



US 20060073893A1

(19) **United States**

(12) **Patent Application Publication**

**Dahl**

(10) **Pub. No.: US 2006/0073893 A1**

(43) **Pub. Date: Apr. 6, 2006**

(54) **TOUCHSCREEN AUDIO FEEDBACK IN A WAGERING GAME SYSTEM**

**Publication Classification**

(76) Inventor: **John M. Dahl**, Plymouth, MN (US)

(51) **Int. Cl.**  
*A63F 9/24* (2006.01)

(52) **U.S. Cl.** ..... 463/35

Correspondence Address:  
**Schwegman, Lundberg, Woessner & Kluth, P.A.**  
**P.O. Box 2938**  
**Minneapolis, MN 55402 (US)**

(57) **ABSTRACT**

A computerized wagering game system includes a gaming module comprising gaming code which is operable when executed on to conduct a wagering game on which monetary value can be wagered, and a touchscreen incorporating audio feedback. In one embodiment, the display comprises a printed bistable liquid crystal display assembly, including a plurality of bistable liquid crystal display elements formed by printing at least a portion of each element onto a substrate. In another embodiment, the display comprises an emissive carbon nanotube display assembly, including a plurality of carbon nanotube elements operable to selectively emit electrons such that they strike a phosphor and cause it to emit light.

(21) Appl. No.: **11/235,904**

(22) Filed: **Sep. 27, 2005**

**Related U.S. Application Data**

(60) Provisional application No. 60/615,492, filed on Oct. 1, 2004.

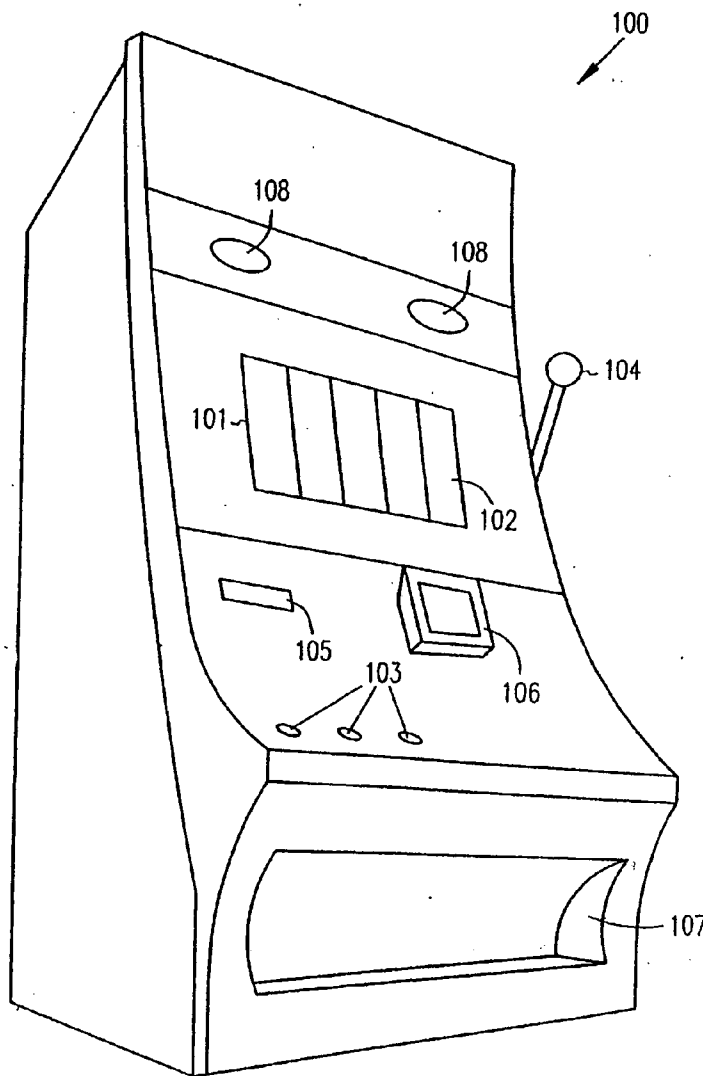


Fig. 1

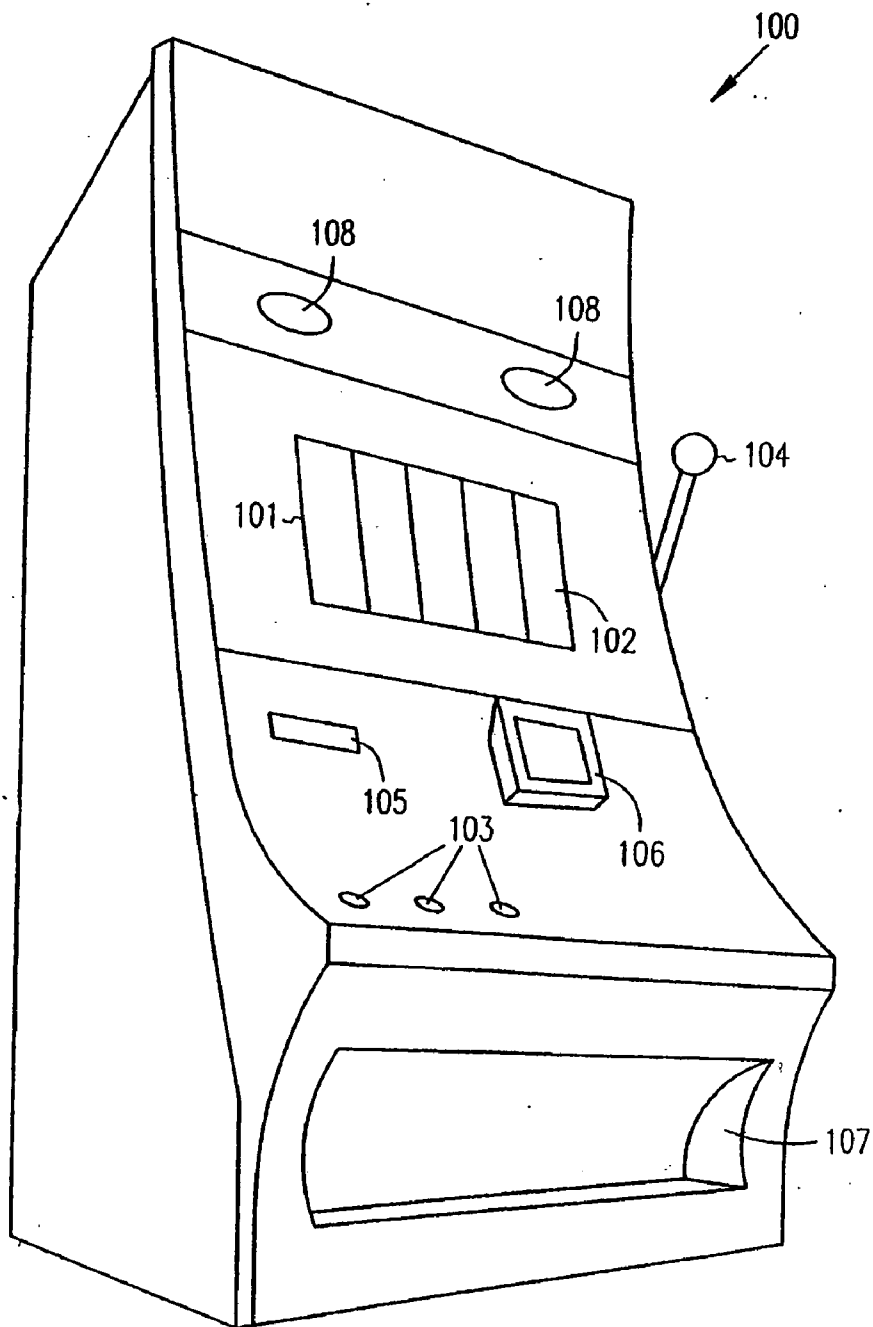


Fig. 2

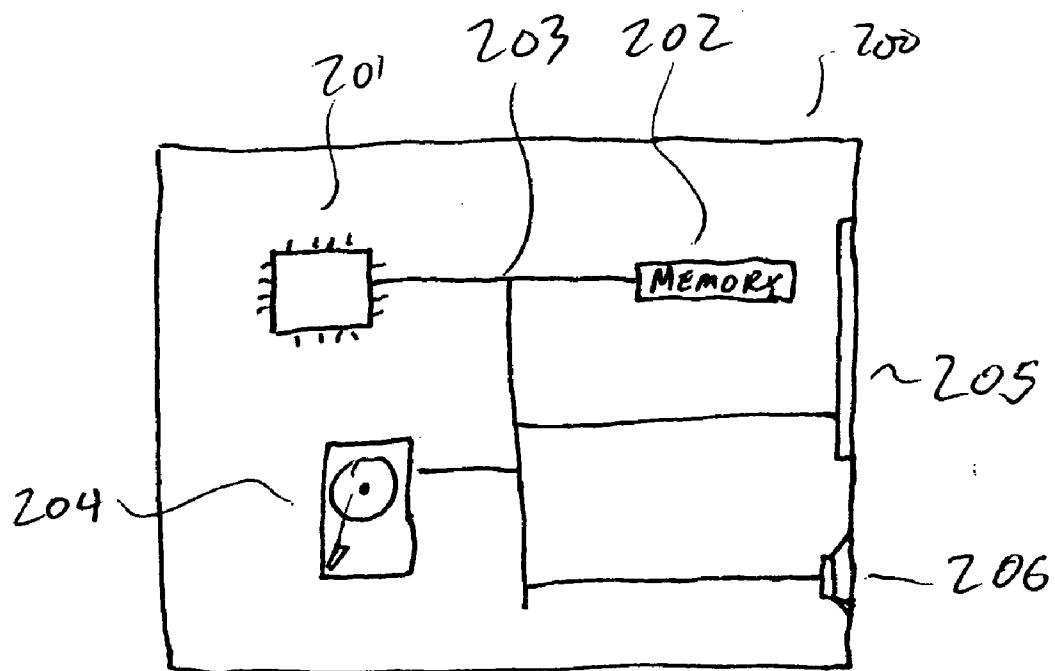


Fig. 3

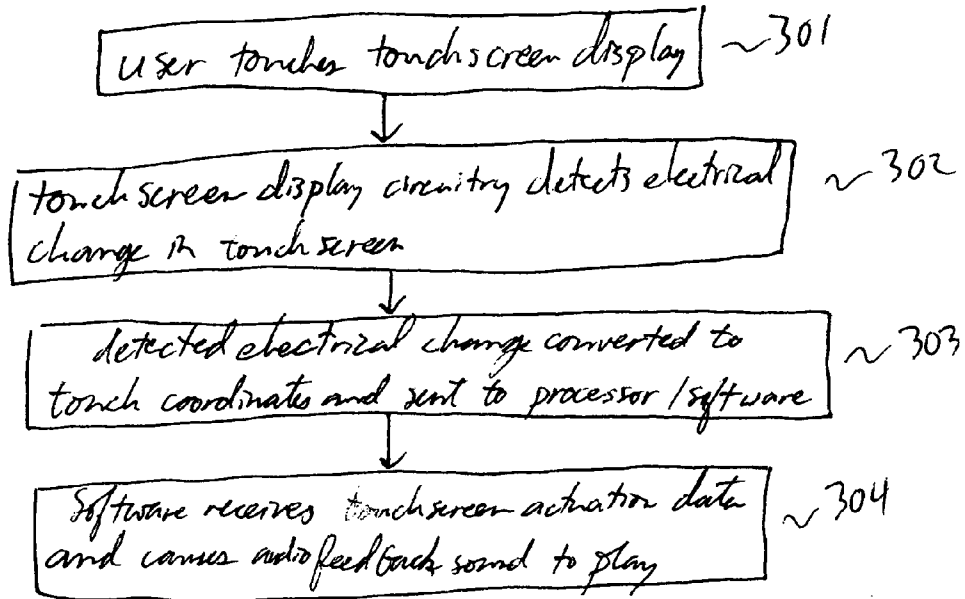
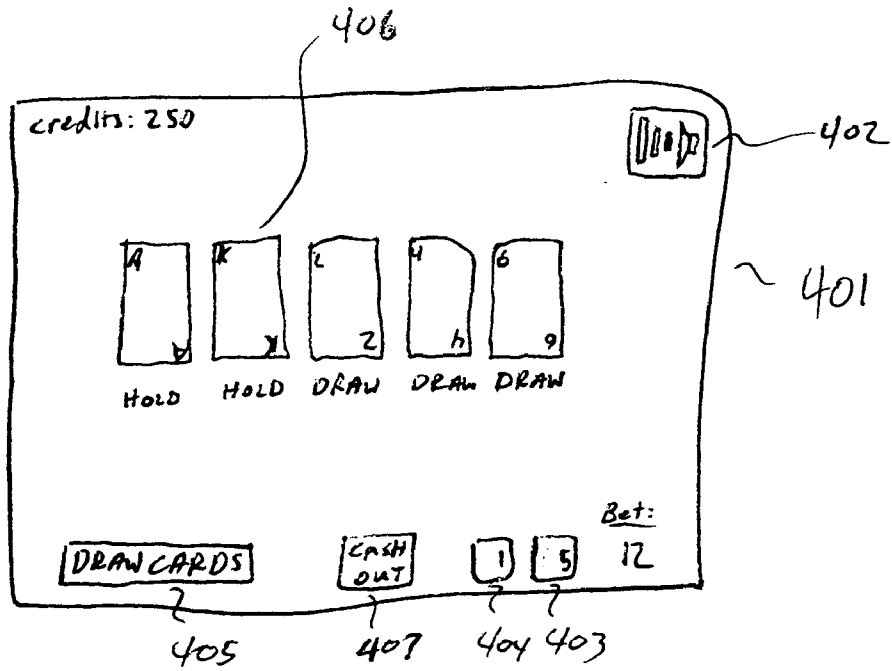


Fig. 4



**TOUCHSCREEN AUDIO FEEDBACK IN A WAGERING GAME SYSTEM**

**RELATED APPLICATION**

[0001] This application claims priority under 35 U.S.C. 119(e) from U.S. Provisional Application Ser. No. 60/615, 492 filed 1 Oct. 2004, which application is incorporated herein by reference.

**FIELD OF THE INVENTION**

[0002] The invention relates generally to computerized wagering game machines, and more specifically to a touchscreen employing audio feedback in a wagering game system.

**LIMITED COPYRIGHT WAIVER**

[0003] A portion of the disclosure of this patent document contains material to which the claim of copyright protection is made. The copyright owner has no objection to the facsimile reproduction by any person of the patent document or the patent disclosure, as it appears in the U.S. Patent and Trademark Office file or records, but reserves all other rights whatsoever.

**BACKGROUND**

[0004] Computerized wagering games have largely replaced traditional mechanical wagering game machines such as slot machines, and are rapidly being adopted to implement computerized versions of games that are traditionally played live such as poker and blackjack. These computerized games provide many benefits to the game owner and to the gambler, including greater reliability than can be achieved with a mechanical game or human dealer, more variety, sound, and animation in presentation of a game, and a lower overall cost of production and management.

[0005] The elements of computerized wagering game systems are in many ways the same as the elements in the mechanical and table game counterparts in that they must be fair, they must provide sufficient feedback to the game player to make the game fun to play, and they must meet a variety of gaming regulations to ensure that both the machine owner and gamer are honest and fairly treated in implementing the game. Further, they must provide a gaming experience that is at least as attractive as the older mechanical gaming machine experience to the gamer, to ensure success in a competitive gaming market.

[0006] Computerized wagering games do not rely on the dealer or other game players to facilitate game play and to provide an entertaining game playing environment, but rely upon the presentation of the game and environment generated by the wagering game machine itself. Incorporation of audio and video features into wagering games to present the wagering game, to provide help, and to enhance the environment presented are therefore important elements in the attractiveness and commercial success of a computerized wagering game system. It is not uncommon for audio voices to provide instruction and help, and to provide commentary on the wagering game being played. Music and environmental effects are also played through speakers in some wagering game systems to enhance or complement a theme of the wagering game. These sounds typically accompany

video presentation of the wagering game on a screen, which itself often includes animation, video, and three-dimensional graphics as part of presentation of the wagering game.

[0007] The displays are typically touchscreen displays that enable a game player or other user to provide input by touching certain regions of the display. For example, a player in a card game may touch certain cards to hold them, or may touch certain graphically represented buttons to control game settings. Touching the screen can therefore be an important way of interacting with the wagering game system, and in some systems is the primary way of providing input to the game.

[0008] But, touchscreens don't always detect a touch accurately, and it can be difficult to know whether a touch has been recognized in the wagering game machine. Factors such as variation from touchscreen to touchscreen, variations in the circuitry supporting the touchscreen, dirt or other materials on the touchscreen, and variations in fingers can all contribute to differences in perceived touchscreen response.

[0009] It is therefore desirable to have better indication of recognized actuation of a touchscreen.

**SUMMARY**

[0010] One example embodiment of the invention comprises a computerized wagering game system including a gaming module comprising gaming code which is operable when executed on to conduct a wagering game on which monetary value can be wagered, and a touchscreen having audio feedback. Audio feedback is used to indicate touchscreen actuation in some embodiments of the invention to address the problem of users not being familiar with touchscreens, or uncomfortable with their use, by providing audible feedback when the touchscreen is touched and input is registered in a wagering game machine. Sensitivity of touchscreens varies, as does the response of a touchscreen to various stimulus. For these reasons, it is desirable that additional feedback be provided to a wagering game user to clearly indicate that the touchscreen has been actuated and that input has been received.

**BRIEF DESCRIPTION OF THE FIGURES**

[0011] FIG. 1 shows a computerized wagering game machine, as may be used to practice some example embodiments of the invention.

[0012] FIG. 2 shows a block diagram of a computerized wagering game system employing a touchscreen display with audio feedback, consistent with some example embodiments of the invention.

[0013] FIG. 3 is a flowchart illustrating a method of providing audio feedback for a touchscreen display in a computerized wagering game system, consistent with some example embodiments of the invention.

[0014] FIG. 4 is a screen image of a wagering game presented on a touchscreen display, including touchscreen controls having audio feedback, consistent with some example embodiments of the invention.

**DETAILED DESCRIPTION**

[0015] In the following detailed description of example embodiments of the invention, reference is made to specific

examples by way of drawings and illustrations. These examples are described in sufficient detail to enable those skilled in the art to practice the invention, and serve to illustrate how the invention may be applied to various purposes or embodiments. Other embodiments of the invention exist and are within the scope of the invention, and logical, mechanical, electrical, and other changes may be made without departing from the subject or scope of the present invention. Features or limitations of various embodiments of the invention described herein, however essential to the example embodiments in which they are incorporated, do not limit the invention as a whole, and any reference to the invention, its elements, operation, and application do not limit the invention as a whole but serve only to define these example embodiments. The following detailed description does not, therefore, limit the scope of the invention, which is defined only by the appended claims.

[0016] One embodiment of the invention addresses the problem of users not being familiar with touchscreens, or uncomfortable with their use, by providing audible feedback when the touchscreen is touched and input is registered in a wagering game machine. Sensitivity of touchscreens varies, as does the response of a touchscreen to various stimulus. For these reasons, it is desirable that additional feedback be provided to a wagering game user to clearly indicate that the touchscreen has been actuated and that input has been received.

[0017] FIG. 1 illustrates a computerized wagering game machine system, as may be used to practice various embodiments of the present invention. The computerized gaming system shown generally at 100 is a video wagering game system, which displays information for at least one wagering game upon which monetary value can be wagered on touchscreen video display 101. The touchscreen video display 101 is in various embodiments a CRT display, a plasma display, an LCD display, a field emission display, or any other type of display suitable for displaying electronically provided display information. Further embodiments include alternate or additional displays which may or may not be touchscreen displays, such as a second display located above the primary display, or other displays coupled to the wagering game system. Alternate embodiments of the invention will include other game indicators, such as mechanical reels instead of or in addition to the video graphics reels shown at 102 that comprise a part of a video slot machine wagering game.

[0018] A game of chance is implemented using software within the wagering game, such as through instructions stored on a machine-readable medium such as a hard disk drive or nonvolatile memory. In some further example embodiments, some or all of the software stored in the wagering game machine is encrypted or is verified using a hash algorithm or encryption algorithm to ensure its authenticity and to verify that it has not been altered. For example, in one embodiment the wagering game software is loaded from nonvolatile memory in a compact flash card, and a hash value is calculated or a digital signature is derived to confirm that the data stored on the compact flash card has not been altered. The game of chance implemented via the loaded software takes various forms in different wagering game machines, including such well-known wagering games as reel slots, video poker, blackjack, craps, roulette, or hold 'em games. The wagering game is played and controlled with

inputs such as various buttons 103 or via the touchscreen video display 101. In some alternate examples, other devices such as pull arm 104 used to initiate reel spin in this reel slot machine example are employed to provide other input interfaces to the game player.

[0019] Monetary value is typically wagered on the outcome of the games, such as with tokens, coins, bills, or cards that hold monetary value. The wagered value is conveyed to the machine through a changer 105 or a secure user identification module interface 106, and winnings are returned via the returned value card or through the coin tray 107. Sound is also provided through speakers 108, typically including audio indicators of game play, such as reel spins, credit bang-ups, and environmental or other sound effects or music to provide entertainment consistent with a theme of the computerized wagering game. In some further embodiments, the wagering game machine is coupled to a network, and is operable to use its network connection to receive wagering game data, track players and monetary value associated with a player, and to perform other such functions.

[0020] In operation, the touchscreen 101 is used to provide input to the wagering game machine, such as when a game player selects a game object or pushes a graphically rendered button, or when a service technician uses the touchscreen to navigate a service menu or a configuration menu. But, as discussed previously, actuation of the touchscreen is often not directly indicated by an immediate graphical or other indicator, which can result in detection of repeated actuations or in a user waiting needlessly for a wagering game machine to respond to a touch that was not registered by the touchscreen.

[0021] In various embodiments of the invention, successful actuation of the touchscreen is therefore identified by use of audio feedback. In some embodiments, the sounds are designed to be sounds familiar to the user as sounds consistent with providing input to machines in similar contexts. Some examples include a simple click, beep, or tone, or a complex tone such as a telephone produces when pressing keys. Other embodiments play a simulated or recorded sound such as a typewriter sound, or a keyboard sound such as is made when using a computer keyboard. These are but examples of sounds that can indicate that input has been received in the wagering game system via the touchscreen.

[0022] A significant number of commercially available keyboards employ a tactile and audible feedback mechanism, such as a bending spring arrangement to give a "clicky" feel and sound to the keyboard and offer some resistance to pressing the key. This feedback is familiar to users of computer keyboards for the last 25 years, and was a standard feature of many early keyboards such as those sold by IBM. Several companies, including Alps Electric, Lite-On, and NMB Technologies, also manufacture this type of keyboard, which offers very good tactile and audio feedback. Audio simulation of a keyboard with which many people are familiar is therefore believed likely to provide a recognizable indication that an attempt to provide input via a touchscreen has been recognized.

[0023] Similarly, typewriters often used keys with some feedback, and the sound of the typewriter striking the page provided further audio evidence that the key was depressed sufficiently to cause an intended action. Reproduction of

such a familiar sound in a wagering game system upon actuation of a touchscreen provides feedback to the game player, technician, or other user that touchscreen input has been received. In some embodiments of the invention, the user can select what sound is desired to indicate touchscreen input, such as by selecting from a list of sounds in a user preferences screen.

[0024] FIG. 2 is a simplified block diagram of a computer system, illustrating how a touchscreen system with audio feedback may be implemented in a computerized wagering game system. The wagering game system 200 comprises a processor 201 and a memory 202 coupled by a bus 203. The processor is in some embodiments a typical general-purpose computer processor such as can be found in home computers. The bus also couples the processor and memory to nonvolatile storage such as hard disk drive 204, and to touchscreen display 205 and audio speaker 206. The audio speaker and the touchscreen display are in some embodiments coupled to the bus via function-specific adapters, such as a touchscreen display adapter card or circuit board and a sound card or board. The circuits on these adapters serve to convert data from the bus 203 into audio and video information usable by the touchscreen display 205 and the speaker 206, and serve to convey touchscreen actuation information back to the computer via the bus 203.

[0025] In operation, the system starts by loading an operating system and software programs from the nonvolatile storage 204 into memory 202. The nonvolatile storage in alternate embodiments is some other machine-readable medium, such as nonvolatile memory or a network connection such as a wireless connection to a server. The software instructions loaded into memory are executed on the processor 201, which uses the instructions to control the computer's components such as the touchscreen display 205 and the speaker 206. The software instructions in one embodiment thereby comprise part of a wagering game system by causing the computerized wagering game system to present a wagering game upon which monetary value can be wagered.

[0026] When the touchscreen 205 is actuated in one example, the actuation is reported back to the processor, which is programmed via software instructions to recognize touchscreen actuation and cause audible feedback to be played through speaker 206, such as a typewriter, keyboard, or clicking sound. In another embodiment, the circuitry coupled to detect actuation of the touchscreen is coupled directly to a speaker, and is operable to create audible feedback without execution of software instructions in the computer system.

[0027] A more detailed example of software-based recognition of touchscreen actuation and presentation of audio feedback is shown in the flowchart of FIG. 3. At 301, the user touches the touchscreen display, such as to make a menu selection, change a wagering game setting such as volume, select a wagering game object, place a bet, or initiate play of a wagering game. The touch is registered by the touchscreen display as an electrical or other change in the touchscreen. For example, capacitive touchscreens are typically coated with a grid or array of transparent conductive material such as indium tin oxide, which is charged such that the capacitance between conductive elements results in storage of a stable, measurable electrical charge. When a

finger or other capacitive object is placed near or on the touchscreen, the capacity to store electrical charge in the vicinity of the touch is changed, and is sensed by an electric circuit coupled to the conductor array. Similarly, resistive touchscreens work by using an array of thin, metallic resistive elements that connect to conductors when actuated such that the resistance detected through the completed circuit indicates the touch position, and other technologies such as surface wave touchscreens use changes in ultrasonic sounds passing over the touchscreen to detect the position of an object near or touching the touchscreen.

[0028] The electrical signals from these touchscreen technologies or other touchscreens are received in touchscreen circuitry operable to interpret the touchscreen data at 302, converting changes into a positive actuation of the touchscreen typically having certain coordinates or position on the screen. The coordinate information at 303 enables use of the touchscreen for selecting one of several objects presented on the screen, such as for navigating a menu or selecting specific gaming objects. The touchscreen circuitry then conveys the touchscreen actuation data to the computer system by sending a message over the bus 203 to the processor 201, which in this example embodiment is executing touchscreen support software operable to interpret the message as actuation of the touchscreen.

[0029] The software receives the touchscreen actuation data at 304, and provides the coordinate information to other software processes such as a wagering game so that the touchscreen actuations can be used to control operation of the game. The touchscreen support or driver software further causes a sound to play on speaker 206 of FIG. 2, providing audible feedback that a touchscreen actuation has been received and recognized.

[0030] FIG. 4 shows an example of application of audio feedback touchscreen technology in a wagering game system. The touchscreen display 401 here shows a draw poker game, and features a number of touchscreen buttons and wagering game objects selectable using the touchscreen. For example, the user audio control 402 can be touched repeatedly to change the volume of the wagering game system to a level desired by the user, with each recognized touch or actuation of the button indicated by a sound that reflects both actuation of the touchscreen display and the relative volume of the newly selected volume level.

[0031] When playing, a game player will deposit credits into the wagering game machine and touch the various buttons rendered on the touchscreen display to play the game. For example, touching the 5 credit button 403 twice and the one credit button 404 twice results in a bet of twelve credits, after which the player hits the draw cards button 405 to be dealt a hand of poker.

[0032] The cards are shown at 406, along with an indicator of whether the game player wishes to retain or "hold" the cards, or discard them and "draw" new cards. The player changes the indicated status of each card by touching the card itself, and the card's indicated "hold" or "draw" status is changed. The touch actuation that changes the card's status between "draw" and "hold" is also indicated using an audio sound, which in some embodiments is different than the sounds used to indicate other touchscreen actuations.

[0033] Once a wagering game player has finished playing poker, the "cash out" touchscreen button 407 is pressed to



return the game player's credits and winnings to the game player. This example illustrates how a touchscreen can be used in a wagering game system to control a variety of game functions, and illustrates how having audio feedback confirming actuation of the touchscreen can benefit the wagering game player by providing an audible indication that the touchscreen has detected and recognized a touch.

[0034] These examples are presented as examples only, and do not limit the scope of the claims attached hereto. Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiments shown. This application is intended to cover any adaptations or variations of the example embodiments of the invention described herein. It is intended that this invention be limited only by the claims, and the full scope of equivalents thereof.

- 1. A computerized wagering game system, comprising:
  - a gaming module comprising a processor and gaming code which is operable when executed on the processor to present a wagering game on which monetary value can be wagered;
  - a touchscreen video display; and
  - an audio module operable to detect that input is received from the touchscreen video display, and to provide audio feedback indicating that the touchscreen input is received.
- 2. The computerized wagering game system of claim 1, wherein the audio feedback comprises a clicking sound.
- 3. The computerized wagering game system of claim 1, wherein the audio feedback comprises a keyboard sound.
- 4. The computerized wagering game system of claim 1, wherein the keyboard sound comprises a bending spring keyboard.
- 5. The computerized wagering game system of claim 1, wherein the audio feedback comprises a beep.
- 6. The computerized wagering game system of claim 1, wherein the audio feedback comprises a typewriter sound.
- 7. The computerized wagering game system of claim 1, wherein the audio feedback sound is user-configurable.
- 8. A method of operating a computerized wagering game system, comprising:

conducting a wagering game on which monetary value can be wagered;

receiving input via a touchscreen video display;

detecting in an audio module that input is received from the touchscreen video display; and

providing audio feedback indicating that the touchscreen input is received.

9. The method of claim 8, wherein the audio feedback comprises a clicking sound.

10. The method of claim 8, wherein the audio feedback comprises a keyboard sound.

11. The method of claim 8, wherein the keyboard sound comprises a bending spring keyboard.

12. The method of claim 8, wherein the audio feedback comprises a beep.

13. The method of claim 8, wherein the audio feedback comprises a typewriter sound.

14. The method of claim 8, wherein the audio feedback sound is user-configurable.

15. A machine-readable medium with instructions stored thereon, the instructions when executed operable to cause a computerized wagering game system to:

conduct a wagering game on which monetary value can be wagered;

receive input via a touchscreen video display;

detect in an audio module that input is received from the touchscreen video display; and

provide audio feedback indicating that the touchscreen input is received.

16. The machine-readable medium of claim 15, wherein the audio feedback comprises a clicking sound.

17. The machine-readable medium of claim 15, wherein the audio feedback comprises a keyboard sound.

18. The machine-readable medium of claim 15, wherein the keyboard sound comprises a bending spring keyboard.

19. The machine-readable medium of claim 15, wherein the audio feedback comprises a beep.

20. The machine-readable medium of claim 15, wherein the audio feedback comprises a typewriter sound.

\* \* \* \* \*