

spinning for 3.45 seconds, virtual reel **191b** spinning for 4.01 seconds, and virtual reel **191c** spinning for 4.62 seconds before each reel stops in succession. Of course, numerous other time intervals, ranges and possibilities may also be used, as will be readily appreciated.

[0073] In various embodiments, a timing formula can be used to facilitate the time delay between stopping one virtual reel and the next virtual reel in a reel type game where reels are spun and then stopped in succession. Such a formula could be implemented by reel spin timer **145** or a similar processing component, and might be:

$$\text{FurtherSpinMS} = \text{ConstantMS} + \text{Rand}(0,21) * \text{StopMS} \quad (1)$$

Where: FurtherSpinMS represents the time delay or interval between stopping one reel and stopping the next reel; ConstantMS represents a minimum constant time; StopMS is the amount of time that it takes for a stepper motor to spin from one reel stop to the next, and Rand(0,21) represents a random integer from 0 to 21. In the event that a table is used, such a formula might simply be:

$$\text{FurtherSpinMS} = \text{TableMS}[\text{Rand}(0,21)] \quad (2)$$

Where TableMS represents a particular value taken from a table corresponding to the random integer that is generated. Of course, other numbers besides **21** may be used for limiting the generation of random numbers, and it will be appreciated that a wide variety of numbers, ranges and random number generation processes can be used.

[0074] Through the use of the various components described above with respect to processor-based gaming machine **100**, a more accurate emulation of physical reels can be had with respect to the audio presentations that correspond to virtual reels **191** during game play. Reel sound generator **147** can be used to generate or facilitate the generation of simulated physical reel sounds corresponding to one or more virtual reels **191**. As noted above, physical reel sounds can be sampled from actual physical reels, with the specific results being recorded and stored on various files, such as, for example, .wav files, that can be located on reel sound generator memory **148** or any other suitable associated memory. Reel sound generator can retrieve various reel sound files or portions of reel sound files from associated memory **148**, and then distribute or facilitate the distribution of reel sounds to one or more speakers, such as dedicated reel speakers **149a**, **149b**, **149c**. As noted above, the various dedicated reel speakers can correspond to different virtual reels, and sounds presented thereon can come from separate and discrete audio channels, such that stereo sound is provided.

[0075] In various embodiments, the stored recordings of actual physical reels can include multiple and/or lengthy sound recordings, such that snippets or portions of a given sound recording file can be selected randomly for any specific sound playback and emulation. For example, the general sounds of an actual physical reel spin, accompanying stepper motor whine and other associated mechanical sounds can be recorded for ten seconds, twenty seconds, or more, and such a recording can then be stored on one or more files and sampled from randomly whenever accompanying sound for a spinning virtual reel is to be provided, such as for the few seconds that such a virtual reel actually spins during game play. As one particular example, the reel spin sounds provided for reel **191a** during the play of a first reel game can be taken from time 2.32 seconds through time 5.75 seconds on a twenty second sound recording file of reel spin for that reel. During a subsequent reel game, the reel spin sounds provided

for reel **191a** can be taken from time 12.66 seconds through time 15.97 seconds from that same twenty second sound recording file. While the differences in overall sounds may be slight from one sampled clip to the next, the overall effect is that the provided sounds are slightly different from one game play to the next, which adds to the overall realistic emulation of physical reels.

[0076] Similar to the foregoing embodiments for reel spin timings, such sound recordings can be made and stored in numerous sound files, which can be sampled from for each virtual reel separately. That is, the potential sounds that could be selected for virtual reel **191a** can come from a separate sound file or set of sound files than those for virtual reel **191b**. In fact, each virtual reel for each different reel type game on gaming machine **100** can have its own sound file or set of sound files, such that each virtual reel may sound slightly different than every other virtual reel, as in the case of actual physical reels. As will be readily appreciated, the use of reel sound generator **147** can be combined with the use of reel spin timer **145** for greater reel emulation effects. For example, reel spin timer **145** can generate a reel spin start, spin time and stop for each virtual reel **191**, which reel spin start, spin and stop times can then be provided to the reel sound generator **147** so that appropriate lengths of sound can be randomly sampled for each reel function of each separate virtual reel.

[0077] Various “biasing” effects can also be provided for the various virtual reels with respect to each other, both in terms of reel spin times and simulated sounds. Such reel biasing might involve assigning a “late” value to a given virtual reel, which late value might result in generally later start, spin and stop times, such as what might occur in a physical reel that is generally stickier or slower than the other reels in a given machine. Such biasing values might also be provided with respect to sounds, such as the addition of a systematic “hiss” or a clicking for a given virtual reel emulating a physical reel that is old or might need maintenance. As will be readily appreciated, such biasing effects might be subtle, and may be provided for only one virtual reel or a subset of virtual reels, such that the overall effect is a more realistic emulation of a set of individual physical reels operating to present a game.

[0078] In various embodiments, reel sound generator **147** can also be used to modify the sounds that are recorded in the various sound files, so as to provide even more realistic emulations of the sounds of physical reels. Such sound processing can include generally randomizing the various tones, length, pitch or content of sounds from one simulated reel spin to the next. For such purposes, reel sound generator **147** may include a digital sound processor adapted for the dynamic presentation and/or modification of sounds from recorded sound files. Further, in the event that separate and discrete channels are used for each separate reel speaker, or at least where multiple audio channels are used, separate controls to vary volume, bass, treble, pitch or content can be had with respect to each separate channel.

[0079] In some embodiments where one or more speakers are adapted to provide stereo sound, for example, with respect to accurate sound emulations of rotating reels, such stereo speakers may also be used for other dynamic presentations on the gaming machine. Since gaming machine **100** is a processor-based gaming machine, it will be readily appreciated that a wide variety of displays and special effects can be provided. Various displays can involve animated reel symbols, figures or other objects, which items may move across the display