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(54) **APPLIANCE FOR A TOILET HAVING A FLUSH RESPONSIVE AUDIO PLAYER**

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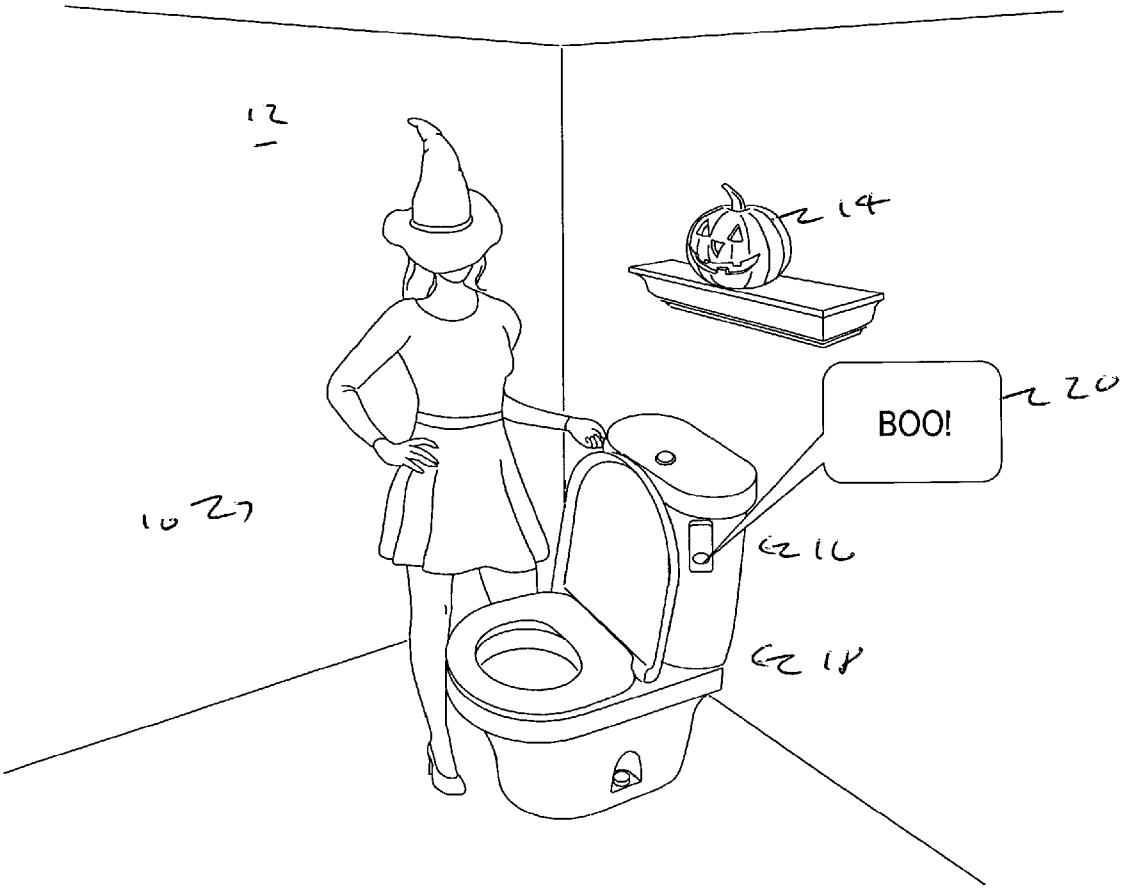
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(57) **ABSTRACT**

An appliance for a toilet having a flush responsive audio player plays preselected audio content keyed in response to a toilet flush event, the audio content having a meaning that is meant to induce a predetermined response in the user of the toilet. The preselected audio content may be pre-installed audio content, user-selected and installed audio content and/or user-generated, custom audio content. Any preselected audio content of copyrighted or un-copyrighted material may be employed in accord with the principles of the present invention



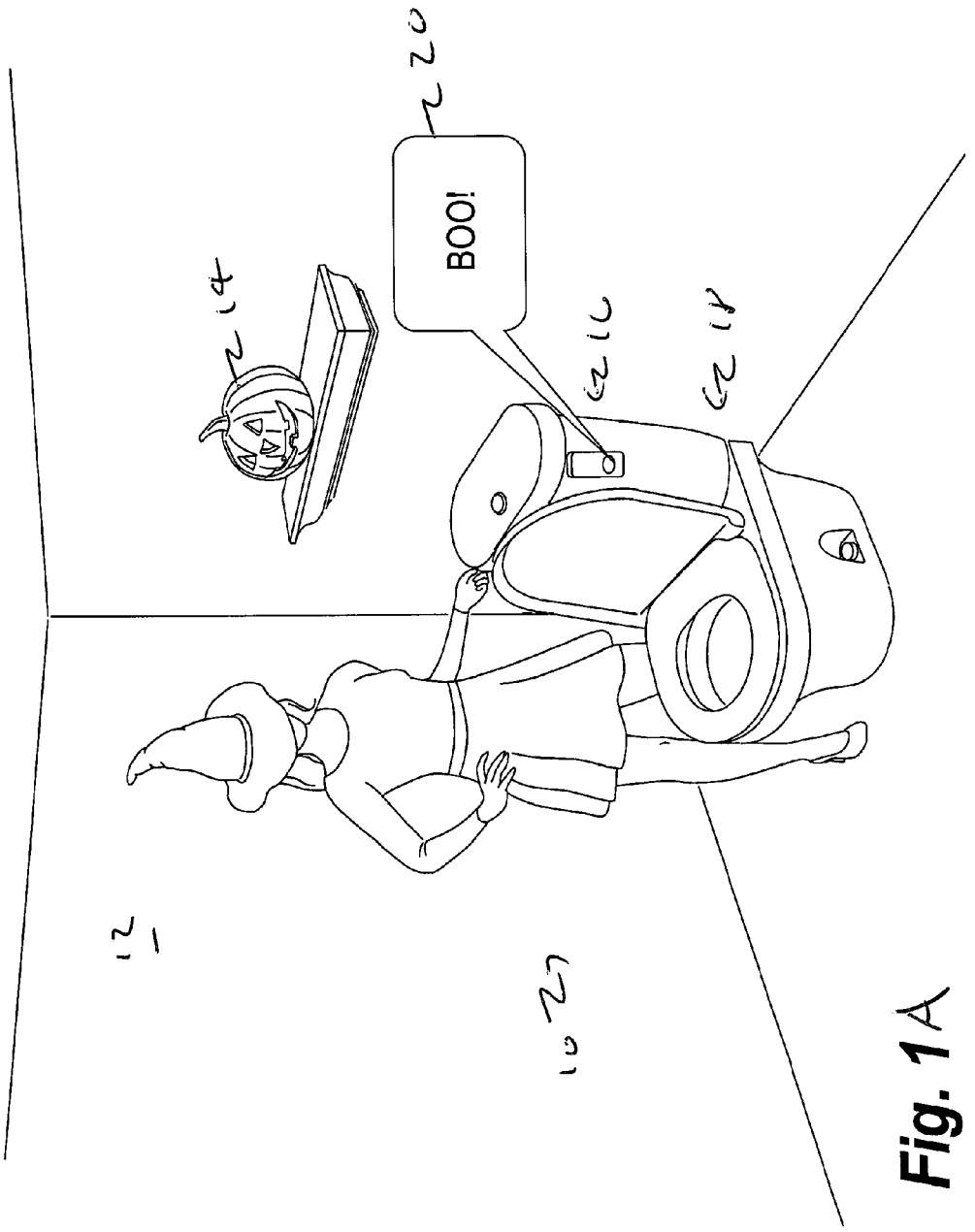


Fig. 1A

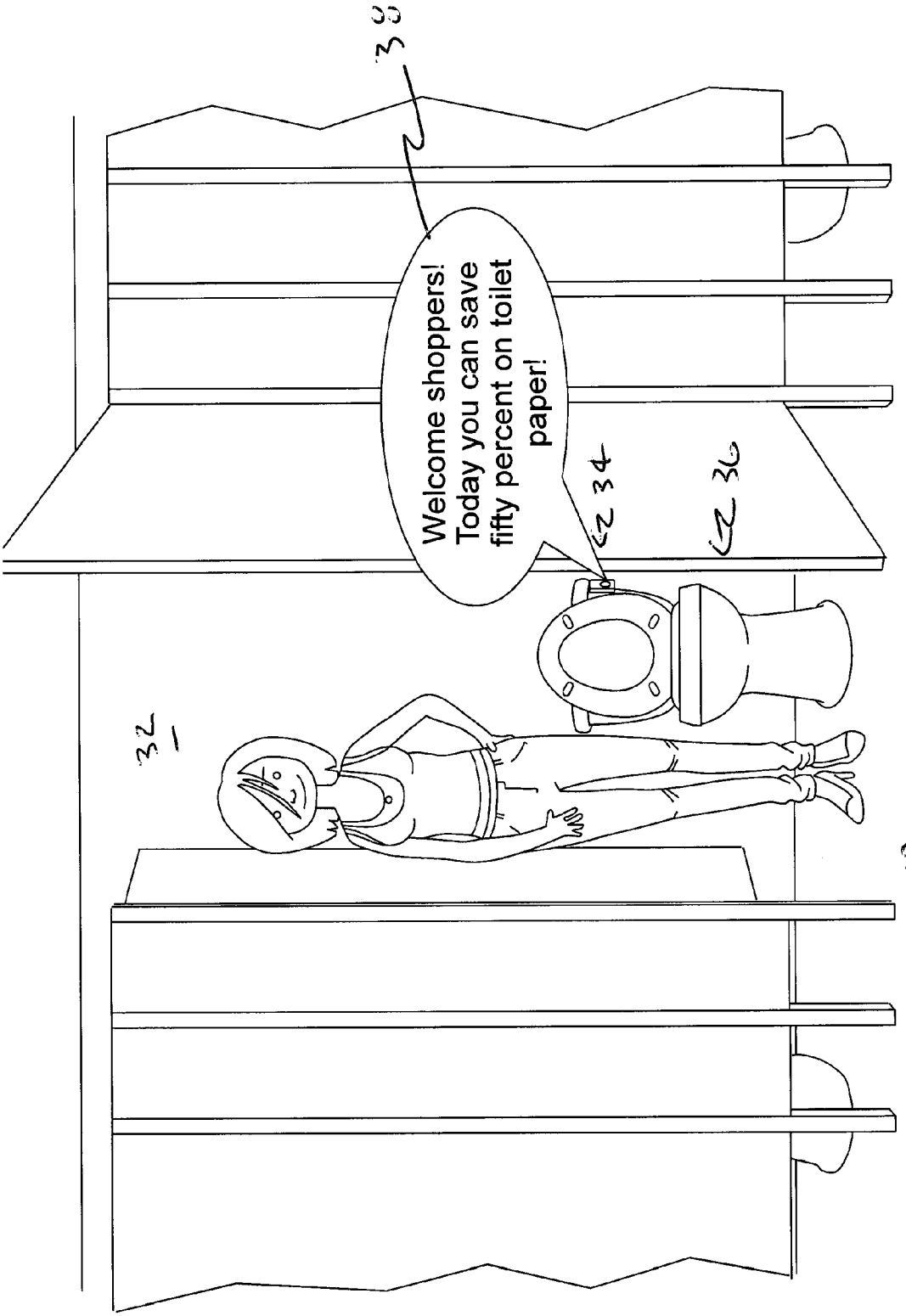

38
Welcome shoppers! Today you can save fifty percent on toilet paper!
34
36
32

Fig. 1B

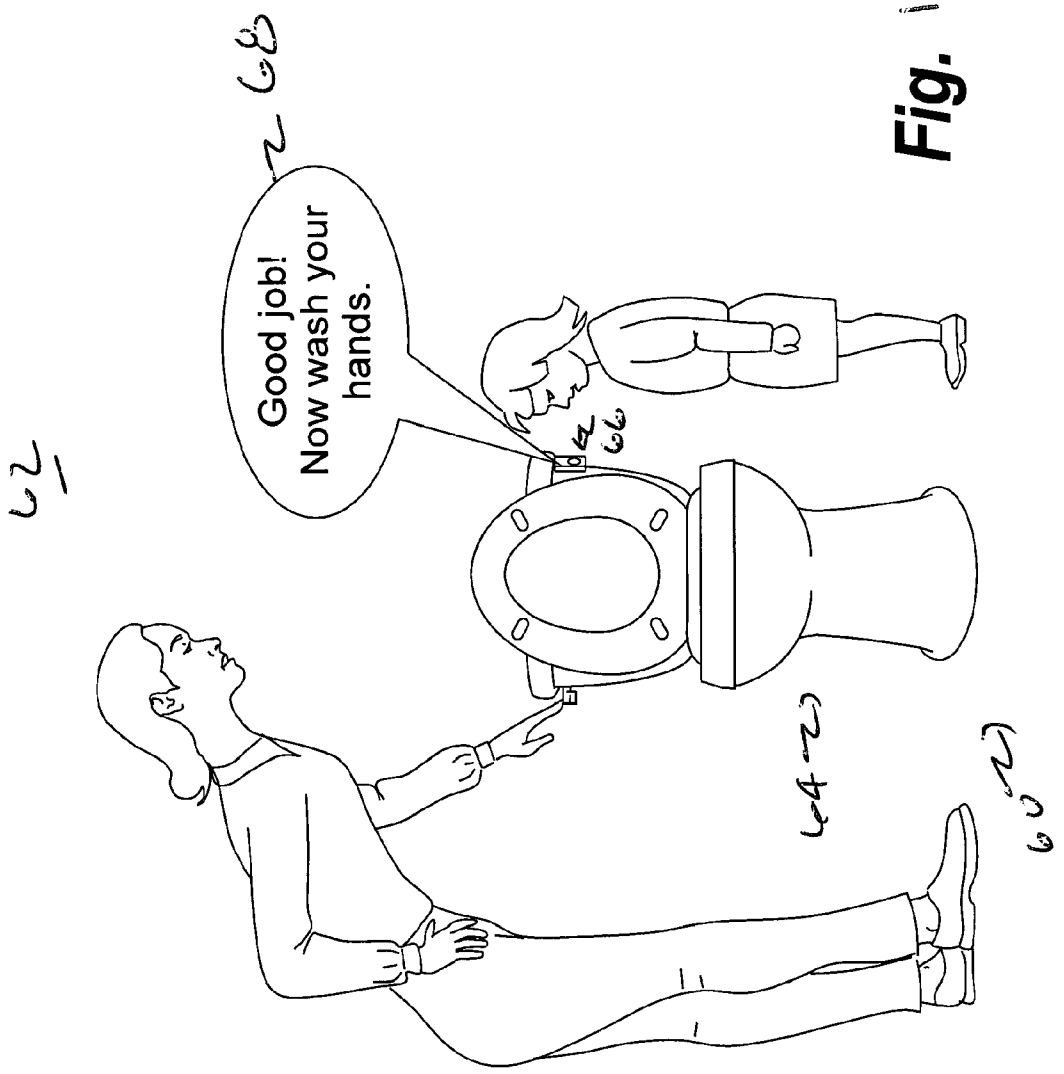


Fig. 1

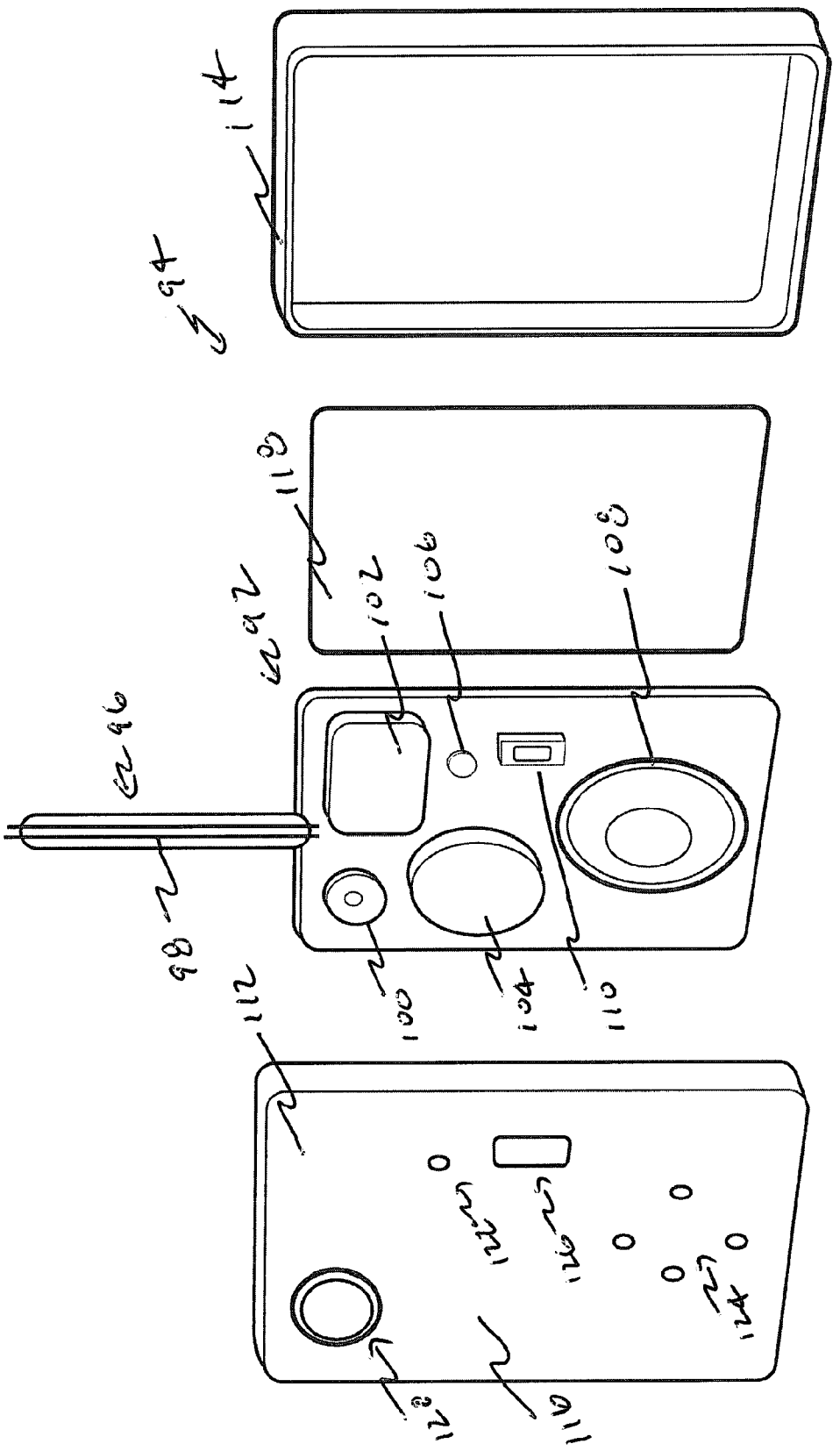

94
114
92
96
98
112
100
104
110
102
106
108
116
118
120
122
124
126
128

FIG 2

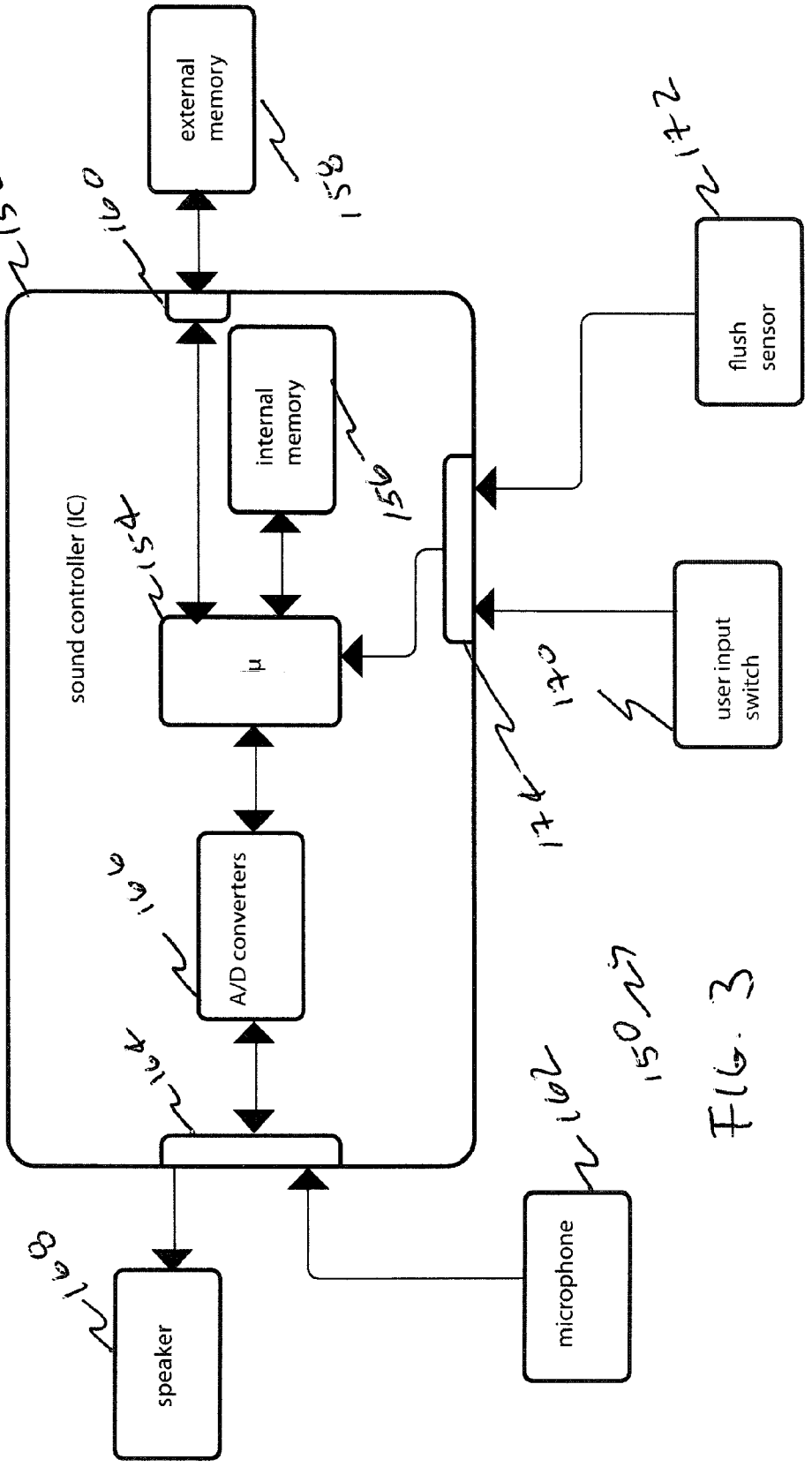

external memory
158
160
152
sound controller (IC)
154
μ
internal memory
156
A/D converters
166
168
speaker
microphone
162
150
flush sensor
172
user input switch
170
174

FIG. 3

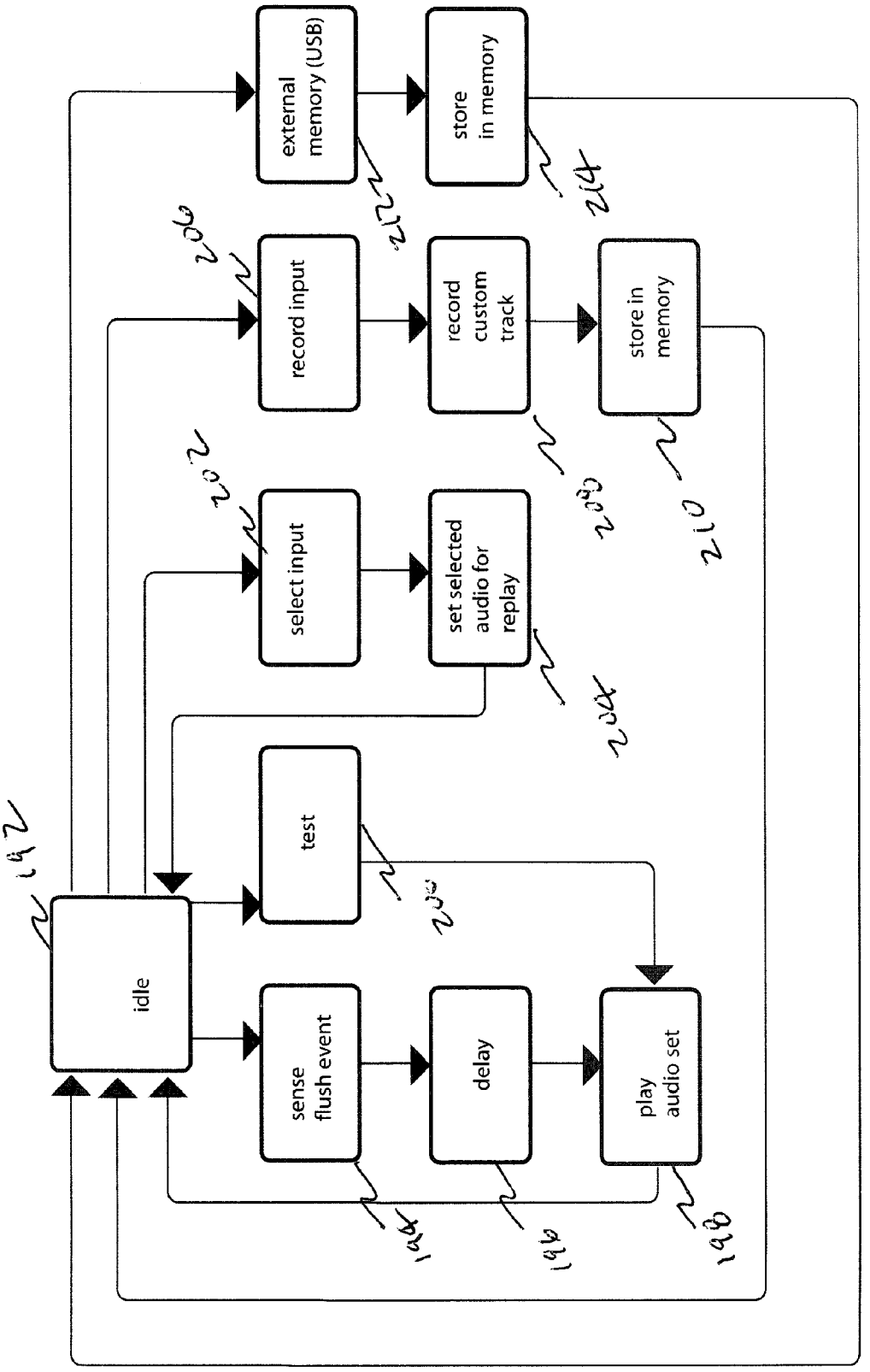

idle
test
sense flush event
delay
play audio set
select input
set selected audio for replay
record input
record custom track
store in memory
external memory (USB)
store in memory

FIG. 4

APPLIANCE FOR A TOILET HAVING A FLUSH RESPONSIVE AUDIO PLAYER

FIELD OF THE INVENTION

[0001] This invention is shown to the field of electrical audio systems and devices, and more particularly, to a novel appliance for a toilet having a flush responsive audio player.

BACKGROUND OF THE INVENTION

[0002] Toilets are an established part of the infrastructure of the modern world. For example, in the United States alone, by some estimates there are one-hundred (100) to one hundred fifty (150) million households with toilets with approximately three hundred (300) to three hundred fifty (350) million toilets total.

[0003] The bathroom experience for the most part is a solitary one, typically involving the steps of toilet use, flushing of the toilet and any appropriate hygiene. Typically, the flushing of the toilet has an event character that occurs in time and is characterized by a distinctive "swoosh" sound as the water is evacuated from the bowl. Heretofore, the bathroom experience was completed with the performance of the foregoing steps and the flushing sound incident to toilet use went largely unnoticed as accompanying background noise.

[0004] There is thus a need for an appliance for a toilet having a flush responsive audio player that makes the bathroom experience into a more enjoyable and/or informative experience.

SUMMARY OF THE INVENTION

[0005] Accordingly, it is an object of the present invention to disclose an appliance for a toilet having a flush responsive audio player that transforms the bathroom experience into a more enjoyable and/or informative experience.

[0006] A related object of the present invention is to disclose an appliance for a toilet having a flush responsive audio player that keys preselected audio content to the flush sound made by the toilet such that the user experiences two sounds in close succession, initially the flush sound incident to toilet use, and subsequently the preselected audio content keyed to respond to the flush event, the audio content having a meaning that is meant to induce a predetermined response in the user of the toilet.

[0007] A related object of the present invention is to disclose an appliance for a toilet having a flush responsive audio player where the preselected audio content, keyed to respond to the flush event, is meant to induce humor, to be motivational, and among other predetermined responses to be propaedeutic to good hygienic practices.

[0008] Another object of the present invention is to disclose an appliance for a toilet having a flush responsive audio player where the preselected audio content, keyed to respond to the flush event, is pre-installed audio content, is user-selected audio content selected from a library of prerecorded audio content and/or is user-generated custom audio content.

[0009] A further object of the present invention to disclose an appliance for a toilet having a flush responsive audio player that is battery-powered and usable over many flush cycles without requiring change of batteries.

[0010] Another object of the present invention is to disclose an appliance for a toilet having a flush responsive audio player that is user-friendly and capable of low-cost manufacture.

[0011] In accord with these and other objects, the appliance for a toilet having a flush responsive audio player in accord with the present invention is provided with a portable housing adapted for use with a toilet, preferably a clamshell housing, and means, such as an adhesive patch attached to the clamshell housing, for removably mounting the housing to the toilet.

[0012] Informational, branding, design or other graphics or indicia is provided, preferably carried on cards imprinted with such indicia contained within the clamshell housing.

[0013] A flush event sensor is provided that is responsive to evacuation of water from the toilet bowl to provide a flush event signal representative that the toilet has been flushed. The flush event sensor preferably includes an elongated wire adapted to extend from the housing into the toilet tank. The conductor's of the elongated wire of the flush event sensor normally are submerged in the water of the tank of the toilet and are uncovered during a flush cycle to provide a signal representative of a flush event although other means for providing a signal indication of a flush event could be employed without departing from the inventive concepts.

[0014] An audio player coupled to the flush event sensor is provided that is operative in response to a flush event signal to play preselected audio content keyed to the flush sound made by the toilet such that the user experiences two sounds in close succession, initially the flush sound incident to toilet use, and subsequently the preselected audio content keyed to respond to the flush event, the audio content having a meaning that is meant to induce a predetermined response in the user of the toilet.

[0015] The flush responsive audio player is preferably provided with a battery-powered sound controller including a processor operatively connected to the elongated wire of the flush event sensor and an audio speaker carried by a printed circuit board mounted within the clamshell housing.

[0016] A memory storing a library of audio content is preferably provided that is operatively coupled to the processor of the sound controller. The memory may be internal memory and the preselected audio content may be pre-installed in internal memory. The memory may be external memory, preferably a USB thumb drive, and the preselected audio content may be user-selected audio content.

[0017] A microphone is preferably provided that is coupled to the processor of the sound controller of the flush responsive audio player. The microphone is used to provide user-generated custom audio content.

[0018] Any preselected audio content of copyrighted or un-copyrighted material may be employed in accord with the principles of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] These and other objects, inventive aspects and advantageous features of the present invention will become apparent as the invention becomes better understood by referring to the following, solely exemplary, detailed description of the presently preferred embodiments, and to the drawings, wherein:

[0020] FIG. **1** illustrates different exemplary use applications of the appliance for a toilet having a flush responsive audio player in accord with the present invention, showing in the FIG. **1**A thereof a private holiday scene where the audio content played in response to a flush event is meant to induce a humorous mood, surprise and laughter;

[0021] FIG. **1**B is a pictorial view showing a commercial public scene where the audio content played in response to a flushing event is meant to induce continued in-store shopping;

[0022] FIG. **1**C is a pictorial view showing a home scene where the audio content played in response to a flush event is meant by an attending mother to induce good hygienic habits in her child's use of the toilet;

[0023] FIG. **2** is an exploded pictorial view illustrating an appliance for a toilet having a flush responsive audio player in accord with the present invention;

[0024] FIG. **3** is a block circuit diagram of the flush responsive audio player of the appliance for a toilet having a flush responsive audio player in accord with the present invention; and

[0025] FIG. **4** is a flow chart illustrating the operation of the processor of the sound controller of the appliance for a toilet having a flush responsive audio player in accord with the present invention.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

[0026] The appliance for a toilet having a flush responsive audio player of the present invention emits audio content such as recordings, sayings, sound effects, music and among other things phrases that is triggered when a toilet is flushed. The audio content follows in close succession the flush sound of the flush event and is keyed to respond to the flush event. Of the two sounds that follow each other, the audio content has a meaning that is meant to induce a response in the toilet user. The meaning and intended response is context dependent and varies according to the location of the toilet (private or public, governmental, educational, commercial, etc.), status or age of the user (child, adult, adolescent, student, patron of a public or private institution or home, etc.) and, among others, the response or purpose the audio content is intended to impart or serve (humor, motivational, messaging, including theme applications for holidays, sports teams, advertising, branding, as well as functional uses in staff bathrooms, and/or among others toilet training such as assisting a toddler with developing good bathroom practices, etc.). The applications of the present invention thus having such a wide range of possible use contexts, it will be appreciated that the description of the FIGS. **1**A-**1**C is solely exemplary of some presently preferred use applications.

[0027] Referring now to FIG. **1**A, generally designated at **10** is a private holiday scene where the audio content played in response to a flush event is meant to induce humor, surprise and laughter. A private home generally designated **12** is shown decorated with Halloween party paraphernalia **14**. An apparatus for a toilet having a flush responsive audio player generally designated **16** in accord with the present invention is shown mounted on the side of a toilet generally designated **18**. In the illustrated exemplary Halloween party environment, upon flushing of the toilet **18** and hearing the flush sound, the user hears the audio content "Boo!" **20** in close succession. In this application, as will be readily appreciated, the audio content **20** is meant to induce a humorous mood, surprise and laughter in the toilet user.

[0028] Referring now to FIG. **1**B, generally designated at **30** is a commercial public scene where the audio content played in response to a flushing event is meant to motivate in-store shopping. In each of the stalls generally designated **32** of a commercial sales institution an apparatus for a toilet having a flush responsive audio player generally designated **34** is shown mounted on the side of a toilet generally designated **36**. In the illustrated exemplary store environment, upon flushing of the toilet **36** and hearing the flush sound, the user hears the audio content "Welcome shoppers! Today you can save fifty percent on toilet paper!" **38** in close succession. In this application, as will be readily appreciated, the audio content **38** is meant to induce in the user continued in-store shopping after leaving the store's bathroom.

[0029] Referring now to FIG. **1**C, generally designated at **60** is a home scene where the audio content played in response to a flush event is meant by an attending mother to induce good hygienic habits in her child. A bathroom generally designated **62** of a private home having a toilet generally designated **64** is shown occupied by a mother and child. An appliance for a toilet having a flush responsive audio player generally designated **66** is shown mounted on the side of the toilet **64**. In the illustrated exemplary training environment, upon the mother's flushing of the toilet after its use by her child, the child hears the audio content "Good job! Now wash your hands" **68** in close succession. As will be readily appreciated, the audio content **68** in this exemplary application is meant to induce and reinforce good hygienic habits upon each use of the toilet.

[0030] Referring now to FIG. **2**, generally designated at **90** is an exploded pictorial view illustrating an appliance for a toilet having a flush responsive audio player in accord with the present invention. The appliance **90** includes a printed circuit board generally designated **92** mounted within a clamshell housing generally designated **94**. An elongated wire generally designated **96** having exposed electrical contacts **98** is attached to the printed circuit board **92** and extends from the clamshell housing **94**. The exposed electrical contacts **98** of the elongated wire **96** are normally submerged in the water tank of a toilet, not shown, whose conductivity changes, when exposed during evacuation of the flushing toilet bowl as the tank empties and is cyclically refilled, to provide a signal representative of a flush event. An adhesive patch, not shown, is fixed to the clamshell housing **94**, although other means for mounting the appliance **94** to the toilet could be employed.

[0031] A user control input switch **100**, sound controller integrated circuit (IC) **102**, battery pack **104**, microphone **106**, speaker **108** and USB interface **110** are carried by the printed circuit board **92**.

[0032] The clamshell housing **94** includes mating front and rear housing portions **112**, **114** preferably of transparent plastic material. A card **116** is inset into the front housing portion **112** of the clamshell housing **94** and a card **118** is insert in the rear housing portion **114** of the clamshell housing **94**. Informational, branding, design or other graphics including operational instructions, not shown, may be provided on the cards **116**, **118**. As will be readily appreciated, any such indicia will be visible to a user through the transparent front and rear housing portions **112**, **114** of the clamshell housing **94** and will vary with the particular use application.

[0033] The front housing portion **112** of the clamshell housing **94** is provided with a compressible area generally designated **120**, that allows for actuation of the subjacent switch **100**, and is provided with openings generally designated **122**, **124** and **126** respectively aligned with the microphone **106**, speaker **108** and interface **110**. The opening **122** allows the user to input custom audio content into the microphone **106**, the openings **124** allow the user to hear audio

content played by the speaker **108** and the opening **126** permits insertion of a thumb drive, not shown, into the interface **110**.

[0034] Referring now to FIG. **3**, generally designated at **150** is a block circuit diagram of the flush responsive audio player of the appliance for a toilet having a flush responsive audio player of the present invention.

[0035] The flush responsive audio player **150** includes a dedicated sound controller integrated circuit (IC) **152** having processor **154** operatively connected to an internal memory **156**. Any suitable sound controller integrated circuit (IC) may be employed. Although a dedicated sound controller IC is presently preferred, the flush responsive audio player could be otherwise implemented in hardware.

[0036] The memory **156** includes programmable ROM containing program code, and data RAM containing pre-installed audio content, both not shown. Preferably, three tracks of pre-installed audio content preferably in MP3 format are stored in the internal memory **156**, although a different number of at least one track of audio content and/or audio content in a different format may be employed.

[0037] An external memory **158** is operatively coupled to the processor **154** of the dedicated sound controller **152** via external memory interface **160**. The external memory **158** preferably is a USB thumb drive although another type of external memory could be employed. The external memory **158** preferably includes three tracks of user-selected audio content preferably in MP3 format stored therein, although a different number of at least one track of user-selected audio content and/or audio content in another format may be employed.

[0038] The user-selected audio content stored in the external memory of the thumb drive **158** preferably is selected by downloading audio content onto the thumb drive **158** from an Internet website. Other sources of user-selectable audio content may be employed. In the presently preferred and illustrated exemplary embodiment, the processor **154** reads the user-selected audio content in the thumb drive and stores it in the internal memory **156**, which allows removal of the thumb drive **158**. The user-selected audio content alternately may be played directly from external memory **158** eliminating the need to have internal RAM memory storing audio content.

[0039] A microphone **162** is operatively coupled to the processor **154** via input/output (I/O) ports **164** and analog/digital (A/D) converter **166**. The microphone **162** allows the appliance owner to generate custom audio content and to store it in internal memory **156** for replay. Typically, the microphone allows the user to input sounds that they have generated themselves, or that are playing on some external sound source.

[0040] An audio output speaker **168** is operatively coupled to the processor **154** via the input/output (I/O) ports **164** and the analog/digital (A/D) converter **166**. The speaker **168** provides for play back of pre-installed, user-selected and user-installed and/or user-generated custom audio content.

[0041] A user control input switch **170** and flush sensor **172** are operatively coupled to the processor **154** via input ports **174**. The user input switch **170** preferably is a single contact switch that is depressed to initiate a test and is sequentially depressed to toggle-select the different tracks of pre-installed, user-selected and installed and/or user-customized audio content stored in memory for replay in response to sensing a flush event. A record input switch, not shown, is provided to select microphone record mode. Of course, other user control input means and/or other control protocols could be employed.

[0042] Referring now to FIG. **4**, generally designated at **190** is a flowchart illustrating the operation of the processor of the sound controller of the flush responsive audio player of the toilet accessory having a flush responsive audio player in accord with the present invention.

[0043] As shown by a block **192**, the processor is normally in idle or wait state.

[0044] As shown by a block **194**, in response to sensing a flush event, the processor delays a predetermined time as shown by block **196**, preferably three (3) seconds to avoid interference with the sound of the flushing toilet, and plays the audio content set for replay as shown by block **198**. Processing then returns to the block **192**. Typically, two sounds will be heard, the sound of the flushing toilet and the audio content keyed to respond to the flush event. The reason to play the audio content with a predetermined delay is that user's can hear it properly. Usually, a flush sound is still in its denouement when the audio content plays. The audio content may be any preselected audio content of copyrighted or uncopyrighted material that is pre-installed, user-selected and installed, and/or user-generated custom audio content.

[0045] As shown by block **200**, in response to test select input, the processor is operative to play the audio content set for testing as shown by the block **198**, and thereafter processing returns to the block **192**.

[0046] As shown by block **202**, in response to user input sound track selection, the processor is operative to set for play the selected audio content as shown by block **204**, and processing returns to the block **192**.

[0047] As shown by block **206**, in response to user microphone record input selection, the processor is operative to record a user-generated custom sound as shown by block **208** and to store it in internal memory as shown by block **210**. Thereafter processing returns to the block **192**.

[0048] As shown by block **212**, in response to connection of the external memory thumb drive, the processor is operative to read the user-selected audio content downloaded on the thumb drive and to store it in internal memory as shown by block **214**. Processing then returns to the block **192**.

[0049] It will be appreciated that the accessory for a toilet having a flush responsive audio player of the present invention can be variously embodied to meet specific design goals.

[0050] For example, in one entry level model not separately illustrated, a single track of MP3 audio content is provided in internal memory and the sound controller IC is programmed to play that single track whenever tested or in response to a flush event.

[0051] In another entry level model embodiment not separately illustrated, a library of three tracks of MP3 audio content is provided pre-installed in internal memory and the sound controller is programmed to respond to toggling of a single contact input switch to set for replay selected ones of the tracks of the library of pre-installed audio content keyed in response to a flush event.

[0052] In a further embodiment not separately illustrated, the appliance is provided with a microphone for recording user-generated custom audio content and a library that features both user-customized and pre-installed audio content in internal memory. In this embodiment, the sound controller is programmed to record user-generated custom audio content input via the microphone in internal memory and to respond

to toggling of a single contact input switch to set for replay one of the tracks of the library of pre-installed and user-generated custom audio content keyed in response to a flush event.

[0053] In a further embodiment not separately illustrated, the appliance is provided with a library that features preselected audio content pre-installed in internal memory and user-selected audio content downloaded onto external memory. In this embodiment, the processor is programmed to store the user-selected audio content on the external drive into its internal memory and to respond to toggling of a single contact input switch to set for replay one of the tracks of the library of pre-installed and user-selected audio content in response to a flush event.

[0054] Although a dedicated sound controller integrated circuit (IC) and a hardware implemented flush event sensor are presently preferred, the sound controller and/or flush event sensor could be implemented in software, such as on a portable programmable computer (netbook, laptop, smart phone etc.) having an audio input channel, where the portable programmable computer is programmed to monitor its audio input channel to recognize a flush event and to play preselected audio content keyed to respond to the flush event.

[0055] Many modifications of the presently disclosed invention will become apparent to those of skill in the art having the benefit of the instant disclosure without departing from the inventive concepts.

What is claimed is:

1. An appliance for use in proximity to a toilet that transforms the bathroom experience into a more enjoyable and/or informative experience, comprising:

a flush responsive audio player having a library of at least one track of preselected audio content that is operative in response to flushing of the toilet to play a track of its library of at least one track of audio content in such a way as to key the playing of the track of audio content to the flush sound made by the toilet so that the user experiences two sounds in close succession, initially the flush sound, incident to toilet use, and subsequently the track of audio content keyed to respond to the flush event, the track of audio content having a meaning that is meant to induce a predetermined response in the user of the toilet.

2. The invention of claim **1**, wherein the audio content keyed to the flush sound is meant to induce one of humor, to be motivational, and to be propaedeutic of good hygienic practices.

3. The invention of claim **1**, further including a casing providing a protective housing for the flush responsive audio player that is adapted for removable mounting to the toilet.

4. The invention of claim **1**, wherein the preselected audio content of the library of preselected audio content includes pre-installed audio content.

5. The invention of claim **1**, wherein the preselected audio content of the library of preselected audio content includes user-installed audio content.

6. The invention of claim **1**, wherein the preselected audio content of the library of preselected audio content includes user-generated custom audio content.

7. The invention of claim **3**, further including means for mounting the housing casing to the toilet.

8. An appliance for a toilet having a flush responsive audio player, comprising:

a portable housing adapted for use with a toilet;

a flush event sensor responsive to evacuation of water from the toilet to provide a flush event signal representative that the toilet has been flushed; and

means mounted to the housing and coupled to the flush event sensor operative in response to a flush event signal to play preselected audio content keyed to respond to the flush event such that the user experiences two sounds in close succession, initially the flush sound, incident to toilet use, and subsequently the track of audio content keyed to respond to the flush event, the track of audio content having a meaning that is meant to induce a predetermined response in the user of the toilet.

9. The invention of claim **8**, wherein the portable housing includes a clamshell housing and means for removably mounting the clamshell housing to the toilet.

10. The invention of claim **8**, wherein the toilet has a water tank and wherein the flush event sensor includes an elongated wire adapted to extend from the housing into the water tank, where the conductor's of the elongated wire normally are submerged when the elongated wire is inserted in the tank.

11. The invention of claim **8**, wherein said play means includes a sound controller including a processor and an audio speaker carried by a printed circuit board.

12. The invention of claim **11**, wherein a memory storing a library of audio content is operatively coupled to the processor of the sound controller.

13. The invention of claim **12**, wherein the memory is internal memory and the library is at least one track of pre-installed audio content.

14. The invention of claim **12**, wherein the memory is external memory and the library is at least one track of user-selected audio content.

15. The invention of claim **12**, further including a microphone operatively coupled to the processor, wherein the memory is internal memory and wherein the library includes at least one track of custom audio content user-generated by recording custom audio content via the microphone and storing it in internal memory.

* * * * *