reels spinning too slowly may detract from accurately simulating a reel. Thus, a larger simulated reel may be spun more slowly than a smaller reel. Visually, appearance of the reel symbols primarily conveys rotational velocity for a spinning reel. On a mechanical machine, the reel symbols are typically perceived as a blur. In a specific embodiment to convey rotational motion of the symbols, the simulated symbols are rapidly swept across a video display device. This may use a video refresh rate above 24 frames per second to prevent perception of video artifacts based on human visual perception refresh rates.

[0043] In another specific embodiment, the simulated video of reels replaces discrete symbols on a reel with an animation of a pre-blurred image. This pre-distortion of the symbols **126** makes it more difficult for a person to detect static attributes of each symbol **126** as they spin by, thereby reducing a reliance on display device refresh rate. The degree of blurring largely controls the perception of rotational velocity. Less blurring of symbols **126** in the direction of rotation portrays a slower reel, while increased blurring of symbols **126** conveys a greater velocity. Complete obscuration of symbols **126** conveys a much greater velocity. The blurring may be accomplished either by replacing the symbols with an animation of blurred images spinning, or by individual blurred images actually moving across the display device. Blurring may also extend to spaces between adjacent symbols to reduce the size of white space between moving symbols, which can result in flashing and reduce the perception of true rotation.

[0044] In practice, a designer assigns a speed to reel **125** and simulated symbols **126**. The speed refers to a simulated reel velocity for the symbols on a mechanical reel. The speed may be altered based on the simulated reel size, along with other factors.

[0045] Simulated reel speed may also affect jitter **120**. For example, output video jitter **120** may be related to the simulated speed of rotation of reel **125**. In a specific embodiment, lateral displacement jitter **120** is implemented relative to simulated reel speed of rotation of reel **125** on a periodic basis. In this case, cyclic displacement is linked to periodic rotation of reel **125** so that specific reel locations are displaced similarly or identically upon each rotation of reel **125**. This effect simulates a real mechanical reel where the reel strip is unevenly installed and/or a reel that is geometrically or materially imperfect. In another specific embodiment, lateral displacement jitter **120** is implemented relative to simulated reel speed of rotation of reel **125** on a random basis. This simulates a mechanical reel that wobbles slightly as it rotates upon its axis, perhaps due to a mismatch between an axis for the reel and the reel bearings. This random displacement often becomes increasingly noticeable on a mechanical machine as component wear increases.

[0046] Another mechanical modeling technique may include translating performance of a handle, associated with a gaming machine, to the simulated video reels. In many old mechanical reel gaming machines, a longer handle provided greater mechanical advantage to wind a spring that spun the reels. Players would also pull a handle variably to perceivably affect reel outcome (regardless of whether it actually did). In one embodiment, handle feedback is used in part to determine rotational speed of a simulated mechanical reel **125**. This may then affect video output of jitter **120**. In a specific embodiment, a handle, provided with a gaming machine, includes a force sensor that is configured to output an indication of force that a person used when pulling the handle. Rotational speed for simulated mechanical reel **125** then relates to the detected force.

[0047] Another simulated visible mechanical imperfection is 'reel kickback'. Reel kickback refers to the dynamic bounce or motion of a reel that is produced when stopped. Theoretically, a wheel stopping mechanism halts wheel motion instantaneously at a specific position. Realistically, this instantaneous stoppage does not occur. Reels on old gaming machines were often stopped by a latching mechanism. As each reel latched into its final resting position, the latching mechanism absorbed the rotational kinetic energy in the reel, and stored a portion of this energy as the reel stopped. The stored potential energy would cause "kick-back": in the instant just before a reel completely stops, a small amount of reverse rotation (in a direction opposite to reel spinning) can be observed during the stopping and settling process.

[0048] FIG. **2** shows simulated reel kick-back **130** of a video reel **125** in accordance with another embodiment.

[0049] Kick-back **130** includes a small amount of counter-rotation **132**, which includes motion from an initially intended stopping position **136** for reel **125** to a final stopping position **138**. Kick-back **130** is thus added to the graphical animation of spinning reel **125** after the reel ceases its spinning in a primary direction **134** of spin. Counter-rotation **132** includes motion in a direction opposite to the primary direction **134** of spin for reel **125**. Thus, if a video reel **125** is spinning downward **134**, kick-back **130** includes a small amount of upward **132** simulated wheel rotation.

[0050] Reference lines for stopping position **136** and final stopping position **138** indicates reel kick-back **130** and the amount of counter-rotation **132**. Stopping position **136** refers to a wheel position where rotation in the primary direction stops, and turns into counter-rotation **132**; final stopping position **138** refers to a wheel position in which counter-rotation **132** stops and reel **125** finally stops moving.

[0051] In general, the amount of counter-rotation **132** may include any video motion that induces a perceived sense of realism by a player. Kickback **130** may vary with the size of a video display area, a size for reel **125**, an amount of motion the designer wants, combinations thereof, etc. Different gaming machines and reel mechanisms will exhibit varied performance, so the amount of counter-rotation **132** may be determined empirically by comparison to a specific gaming machine or mechanism. Larger machines and reels will typically exhibit greater counter-rotation. Kick-back **130** and counter-rotation **132** may be measured as a percentage of reel **125** size. In a specific embodiment, counter-rotation **132** from reference line **136** was less than about 5% of the visible height of reel **125**. Kick-back **130** may also be measured in pixels. A counter-rotation **132** from about 1 pixel to about 10 pixels is suitable for many display devices. Kick-back **130** may also be implemented as a percentage size of a video screen that displays reels **125**. In a more specific embodiment, the symbols **126** on reel **125** bounce back from reference line **136** less than 0.5% of the screen height for a display device. For a display device with a **1080** vertical resolution, a kickback between about 0.3% and about 0.5% of the screen height is suitable. This allows the kick-back **130** to vary with the dimensions of a display device. This screen height scaling may result in a non-whole number of pixels for kick-back **130**. Fractions may be rounded up or down or ignored as desired.

[0052] This kick-back phenomenon also often appears in a real mechanical reel just before rotation begins. In particular,