serves to hold the instant film within the recess. In this way, a photograph can be easily attached to the product packaging box. One who observes the product packaging box can enjoy an image on the instant film through the transparent plate member. In this way, the product packaging box can create an opportunity to recall the emotions felt at the time of purchase. Triggered by the product packaging box, the joy felt when receiving the present, for example, can be recalled.

[0008]

Here, a space above the front surface of the plate member is surrounded by the enclosure along the contour of the recess. The enclosure serves to form a tray on an upper surface of the upper box component. A small object such as jewelry can be

placed on the plate member. The enclosure serves to hold the small object on the plate member. Since such a tray is utilized on a daily basis, an owner of the product can frequently see the image on the instant film. The emotions felt at the time of purchase can be strongly imprinted in the memory of the owner. One who observes the product packaging box can be left with a strong impression of the product.

[0009]

The product packaging box may further include an auxiliary plate overlaid on a lower surface of the plate member from below and bound to the plate member, and configured to hold the instant film between the auxiliary plate and the plate member. The plate member and the auxiliary plate can be removed as a unit from the upper box component. The plate member and the auxiliary plate can function as a photo frame for the instant film. The owner of the product can remove the instant film from the product packaging box and display the instant film at a desired place alone. The owner thus can enjoy the image on the instant film at a desired place.

[0010]

The product packaging box may further include a magnetic body fixed to the upper box component and placed below the auxiliary plate, and a magnet fixed to the auxiliary plate, fixed to the magnetic body based on the magnetic force, and configured to fix the instant film within the recess. The magnetic force serves to fix the auxiliary plate within the

recess. The photo frame including the auxiliary plate and the plate member can be securely held within the recess regardless of whether the upper box component is opened or closed. Since the magnet is attached to the auxiliary plate, the photo frame can be easily attached to a surface of a refrigerator or the like.

[0011]

In addition, the product packaging box may include a magnet fixed to the plate member, a first magnetic body fixed to the auxiliary plate, fixed to the magnet based on the magnetic force of the magnet, and configured to fix the auxiliary plate to the plate member, and a second magnetic body fixed to the upper box component and placed below the first magnetic body. The magnetic force serves to fix the auxiliary plate to the lower surface of the plate member. The instant film is sandwiched between the plate member and the auxiliary plate overlaid on the plate member. The magnetic force of the magnet acts on the second magnetic body via the first magnetic body. In this way, the magnetic force serves to fix the plate member and the auxiliary plate within the recess. The photo frame including the auxiliary plate and the plate member can be securely held within the recess regardless of whether the upper box component is opened or closed. Since the first magnetic body exerts the magnetic force, the photo frame can be easily attached to the surface of the refrigerator or the like. The magnet and the first magnetic body may be exchanged between the

plate member and the auxiliary plate.

[0012]

The recess may define a space that is adjacent to an outer periphery of the plate member and is open on an inner side of the enclosure. The space adjacent to the outer periphery of the plate member is open on the inner side of the enclosure. Access to the outer periphery of the plate member is permitted from this space. By applying the external force to the outer periphery of the plate member, the plate member can be easily pulled up from the recess. The plate member can be easily removed from the upper box component. Replacement and removal of the instant film can be favorably realized.

Advantageous Effects of Invention

[0013]

As described above, according to the present invention, it is possible to provide a product packaging box that can create an opportunity to recall the joy felt when receiving a present.

Brief Description of Drawings

[0014]

Fig. 1 is a perspective view schematically illustrating the appearance of a product packaging unit according to an embodiment of the present invention.

Fig. 2 is a perspective view schematically illustrating

an inner box contained within a lower outer box.

Fig. 3 is a perspective view illustrating the appearance of the inner box according to the embodiment of the present invention.

Fig. 4 is a plan view of the inner box.

Fig. 5 is a perspective view schematically illustrating the structure of the inner box when an upper box component is opened.

Fig. 6 is an enlarged perspective view schematically illustrating the structure of a hinge.

Fig. 7 is a sectional view at the vertical plane along the line 7-7 in Fig. 3.

Fig. 8 is a sectional view at the vertical plane along the line 8-8 in Fig. 5.

Fig. 9 corresponds to a sectional view of the plate member and the auxiliary plate along the line 9-9 in Fig. 3.

Fig. 10 is a circuit diagram of a light irradiation circuit according to a first example.

Fig. 11 is a block diagram schematically illustrating the structure of an audio playback unit.

Fig. 12 corresponds to Fig. 8 and illustrates a relation between a recording switch and a protection component.

Fig. 13 corresponds to Fig. 9 and is a sectional view of a plate member and an auxiliary plate according to another example.

Fig. 14 corresponds to Fig. 9 and is an enlarged sectional

view at the vertical plane of a plate member according to another example.

Fig. 15 is a circuit diagram of a light irradiation circuit according to a second example.

Description of Embodiments

[0015]

Embodiments of the present invention will be explained below with reference to the accompanying drawings.

[0016]

Fig. 1 schematically illustrates a product packaging unit according to one embodiment of the present invention. A product packaging unit 101 includes an outer box 102. The outer box 102 includes a lower outer box 103 and an upper outer box 104 that covers the lower outer box 103 from above. As depicted in Fig. 2, the lower outer box 103 includes a bottom plate 103a shaped in a rectangle or square and four side plates 103b respectively standing at right angles from four sides of the bottom plate 103a. An accommodation space of rectangular parallelepiped is defined inside the lower outer box 103. An inner box (product packaging box) 11 is contained within the accommodation space. The bottom plate 103a and the side plates 103b are each a flat paper plate. The bottom plate 103a and the side plates 103b, as well as the side plates 103b with each other are coupled along respective edges. The lower outer box 103 has a seamless, continuous appearance along the edges.

[0017]

The upper outer box 104 includes a top panel 104a shaped in a rectangle or square and four side plates 104b respectively extending downward from four sides of the top panel 104a. The top panel 104a is supported by upper ends of the side plates 103b of the lower outer box 103 and closes an opening 105 of the lower outer box 103 surrounded by the side plates 103b. The side plates 104b of the upper outer box 104 surround the side plates 103b of the lower outer box 103. The top panel 104a and the side plates 104b are each a flat paper plate. The top panel 104a and the side plates 104b, as well as the side plates 104b with each other are coupled along respective edges. An upper surface of the upper outer box 104 may be printed with, for example, a logo of a distributor or a manufacturer. The upper outer box 104 has a seamless, continuous appearance along the edges. The upper outer box 104 is entirely opaque. In addition, the top panel 104a may be made of a transparent resin material.

[0018]

As depicted in Fig. 3, the inner box 11 includes a lower box component 12 and an upper box component 13 placed on the lower box component 12 to form a rectangular parallelepiped box in combination with the lower box component 12. The lower box component 12 includes a hard molded resin body including a bottom plate 14a shaped in a rectangle or square and four side walls 14b respectively standing at right angles from four sides of the bottom plate 14a, and a covering paper 15 adhered to

outer surfaces of the hard molded resin body so as to decorate the hard molded resin body. The upper box component 13 includes a hard molded resin body having a top panel 16a that receives a plate member 62 within a recess 61 shaped in a rectangle or square and side walls 16b respectively extending downward from four sides of the top panel 16a to mate their lower ends with respective upper ends of the side walls 14b of the lower box component 12 to form side walls of the inner box 11, and a covering paper 17 adhered to outer surfaces of the hard molded resin body so as to decorate the molded resin body. The covering papers 15, 17 may be a sueded paper, a cloth-like paper, or the like. The covering paper 17 covers an inner surface of the recess 61. The inner surface of the recess 61 is neatly covered with the covering paper 17.

[0019]

The plate member 62 is fitted to a contour of the recess 61 and fixed within the recess 61. The plate member 62 is fitted into the recess 61. When fitted, the plate member 62 comes into contact with an inner wall surface of the recess 61, for example, at an upper end and a lower end in a plan view. The upper end and the lower end (or any one of the upper end and the lower end) in the plan view position the plate member 62 in an upper-lower direction in the plan view. The plate member 62 may be, for example, a transparent hard acrylic plate. A front surface of the plate member 62 defines a flat surface 63. A space above the flat surface 63 is surrounded by an

enclosure 64. The enclosure 64 has a wall surface 64a erecting from a horizontal plane including the flat surface 63 along the contour of the recess 61. For each side of the contour, the wall surface 64a is continuous from the inner wall surface of the recess 61 in one vertical plane. The wall surface 64a can guide the plate member 62 downward in a vertical direction. In this way, the plate member 62 and the enclosure 64 cooperate to form a tray on an upper surface of the upper box component 13. The plate member 62 forms an entire bottom plate of the tray. Here, the recess 61 defines a space 65 that is adjacent to an outer periphery of the plate member 62 and is open inside the enclosure 64. The space 65 is located outside a left end and a right end in the plan view. The space 65 may be located at either the left end or the right end. The space 65 is open with a dimension that prevents the drop of a small object anticipated when the plate member 62 and the enclosure 64 are utilized as the tray.

[0020]

As depicted in Fig. 4, the plate member 62 covers an instant film 66 placed within the recess 61. A lower surface of the plate member 62 is overlaid on an upper surface of the instant film 66. In the plan view, the entire instant film 66 is placed below the plate member 62. In the plan view, a first decoration 67a is fixed to the plate member 62 at a position above the instant film 66. The first decoration 67a is printed on the flat surface 63 in a strip shape parallel to the upper

end in the plan view, for example. For example, opaque ink is utilized for the first decoration 67a. Similarly, in the plan view, a second decoration 67b is fixed to the plate member 62 at a position below the instant film 66. The second decoration 67b is printed on the flat surface 63 in a strip shape parallel to the lower end in the plan view, for example. For example, opaque ink is utilized for the second decoration 67b.

[0021]

As depicted in Fig. 5, a cushioning material 18 is fitted in a space of rectangular parallelepiped surrounded by the side walls 14b of the lower box component 12. The cushioning material 18 includes, for example, a sponge and a cloth 18a wrapping the sponge. A slit 19 is formed in the cushioning material 18. A ring (jewelry) 21 is inserted into the slit 19, for example. The elasticity of the cushioning material 18 serves to hold the ring 21 in the slit 19.

[0022]

The ring 21 includes an annular member 22 made from platinum having an inside diameter corresponding to the size of a finger, for example, and a diamond stone 23 fixed to the mount of the annular member 22. The diamond stone 23 may be a single stone or a group of stones. The diamond stone 23 exhibits a blue fluorescence equal to or stronger than strong blue, namely, strong blue or very strong blue. The diamond stone 23 shines clear and white (transparent) under a visible light (the natural light or from a normal electric light). The diamond stone 23

shines blue under ultraviolet radiation. The diamond stone 23 is thus supported in the lower box component 12. When pieces of diamond stone 23 are arranged, the blue fluorescence of all pieces of diamond stone 23 (or for each design-coherent group) may be unified to the strong blue or the very strong blue.

[0023]

A ceiling member 24 is fitted in a space of rectangular parallelepiped surrounded by the side walls 16b of the upper box component 13. The ceiling member 24 includes a dressing top panel 24a shaped in a rectangle or square to form the ceiling surface of the inner box 11, and four side lining panels 24b respectively continuous from four sides of the dressing top panel 24a to cover over inside surfaces of the four side walls 16b. Here, the side lining panels 24b are not adhered to the inside surfaces of the side walls 16b, and the ceiling member 24 is detachably set inside the upper box component 13.

[0024]

As depicted in Fig. 6, the upper box component 13 is coupled to the lower box component 12 through a hinge 26 for swinging movement between an opened position and a closed position. The hinge 26 includes a first hinge blade 27 overlaid and fixed on the inside surface of the side wall 16b of the upper box component 13, a second hinge blade 28 overlaid and fixed on the inside surface of the corresponding side wall 14b of the lower box component 12, and a single hinge pin 29. The first hinge blade 27 has tubes 27a. The second hinge blade 28

has tubes 28a alternated in series with the tubes 27a of the first hinge blade 27. The hinge pin 29 is commonly inserted into the tubes 27a of the first hinge blade 27 and the tubes 28a of the second hinge blade 28. The first hinge blade 27 swings around the hinge pin 29 relative to the second hinge blade 28. A central axis of the hinge pin 29 corresponds to a rotation axis of the upper box component 13 when opened or closed.

[0025]

A plate spring 31 is connected to the hinge 26. As depicted in Fig. 7, the plate spring 31 is formed in a bent plate keeping generatrices in parallel with the axis of the hinge pin 29. The opposite ends of the plate spring 31 are respectively coupled to the first hinge blade 27 and the second hinge blade 28 at positions spaced from the hinge pin 29. The first hinge blade 27 is positioned beside the second hinge blade 28 along a common provisional plane, and the intermediate section of the plate spring 31 gets furthest inward from the hinge pin 29, when the upper box component 13 takes the closed position where the lower end of the upper box component 13 is mated with the upper end of the lower box component 12. As the upper box component 13 displaces around the hinge pin 29 toward the closed position from the opened position, the outside angle reduces between the first hinge blade 27 and the second hinge blade 28 so that the intermediate section of the plate spring 31 gets closer to the hinge pin 29. As depicted in Fig. 8, when

the intermediate section of the plate spring 31 is in contact with the hinge pin 29, a further displacement of the upper box component 13 is restrained around the hinge pin 29 relative to the lower box component 12. The contact of the plate spring 31 with the hinge pin 29 in this manner defines the opened position of the upper box component 13. The plate spring 31 exerts the driving force to urge the upper box component 13 toward the closed position when an opening angle is smaller than a predetermined opening angle around the hinge pin 29 between the upper box component 13 and the lower box component 12. The plate spring 31 exerts the driving force to urge the upper box component 13 toward the opened position when the opening angle is larger than the predetermined opening angle around the hinge pin 29 between the upper box component 13 and the lower box component 12. A hinge cover 32 covers the hinge 26 and the plate spring 31. The hinge cover 32 may be formed of a material identical to that of the cloth 18a of the cushioning material 18, for example.

[0026]

A light-emitting diode (LED) lamp (light source) 33 is embedded in the dressing top panel 24a for the upper box component 13. The LED lamp 33 is configured to emit ultraviolet radiation based on a predetermined directivity D_v . The LED lamp 33 emits an ultraviolet light of ultraviolet A having a wavelength ranging from 395 nm to 405 nm, for example. The LED lamp 33 is preferably configured to emit radiation other than

visible light. The LED lamp 33 is preferably designed to have a narrower directivity Dv. The LED lamp 33 has the directivity Dv allowing entire radiation to be blocked with the lower box component 12.

[0027]

A battery 35 is connected to the LED lamp 33. The battery 35 is contained within a battery chamber 34 defined between the top panel 16a of the hard molded resin body and the dressing top panel 24a. A thin button cell may be utilized as the battery 35, for example. Here, button cells are connected in series, for example. Current is supplied to the LED lamp 33 from the battery 35.

[0028]

A switch 36 is established in the hinge 26 and the plate spring 31. The switch 36 is configured to control the supply of current to the LED lamp 33 and the termination of the current. A first contact 37 is fixed to an intermediate section of the plate spring 31 while being electrically insulated from the plate spring 31. The hinge 26 functions as a second contact establishing the switch 36 in combination with the first contact 37. Accordingly, the hinge 26 is made of an electrically conductive material. An electrically conductive material such as copper (Cu) is utilized to form the first contact 37, for example. An insulating material is interposed between the first contact 37 and the plate spring 31, for example. The first contact 37 is placed on the plate spring 31 at a surface opposed

to the hinge pin 29. The first contact 37 is in contact with the hinge 26 when the upper box component 13 takes the opened position. The first contact 37 is spaced apart from the hinge 26 when the upper box component 13 takes a position other than the opened position.

[0029]

As depicted in Fig. 7, an auxiliary plate 68 is overlaid on the lower surface of the plate member 62 from below. The auxiliary plate 68 is coupled to the plate member 62, and is configured to hold the instant film 66 between the auxiliary plate 68 and the plate member 62. The instant film 66 is sandwiched between the plate member 62 and the auxiliary plate 68. The auxiliary plate 68 may be formed of a transparent material similarly to the plate member 62, or may be formed of an opaque material. The auxiliary plate 68 has a contour that coincides with a contour of the plate member 62.

[0030]

In the plan view, a first fragrant agent 69a is sandwiched between the plate member 62 and the auxiliary plate 68 at a position above the instant film 66. The first fragrant agent 69a extends in a strip shape parallel to the upper end in the plan view, for example. The first fragrant agent 69a may include, for example, a strip-shaped sheet and perfume impregnated in the paper sheet. In the plan view, the first decoration 67a covers the first fragrant agent 69a. The first fragrant agent 69a is hidden by the first decoration 67a.

Similarly, in the plan view, a second fragrant agent 69b is sandwiched between the plate member 62 and the auxiliary plate 68 at a position below from the instant film 66. The second fragrant agent 69b extends in a strip shape parallel to the lower end in the plan view, for example. The second fragrant agent 69b may include, for example, a strip-shaped paper sheet and perfume impregnated in the paper sheet. In the plan view, the second decoration 67b covers the second fragrant agent 69b. The second fragrant agent 69b is hidden by the second decoration 67b.

[0031]

Openings 72 are respectively formed in the auxiliary plate 68 at positions corresponding to the first fragrant agent 69a and the second fragrant agent 69b. The opening 72 passes through the auxiliary plate 68 in the vertical direction. The first fragrant agent 69a and the second fragrant agent 69b are exposed to the respective openings 72. Each opening 72 is connected to a space within the recess 61 in contact with a lower surface of the auxiliary plate 68. A fragrance component of the first fragrant agent 69a and the second fragrant agent 69b can leak out from the opening 72 into the space within the recess 61.

[0032]

As depicted in Fig. 9, magnets 73 are fixed to the plate member 62. The magnet 73 is embedded in a lower surface of the plate member 62, for example. In the plan view, the first

decoration 67a and the second decoration 67b cover over the respective magnets 73. Each magnet 73 is hidden by the first decoration 67a or the second decoration 67b. None of the magnets 73 are visually recognized from the flat surface 63. Here, for example, if the magnet 73 is formed of a transparent material, the first decoration body 67a and the second decoration body 67b may be omitted. In addition, an opaque decoration may be applied to the lower surface of the plate member 62 while leaving a transparent window. Printing or vapor deposition can be utilized to apply the decoration. The window can be shaped, for example, to resemble a contour of an image on the instant film 66. The image can be observed through the window. Transmission is blocked around the window. The magnet 73 can be hidden.

[0033]

First magnetic bodies 74 fixed to the respective magnets 73 based on the magnetic force of the magnets 73 are fixed to the auxiliary plate 68. The first magnetic body 74 is embedded in an upper surface of the auxiliary plate 68, for example. The first magnetic body 74 may have a contour that overlaps the magnet 73 when the plate member 62 is overlaid on the auxiliary plate 68. The magnetic force serves to fix the auxiliary plate 68 to the lower surface of the plate member 62. The instant film 66 is sandwiched between the plate member 62 and the auxiliary plate 68 overlaid on the plate member 62. A magnet may be utilized in place of the first magnetic body 74. At this

time, the magnet of the auxiliary plate 68 may be placed to face the magnet 73 of the plate member 62 with a magnetic pole opposite to that of the magnet 73. The magnet 73 and the first magnetic body 74 may be exchanged between the plate member 62 and the auxiliary plate 68.

[0034]

Second magnetic bodies 75 are fixed to the upper box component 13. The second magnetic bodies 75 are placed below the respective first magnetic body 74. The magnetic force of the magnet 73 acts on the second magnetic body 75 via the first magnetic body 74. In this way, the magnetic force serves to fix the plate member 62 and the auxiliary plate 68 within the recess 61. The second magnetic body 75 protrudes from a horizontal plane 76. The second magnetic body 75 supports the auxiliary plate 68 at a position spaced apart from the horizontal plane 76 in the vertical direction. In this way, a space connected to the openings 72 is defined between the horizontal plane 76 and the auxiliary plate 68. The opening 72 can be connected to the space 65. Here, a magnet may be utilized in place of the second magnetic body 75. At this time, the magnet of the upper box component 13 may be placed to face the magnet of the auxiliary plate 68 with a magnetic pole opposite to that of the magnet of the auxiliary plate 68.

[0035]

As depicted in Fig. 10, a light irradiation circuit 38 according to a first example, including the LED lamp 33, the

battery 35, and the switch 36, is established in the inner box 11. The LED element of the LED lamp 33 is connected in series with the battery 35 in the light irradiation circuit 38. A time-delay normally open contact (hereinafter referred to as "timer contact") 39 is connected in series with the LED lamp 33. The switch 36 and a timer 41 are connected in parallel with the LED lamp 33 and the timer contact 39. When the switch 36 is closed, the timer 41 starts to operate, and the timer contact 39 closes after a predetermined time (hereinafter referred to as a "first time") has elapsed. The LED lamp 33 is thus energized. When the switch 36 opens, the timer 41 returns to the initial status, the timer contact 39 opens. The LED lamp 33 thus blows out.

[0036]

As depicted in Fig. 11, an audio playback unit 45 that plays back recorded audio is incorporated in the inner box 11. The audio playback unit 45 includes an audio circuit 48 that acquires an audio signal from a microphone 46 and supplies the audio signal to a speaker 47. The audio circuit 48 is connected to the battery 35. The audio circuit 48 operates by receiving a voltage of the battery 35.

[0037]

The microphone 46 detects vibrations in the air caused by audio and converts the vibrations into an audio signal (electric signal). The generated audio signal is recorded in, for example, a memory 49. As the memory 49, for example, an EEPROM may be

utilized. The memory 49 may be a memory that allows writing of an audio signal only once. The microphone 46 is supported by the upper box component 13 or the lower box component 12. Here, for example, the microphone 46 is contained within a space defined between the top panel 16a and the dressing top panel 24a. The top panel 16a or the dressing top panel 24a may have a through hole that is formed corresponding to a position of the microphone 46 and connects outside air to the microphone 46.

[0038]

The speaker 47 generates vibrations in the air based on the audio signal and plays back the corresponding audio. The played-back audio stimulates auditory sense of one who is listening to the played-back audio. In this way, one who is listening to the played-back audio can hear the audio. The speaker 47 is supported by the upper box component 13 or the lower box component 12. Here, for example, the speaker 47 is contained within the space defined between the top panel 16a and the dressing top panel 24a. The top panel 16a or the dressing top panel 24a may have a through hole that is formed corresponding to a position of the speaker 47 and connects outside air to the speaker 47.

[0039]

The audio playback unit 45 is connected to a hold circuit 51 that holds the audio playback until a predetermined time (hereinafter referred to as "second time") has elapsed since the start of ultraviolet radiation. The hold circuit 51

connects the switch 36 to the audio circuit 48. The audio circuit 48 and the light irradiation circuit 38 share the battery 35 and the switch 36. The hold circuit 51 measures (the first time + the second time) after the close of the switch 36. Here, when the predetermined second time has elapsed since the start of ultraviolet radiation, the audio circuit 48 extracts the audio signal from the memory 49 and supplies the audio signal to the speaker 47.

[0040]

A recording switch 52 is connected to the audio circuit 48. When the recording switch 52 is closed, the audio circuit 48 acquires the audio signal from the microphone 46 and stores the audio signal in the memory 49. As depicted in Fig. 12, a button of the recording switch 52 may be installed on an inner wall surface of the upper box component 13. Here, the recording switch 52 is closed as long as the button is continuously pressed. When the button is released from a pressing operation, the recording switch 52 is opened. By disposing the button inside the upper box component 13, the recording switch 52 can be protected from false operation only by positioning the upper box component 13 at the closed position. The upper box component 13 functions as a protection component that protects the recording switch 52 from objects other than components of the inner box 11. In this way, it is possible to prevent unintended audio recording (deletion of audio due to overwriting). In addition, the recording switch 52 may be

interlocked with the close of the switch 36. As a result, when the recording switch 52 is operated in a state where the upper box component 13 reaches the opened position, the audio can be recorded in the memory 49.

[0041]

The LED lamp 33, the timer contact 39, the timer 41, the audio circuit 48, the memory 49, and the hold circuit 51 may be mounted on a common printed circuit board, for example. Wires such as vinyl coated wires or cables may be utilized to electrically connect the first contact 37 of the switch 36, the first hinge blade 27 or the second hinge blade 28 of the hinge 26, the battery 35, the microphone 46, the speaker 47 and the like to wiring patterns on the printed circuit board. The printed circuit board may be contained within the battery chamber 34, for example.

[0042]

Next, the operation of the inner box 11 will be described below. As depicted in Fig. 3, when the upper box component 13 is located at the closed position, the lower end of the upper box component 13 is mated with the upper end of the lower box component 12. The upper box component 13 covers over the ring 21 and buries the diamond stone 23. One who observes the inner box 11 looks at the exterior of the closed inner box 11. The diamond stone 23 is placed out of sight of one who observes the inner box 11.

[0043]

Here, as depicted in Fig. 7, the intermediate section of the plate spring 31 gets furthest from the hinge pin 29. Accordingly, the first contact 37 of the switch 36 is spaced from the hinge 26 namely the second contact. The switch 36 opens. The LED lamp 33 is maintained in an off state. The operation of the audio circuit 48 is maintained in a stopped state.

[0044]

When one who observes the inner box 11 manipulates the upper box component 13 toward the opened position around the hinge pin 29 against the elasticity of the plate spring 31, the lower end of the upper box component 13 gets remote from the upper end of the lower box component 12. A visible light streams in through a gap between the upper box component 13 and the lower box component 12 toward the diamond stone 23. The diamond stone 23 gradually appears in the sight of one who observes the inner box 11. The diamond stone 23 is exposed to the radiation of the visible light. Accordingly, the diamond stone 23 shines clear and white.

[0045]

The plate spring 31 exerts the driving force to urge the upper box component 13 toward the opened position when the opening angle is larger than the predetermined opening angle around the hinge pin 29 between the upper box component 13 and the lower box component 12. The upper box component 13 thus reaches the opened position. The elasticity of the plate spring

31 serves to hold the upper box component 13 at the opened position. The flat surface 63 of the upper box component 13 is located at a higher position as a distance from the rotation axis increases. As depicted in Fig. 5, one who observes the inner box 11 is allowed to look at the diamond stone 23 without blockage of the upper box component 13. The diamond stone 23 shines clear and white (transparent) under a visible light (the natural light or from a normal electric light).

[0046]

When the upper box component 13 reaches the opened position, as depicted in Fig. 8, the intermediate section of the plate spring 31 is urged against the hinge pin 29 with the elasticity of the plate spring 31. In this way, the first contact 37 comes into contact with the hinge 26 namely the second contact. The switch 36 closes. When the first time has elapsed after the close (ON operation) of the switch 36, the LED lamp 33 lights up. The LED lamp 33 starts emitting ultraviolet radiation toward the diamond stone 23. The diamond stone 23 shines blue.

[0047]

The color of the diamond stone 23 changes from transparency (white) to blue after the diamond stone 23 shining clear and white has been observed for a while subsequent to the opening of the upper box component 13. A visual performance is in this manner accomplished in response to the opening action of the upper box component 13. Since the plate spring 31 exerts

the driving force for positioning the upper box component 13 at the opened position, the diamond stone 23 is prevented from starting to change the color at an intermediate position between the closed position and the opened position, and one who observes the inner box 11 can reliably see the change in the color of the diamond stone 23.

[0048]

When the second time has elapsed from the start of ultraviolet irradiation, the audio circuit 48 plays back the recorded audio. For example, in the case of a present, the audio of a giver (for example, "Will you marry me?" or "Let's stay together from now on") can be delivered to one who observes the inner box 11. Since the audio playback is delayed relative to a visual performance of the diamond stone 23, the visual performance of the diamond stone 23 and an audio performance sequentially act on one who observes the inner box 11. One who observes the inner box 11 can be aware of an auditory performance (including language processing) of the audio after being aware of the visual performance of the diamond stone 23. The audio performance is superimposed on the visual performance. According to the insight of the present inventor, since a person cannot be aware of a plurality of senses at the same time, a synergistic effect of visual and audio can be strengthened by delaying the audio playback from the visual performance, compared to when the audio performance progresses simultaneously with the visual performance. This type of performance generates

a dramatic impact on one who observes the inner box 11.

[0049]

When the switch 36 is opened, the LED lamp 33 blows out. The audio circuit 48 stops supplying the audio signal. The audio playback ends.

[0050]

Prior to giving the present, the audio of the giver is recorded in advance on the inner box 11. For recording, the upper box component 13 is positioned at the opened position. The giver speaks (for example, "Will you marry me?" or "Let's stay together from now on") into the microphone 46 while pressing the recording switch 52. The audio circuit 48 operates in accordance with the close of the recording switch 52. The audio is converted into the audio signal by the microphone 46. The audio signal is stored in the memory 49. When the finger is released from the button of the recording switch 52, the audio recording ends.

[0051]

Here, the cloth 18a of the cushioning material 18 may be colored in black or dark blue. According to such coloring, even when the visible light adjacent to an ultraviolet region is slightly mixed into the light from the LED lamp 33, the visible light illuminating the cloth 18a is not noticeable. The light from the LED lamp 33 can be concealed from one who observes the inner box 11.

[0052]

For example, in the jewelry store, an image of a purchase scene can be captured by an instant camera. The instant film 66 can be developed on the spot to preserve the purchase scene. The transparent plate member 62 covers the instant film 66 within the recess 61. The plate member 62 is fixed within the recess 61 and serves to hold the instant film 66 within the recess 61. In this way, the photograph can be easily attached to the inner box 11. One who observes the inner box 11 can enjoy the image on the instant film 66 through the transparent plate member 62. The owner of the ring 21 can see the image on the instant film 66 every time the inner box 11 is taken out. In this way, the product packaging unit 101 can create an opportunity to recall the emotions felt at the time of purchase. Triggered by the product packaging unit 101, the joy felt when receiving the present, for example, can be recalled. Here, the instant film 66 can be stored in a dark environment inside the opaque upper outer box 104. Since exposure to sunlight is avoided, degradation of the instant film 66 (and the image) can be prevented.

[0053]

A space above the front surface of the plate member 62 is surrounded by the enclosure 64 along the contour of the recess 61. The enclosure 64 serves to form the tray on the upper surface of the upper box component 13. A small object such as the ring 21 or a key holder can be placed on the plate member 62. The enclosure 64 serves to hold the small object on the

plate member 62. Since such a tray is utilized on a daily basis, the owner of the ring 21 can frequently see the image on the instant film 66. The emotions felt at the time of purchase can be strongly imprinted in the memory of the owner. One who observes the inner box 11 can be left with a strong impression of the ring 21, a brand, and the jewelry store at the time of purchase. In particular, if the tray is shared by a couple (husband and wife), the image on the instant film 66 can serve as a trigger for each individual to recall the emotions felt when receiving the present. The image on the instant film 66 can contribute to maintaining a harmonious relation.

[0054]

The auxiliary plate 68 is fixed to the lower surface of the plate member 62 by the magnetic force of the magnets 73. The instant film 66 is sandwiched between the plate member 62 and the auxiliary plate 68 overlaid on the plate member 62. Since the plate member 62 and the auxiliary plate 68 can be spaced from each other against the magnetic force, the instant film 66 can be easily replaced within a photo frame including the plate member 62 and the auxiliary plate 68. The magnetic force of the magnet 73 acts on the second magnetic body 75 via the first magnetic body 74. In this way, the magnetic force serves to fix the plate member 62 and the auxiliary plate 68 within the recess 61. The photo frame including the auxiliary plate 68 and the plate member 62 can be securely held within the recess 61 regardless of whether the upper box component 13

is opened or closed. Since the first magnetic body 74 exerts the magnetic force under an influence of the magnet 73, the photo frame can be easily attached to a surface of a refrigerator or the like. When the auxiliary plate 68 is fixed, a recess for receiving the instant film 66 may be formed in the plate member 62. The auxiliary plate 68 may be fitted into the recess of the plate member 62. In this way, the instant film 66 can be sandwiched between the plate member 62 and the auxiliary plate 68. In addition, the magnet 73 and the first magnetic body 74 may be exchanged between the plate member 62 and the auxiliary plate 68.

[0055]

In the present embodiment, the recess 61 defines a space 65 that is adjacent to an outer periphery of the plate member 62 and is open on an inner side of the enclosure 64. The space 65 adjacent to the outer periphery of the plate member 62 is open inside the enclosure 64. Access to the outer periphery of the plate member 62 is permitted from this space 65. By applying the external force to the outer periphery of the plate member 62, the plate member 62 can be easily pulled up from the recess 61. The plate member 62 can be easily removed from the upper box component 13. Replacement and removal of the instant film 66 can be favorably realized. The space 65 may extend narrowly along the left end and the right end of the plate member 62 and be formed in a size sufficient to accept, for example, the insertion of the ring 21. In this case, for the removal of the

plate member 62 and the auxiliary plate 68, a rigid tool may be inserted into the space 65. The space 65 may be formed in a size sufficient to allow a fingertip to reach the auxiliary plate 68.

[0056]

In the present embodiment, the first fragrant agent 69a and the second fragrant agent 69b are sandwiched between the plate member 62 and the auxiliary plate 68. The fragrance component of the first fragrant agent 69a and the second fragrant agent 69b leaks out from the opening 72 of the auxiliary plate 68 into the space within the recess 61. The fragrance component can be diffused upward over the upper box component 13 from the space 65, passing beneath the auxiliary plate 68. In this way, a fragrance can be diffused around the inner box 11. If a fragrance specific to the brand of the ring 21 or a fragrance specific to the jewelry store is utilized, one who observes the inner box 11 can be left with a strong impression of the ring 21, the brand, and the jewelry store at the time of purchase.

[0057]

The inner box 11 according to the present embodiment produces a change in the color of the diamond stone 23 from white (clarity) to blue fluorescence. The owner of the ring 21 uses the inner box 11 when enjoying the change in the color of the diamond stone 23. In this way, the inner box 11 continues to be owned together with the ring 21. Opportunities for the

inner box 11 to be taken out increase. Opportunities to see the image on the instant film 66 increase. With a general product, the packaging box is often discarded once the product starts to be utilized.

[0058]

Similarly, the inner box 11 according to the present embodiment plays back the recorded audio. Since the audio performance is realized in this way, the owner of the ring 21 does not throw away the inner box 11 but keeps the inner box 11 and enjoys the audio performance. In this way, the inner box 11 is kept together with the ring 21. The opportunities for the inner box 11 to be taken out further increase. The opportunities to see the image on the instant film 66 further increase.

[0059]

As depicted in Fig. 13, in place of the second magnetic bodies 75, a magnetic body 78 placed below the auxiliary plate 68 may be fixed to the upper box component 13. The magnetic body 78 is in contact with the inner wall surface of the recess 61, for example, at an upper end and a lower end in a plan view. The magnetic body 78 may be, for example, a stainless steel plate extending all the way to the contour of the recess 61. In this case, the auxiliary plate 68 is formed of an opaque material. The auxiliary plate 68 covers the entire horizontal plane 76 defined by the magnetic body 78. At this time, the magnet 79 fixed to the magnetic body 78 by the magnetic force

is fixed to the auxiliary plate 68. The magnet 79 fixes the instant film 66 within the recess 61. The magnet 79 supports the auxiliary plate 68 at a position spaced apart from the horizontal plane 76 in the vertical direction. In this way, a space connected to the openings 72 is defined between the horizontal plane 76 and the auxiliary plate 68. The opening 72 can be connected to the space 65. The magnetic force serves to fix the auxiliary plate 68 within the recess 61. The photo frame including the auxiliary plate 68 and the plate member 62 can be securely held within the recess 61 regardless of whether the upper box component 13 is opened or closed. Since the magnet 79 is attached to the auxiliary plate 68, the photo frame can be easily attached to the surface of the refrigerator or the like. The magnetic body 78 may completely cover the bottom of the recess 61. In this case, the magnetic body 78 may be covered with the covering paper 17 seamlessly extending to the contour of the recess 61 and may extend into the space 65. The bottom of space 65 can be visually neatened by the covering paper 17.

[0060]

Fig. 14 schematically illustrates the structure of the upper box component 13 according to a second example. The plate member 62 is fitted to a contour of the recess 61 and fixed within the recess 61. The plate member 62 is in contact with inner wall surface of the recess 61, for example, at an upper end and a lower end in a plan view. The plate member 62 may be,

for example, a transparent hard acrylic plate. A front surface of the plate member 62 defines the flat surface 63. A space above the flat surface 63 is surrounded by an enclosure 64. The enclosure 64 has the wall surface 64a erecting from a horizontal plane including the flat surface 63 along the contour of the recess 61. For each side of the contour, the wall surface 64a is continuous from the inner wall surface of the recess 61 in one vertical plane. The wall surface 64a can guide the plate member 62 downward in the vertical direction. In this way, the plate member 62 and the enclosure 64 cooperate to form a tray on an upper surface of the upper box component 13. As described above, the recess 61 has the space 65 that is adjacent to an outer periphery of the plate member 62 and is open on an inner side of the enclosure 64. The space 65 is located outside a left end and a right end in the plan view.

[0061]

The instant film 66 is overlaid on the bottom of the recess 61. The bottom of the recess 61 forms the horizontal plane 76 defined by the contour of the recess 61. The plate member 62 is configured to cover the instant film 66. At this time, the magnets 73 are fixed to the plate member 62. The magnet 73 is embedded in a lower surface of the plate member 62, for example. In the plan view, the first decoration 67a and the second decoration 67b cover over the respective magnets 73. Each magnet 73 is hidden by the first decoration 67a or the second decoration 67b. None of the magnets 73 are visually

recognized from the flat surface 63. Here, for example, if the magnet 73 is formed of a transparent material, the first decoration body 67a and the second decoration body 67b may be omitted. On the other hand, magnetic bodies 81 are fixed to the upper box component 13. The magnetic bodies 81 are placed below the respective magnets 73. The magnetic force of the magnet 73 acts on the magnetic body 81. In this way, the magnetic force serves to fix the plate member 62 within the recess 61. Here, the auxiliary plate 68, the first fragrant agent 69a, and the second fragrant agent 69b can be omitted. A magnet may be utilized in place of the magnetic body 81. At this time, the magnet of the upper box component 13 may be placed to face the magnet 73 of the plate member 62 with a magnetic pole opposite to that of the magnet 73.

[0062]

Fig. 15 schematically illustrates the structure of a light irradiation circuit according to the second example. The light irradiation circuit 43 includes an NPN transistor TR1 connected to the battery 35. An LED element of the LED lamp 33 is connected between a positive terminal of the battery 35 and a collector C of the NPN transistor TR1. The switch 36 and a first resistor R1 are connected in series between the positive terminal of the battery 35 and a base B of the NPN transistor TR1. A capacitor C1 is connected between the base B of the NPN transistor TR1 and a negative terminal of the battery 35. A second resistor R2 is connected in parallel with the first

resistor R1 and the capacitor C1. An emitter E of the NPN transistor TR1 is connected to the negative terminal of the battery 35. When the switch 36 is closed in the light irradiation circuit 43, a time constant circuit R1, C1 serves to gradually increase the voltage applied to the base B of the NPN transistor TR1. When the voltage reaches a predetermined threshold at the base B of the NPN transistor TR1 during the voltage increase, the current flows into the collector C. When the predetermined time has subsequently elapsed, the applied voltage is maintained constant at the base B of the NPN transistor TR1. When the switch 36 is opened, the charge of the capacitor C1 is released through the second resistor R2.

[0063]

The hold circuit 51 of the audio playback unit 45 holds the audio playback until a predetermined time (hereinafter referred to as "third time") has elapsed after the ultraviolet radiation reaches the maximum intensity. The audio circuit 48 and the light irradiation circuit 43 share the battery 35 and the switch 36. The hold circuit 51 measures a time from the close of the switch 36 until the ultraviolet radiation reaches the maximum intensity (hereinafter referred to as a "gradual increase time"), and the third time. The gradual increase time can be specified by voltage characteristics of the light irradiation circuit 43. The gradual increase time corresponds to a time from the close of the switch 36 until the voltage applied to the base B of the NPN transistor TR1 reaches and is

maintained at the maximum value. Here, when the predetermined third time has elapsed from the time when the ultraviolet radiation reaches the maximum intensity, the audio circuit 48 extracts the audio signal from the memory 49 and supplies the audio signal to the speaker 47.

[0064]

The LED lamp 33, the NPN transistor TR1, the capacitor C1, the first and second resistors R1 and R2, the audio circuit 48, the memory 49, and the hold circuit 51 may be mounted on a common printed circuit board, for example. Wires such as vinyl coated wires may be utilized to electrically connect the first contact 37 of the switch 36, the first hinge blade 27 or the second hinge blade 28 of the hinge 26, the battery 35, the microphone 46, the speaker 47 and the like to wiring patterns on the printed circuit board. The printed circuit board may be contained within the battery chamber 34, for example.

[0065]

When the upper box component 13 reaches the opened position so that the switch 36 closes in the light irradiation circuit 43 according to the second example, the predetermined voltage is applied to the base B of the NPN transistor TR1 from the battery 35 after the first time has elapsed subsequent to the close (ON operation) of the switch 36. This causes the current to flow into the collector C of the NPN transistor TR1. The LED lamp 33 correspondingly starts to light up. Accordingly, one who observes the inner box 11 is allowed to enjoy the diamond

stone 23 shining clear and white (transparent) for a while subsequent to the opening of the upper box component 13.

[0066]

The time constant circuit R1, C1 serves to gradually increase the voltage applied to the base B of the NPN transistor TR1. The amount of current gradually increases through the LED lamp 33. The LED lamp 33 correspondingly acts to increase the intensity of the ultraviolet radiation to the diamond stone 23. The color of the diamond stone 23 gradually changes from white (clarity) to blue. A visual performance is in this manner accomplished in response to the opening action of the upper box component 13. Since the plate spring 31 exerts the driving force for positioning the upper box component 13 at the opened position, the diamond stone 23 is prevented from starting to change the color at an intermediate position between the closed position and the opened position, and one who observes the inner box 11 can reliably see the change in the color of the diamond stone 23.

[0067]

When the second time has elapsed from the start of ultraviolet irradiation, that is, when the third time has elapsed since the diamond stone 23 starts to shine blue to the maximum extent, the audio circuit 48 plays back the recorded audio. For example, in the case of a present, the audio of the giver (for example, "Will you marry me?" or "Let's stay together from now on") can be delivered to one who observes the inner

box 11. Since the audio playback is delayed relative to the visual performance of the diamond stone 23, the visual performance of the diamond stone 23 and the audio performance sequentially act on one who observes the inner box 11. One who observes the inner box 11 can be aware of the auditory performance (including language processing) of the audio after being aware of the visual performance of the diamond stone 23. The audio performance is added to the visual performance. According to the insight of the present inventor, since a person cannot be aware of a plurality of senses at the same time, a synergistic effect of visual and audio can be strengthened by delaying the audio playback from the visual performance, compared to when the audio performance progresses simultaneously with the visual performance. This type of performance generates a dramatic impact on one who observes the inner box 11.

[0068]

When the switch 36 is opened, the LED lamp 33 blows out. The audio circuit 48 stops supplying the audio signal. The audio playback ends. The charge of the capacitor C1 is released through the second resistor R2.

[0069]

It should be noted that the lower box component 12 may be configured to support the LED lamp 33 in place of the upper box component 13. In addition, the diamond stone 23 may be mounted on each of mounts constituting a chain of a necklace. The mount may be formed of a metallic material such as platinum, gold or

the like. Single piece of diamond stone 23 or pieces of diamond stone 23 may be fixed to the individual mount of the necklace. The diamond stone 23 may be mounted on a pendant, a bracelet, a pierced earring, a ring, an anklet, or the like. A group of pieces of diamond stone 23 may include pieces of a constant size or pieces of different sizes.

[0070]

The inner box 11 may include, as the switch 36, a tact switch having a plunger which the upper box component 13 pushes down when the upper box component 13 reaches the opened position. The light irradiation circuit 38 of the first example and the light irradiation circuit 43 of the second example may be replaced with any other types of electronic circuit unless such a light irradiation circuit realizes the identical function. The action of the switch 36 may be interlocked not only with the upper box component 13 assuming the opened position in the aforementioned manner but also with the upper box component 13 assuming the closed position. And the function of the light irradiation circuit 38, 43, the audio circuit 48, and the hold circuit 51 may be realized with the implementation of a software in a microprocessor (MPU).

Reference Sign List

[0071]

- 11 product packaging box (inner box)
- 12 lower box component

13	upper box component
26	hinge
61	recess
62	plate member
63	horizontal plane (flat surface)
64	enclosure
64a	wall surface
65	space (adjacent to outer periphery of plate member)
66	instant film
68	auxiliary plate
73	magnet
74	first magnetic body
75	second magnetic body
81	magnetic body

CLAIMS

[Claim 1] A product packaging box comprising:

a lower box component;

an upper box component coupled to the lower box component through a hinge for swinging movement between an opened position and a closed position and having a recess on an upper surface;

a transparent plate member fitted to a contour of the recess and fixed within the recess, and configured to cover over an instant film placed within the recess; and

an enclosure having a wall surface erecting from a horizontal plane including a front surface of the plate member along the contour of the recess and surrounding a space above the front surface of the plate member.

[Claim 2] The product packaging box according to claim 1, further comprising:

an auxiliary plate overlaid on a lower surface of the plate member from below and coupled to the plate member, and configured to hold the instant film between the auxiliary plate and the plate member.

[Claim 3] The product packaging box according to claim 1, wherein

the recess defines a space that is adjacent to an outer periphery of the plate member and is open on an inner side of

the enclosure.