GUN TOY HAVING MEANS FOR REPRODUCING RECORDED GUN-SHOT SOUNDS

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ABSTRACT OF THE DISCLOSURE

A toy gun having a disc recording of gun shot sounds and sound reproducing means. A manually actuated rack bar acts through a one-way clutch to wind a negator spring motor and the latter is gear connected, through another one-way clutch to a turntable carrying the disc record. A trigger serves to release the spring motor to drive the turntable as long as the trigger is held depressed.

The present invention relates to a new and useful gun toy and more particularly to such a toy having means for reproducing recorded gun-shot sounds.

United States Patent No. 2,734,310 discloses a toy gun having a metal disc rotatably mounted in a gun body. The disc is keyed to the output shaft of a clock motor of the usual spring actuated type and the spring may be wound by means of a key projecting outside the body of the gun. While the motor is being wound up by means of the key, the disc is prevented from rotating by means of a hammer which engages a lug provided on the periphery of the disc. A trigger is connected to the hammer in such a manner that the hammer will be removed from the lug and then immediately move into position to be engaged again by the lug after the disc has completed one revolution each time the trigger is pulled.

A sound-producing cone is mounted in the body of the gun opposite to the side where the motor is disposed. This cone carries an inwardly-projecting, fixed needle which engages a single sound-recording groove that is formed in the surface of the disc.

It will be apparent to those skilled in the art that such a toy gun has certain disadvantages. One disadvantage resides in the fact that a clock motor of the usual spring-actuated type has a diminishing spring force resulting in a non-uniform rate of rotation of the disc which carries the recorded sound.

Another disadvantage resides in the fact that the re-engagement of the hammer with the lug after each revolution of the disc prevents employing repeating sounds, such as recorded machine gun bursts and the like, on the disc.

Yet another disadvantage resides in the fact that the fixed needle limits the sounds which may be produced by the gun to those which can be recorded in a single sound track.

Still another disadvantage resides in the fact that the winding key for the spring motor detracts from the realism of the simulated gun.

In view of the foregoing factors and conditions characteristic of toy guns of the type disclosed in Patent No. 2,734,310, it is a primary object of the present invention to provide a new and useful toy not subject to the disadvantages enumerated above and having means for reproducing recorded gun-shot sounds efficiently, safely and expeditiously.

Another object of the present invention is to provide a gun toy of the type described which employs a constant-force spring means for rotating a disc in operative engagement with a sound-reproducing means.

A further object of the present invention is to provide a gun toy of the type described which includes means for selecting different types of gun-shot sounds which may be reproduced by a sound-reproducing system operatively associated with a single record disc.

A still further object of the present invention is to provide a gun toy of the type described which includes rack means for loading a constant-force spring means and clutch means operatively associated with the spring means and the rack means for disconnecting the rack means from operative association with the spring means during movement of the rack means from a spring loading position to an initial position, whereby the spring means may be loaded in increments by repeated movement of the rack means from the initial position to the spring loading position.

According to the present invention, a gun toy is provided with a housing assembly which simulates a modern machine gun having a stock, a receiver, a cocking bolt and rack assembly, a rear sight, a forearm grip, a front sight, a barrel, a flash suppressor, a pistol grip, a trigger guard and a simulated magazine. The gun includes a sound-reproducing system including a speaker cone which is mounted in the simulated magazine. The sound-reproducing system also includes a phonograph record and turntable assembly which is rotated by constant-force spring means loaded by the bolt and rack assembly. The gun also includes rack-energy storing means operatively associated with the spring means for storing rack-energy therein during movement of the rack means from one position to a second position. The storing means includes trigger means for releasing the stored energy to actuate the turntable. The gun also includes clutch means operatively associated with the spring means and the rack means for disconnecting the rack means from operative association with the spring means during movement of the rack means from the second position back to its first position, whereby the spring means may be loaded in increments by repeated movement of the rack means between the said positions.

The record may include a plurality of individual sound tracks having different types of machine gun sounds recorded thereon. For example, one of the sound tracks may have regular machine gun sounds recorded thereon while the other sound track has muffled machine gun sounds recorded thereon to simulate a gun operating with a silencer. Different sound tracks are selected by actuating a simulated silencer switch to shift a tone arm from one sound track to the other.

The gun toy also includes a second clutch means connected to the turntable for disconnecting the turntable from the spring means during spring-loading operations. In addition, the gun toy includes a governor means for controlling the rate of travel of the turntable means to a suitable rate satisfactory for good gun-shot sound reproduction.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which like reference characters refer to like elements in the several views.

In the drawings:

FIGURE 1 is a perspective view of a gun toy constituting a presently preferred embodiment of the invention;

FIGURE 2 is an enlarged, partial elevational view looking in at the left hand side of the receiver and magazine portions of the toy shown in FIG. 1 with the housing removed to show internal construction;

FIGURE 3 is an enlarged, partial elevational view similar to FIG. 2, but looking in at the right hand side of the gun shown in FIG. 1;
Continued rotation of the shaft 60 with the clutch-pawl 94 engaging the ratchet wheel 96 imparts counterclockwise rotation to the large-diameter gear 98, as indicated by arrow 110 in FIGS. 3, 6 and 9. Counterclockwise rotation of the large-diameter gear 98 also imparts counterclockwise rotation to a large drum 112 constituting a component of a constant-force spring means 114 including a constant-force spring strip 116 normally biased to wind itself relatively tightly on a small drum 118 rotatably mounted in the housing 12 on a shaft 120. Counterclockwise rotation of the large drum 112 loads the spring strip 116 thereon against this normal bias to store energy in the spring means 114. Thus, the rack means 44 is operatively associated with the large drum 112 and having a refferring energy from the rack means to the spring means when the rack means is moved from its initial FIG. 3 position to a second position wherein the end 48 is disposed within the stock 18.

This rack energy is stored or retained in the spring means 114 by a ratch-energy storing or retaining means 122 (FIGS. 6 and 7) comprising a ratchet gear 124, a sear 126 and a trigger 128. The ratchet gear 124 is axed, together with the large drum 112, on a hub 130 provided on the large-diameter gear 98. The sear 126 is a substantially L-shaped member pivotally mounted in the housing 12 on a pin 132 and having a first arm 134 extending into engagement with a rounded end 136 of trigger 128 and a second arm 138 extending into operative association with the ratchet gear 124 for controlling the rotation thereof.

The arm 138 is biased into engagement with the sear 126 by a torsion spring 140 having a body portion 142 coiled about the pivot means 132, a first arm 144 engaged on a shaft 146 provided on the arm 134 of sear 126 and a second arm 148 bearing against the trigger guard 32. The trigger 128 is pivotally mounted in the housing 12 on a pivot pin 150 and includes an accurate finger-engaging end 152 extending into an opening 154 provided in the trigger guard 32.

The energy stored in spring means 114 may be released by squeezing the trigger 128 swinging the arm 138 to the position shown in FIG. 7. Release of this stored energy permits the spring strip 116 to transfer from the large drum 112 to the small drum 118 imparting rotation to drum 112 which, in turn, rotates the large-diameter gear 98 through the hub 130.

The energy stored in spring strip 116 imparts rotation to the drum 112 during the return of the spring 116 to the drum 112. This rotation of the drum 112 imparts rotation to the large-diameter gear 98 and through the gear 110 to the large-diameter gear 112. This rotation is in a clockwise direction, as indicated by the arrow 156 in FIG. 7. This clockwise rotation of the gear 98 imparts counterclockwise rotation to a turntable-drive gear 158, as indicated by the arrow 160 in FIG. 7, through a clutch member 162 which is connected to the gear 158 by a crank pin 164 for imparting rotation thereon. The gear 158 and the clutch member 162 are mounted on a common shaft 166, together with a turntable means 168 which includes peripheral gear teeth 170 and an inside out ratchet wheel 172. The ratchet wheel 172 is formed in the center of the gear 168 for operatively receiving the clutch member 162 which is adapted to drive the turntable means 168 in a counterclockwise direction, but not in a clockwise direction. Thus, rotation of the gear 158 by the gear 98 during the loading of the spring strip 116 onto the large-diameter drum 112 will not transfer to the turntable means 168. The shaft 166 includes a first end 174 which is journaled in the housing half 16 (FIG. 5) and a second end 176 which is journaled in a bracket 178 mounted in the housing 12.

The turntable means 168 forms a part of a recorded gun-shot reproducing means which is indicated generally at 180 in FIG. 5 and which includes a movable element 182 in the form of a phonograph record having gun-
shot sounds recorded thereon. These sounds are recorded on the movable element 182 in a first sound track 184 having a plurality of concentric grooves 186 and a second sound track 188 having a plurality of concentric grooves 190. The sound track 184 may carry recorded machine gun firing sounds and the sound track 188 may carry muffled machine gun firing sounds simulating the sounds made by a gun having a silencer.

The reproducing means 180 includes a tone arm 192 having a first end 194 swingably mounted in the housing 12 on a post 196 and a second end 198 extending over the movable element 182 and carrying a phonograph needle 199. The tone arm 192 is biased into engagement with a tone arm positioning lever 200 by a spring 202 having an end 204 connected to the tone arm 192 and a second end 206 affixed to the housing 12. The lever 200 is pivotally connected to a shelf member 208 in the housing 12 by a pivot pin 210 and includes a first end 212 which extends through a slot 214 provided in the housing half 16. A button 216 is affixed to the end 212 of lever 200 for actuating by a child-user of the toy 10 in simulation of a silencer switch to swing the lever 200 causing a pad 218, which is affixed to the second end 220 of lever 200, to swing the tone arm 192 against the bias of spring 202 into operative association with the sound track 188 for reproducing the muffled gun-shot sound. A plurality of concentric grooves are provided to define each sound track to allow for inaccurate positioning of tone arm 192 within the limits of a particular sound track. Thus the needle could be placed in any groove of the selected sound track and repeatedly reproduce the sounds recorded therein, it being understood that all concentric grooves in one sound track have the same recorded sounds.

The end 198 of tone arm 192 also carries a bar 222 placing the tone arm 192 in operative association with a speaker cone 224 through a piston member 226 which is reciprocably mounted in a cylindrical member 228 affixed to the speaker cone 224. The piston 226 is biased into engagement with the bar 222 by a spring 230 which is mounted inside the cylindrical member 228 and the piston 226. The speaker cone 224 is mounted in a simulated magazine 34. Good sound reproduction by the sound reproducing means 180 dictates that the movable element 182 be relatively inflexible in the area of needle 199. This may be accomplished by making the turntable means 168 with a comparatively high mass. Preferably, however, the turntable means 168 is made from a fairly light material and a roller 232 is used to support the turntable means 168 in the area of the needle 199. The roller 232 is rotatably mounted in the housing half 16 on a shaft 234.

The angular velocity of the movable element 182 may be controlled by a governor means 236 which is operatively connected to the turntable means 168 by a gear 238 having teeth 240 engaging the peripheral teeth 170 on turntable means 168. The gear 238 is affixed to a shaft 242 which carries a rotor 244 forming a part of the governor means 236. A pair of governor arms 246, 248 are pivotally connected to the rotor 244 by pins 250 and are biased toward the rotor 244 by a spring 252. The arms 246, 248 each includes a free end 254 to which a weight 256 is affixed. A felt pad 258 is also affixed to the free end 254 of each arm 246, 248 for braking engagement with a governor housing 260 when the centrifugal force exerted on the arms 246, 248 by rotation of the rotor 250 exceeds a predetermined amount. The governor housing 260 is mounted in the housing 12 by a plurality of bolts 262 engaged in apertures 264 provided in associated ears 266 forming an integral part of the housing 260.

Referring now more in particular to FIGS. 2, 4 and 7, the large drum 112 is prevented from rotating so far that spring 116 may become disengaged therefrom by a swingable stop member 270 including a first end 272 having a finger member 274 depending therefrom and a second end 276 having a journal 278 swingably mounted on the shaft 70. The finger member 274 is biased into engagement with the drum 112 by a spring means 280 having a body portion 282 coiled about the pin 72, an arm 284 connected to the stop member 270 by a loop 286 and an arm 288 engaged over a pin 300. The finger member 274 is engageable with a shoulder 302 provided on each flange 304 of the drum 112 for preventing the drum 112 from rotating past a position where the spring strip 116 would wind on the drum 112 in a reverse direction should rotation continue after the spring strip 116 has been returned to the drum 118 leaving the end 306 attached to the drum 112. The spool 118 is stopped by a stop member 310 which is pivotally mounted on the shaft 74 and which includes an end 312 having a finger member 314 engageable with the spool 118 for stopping rotation thereof after the spring strip 116 has been transferred to the drum 112.

While the particular gun toy herein shown and described in detail is fully capable of attaining the objects and providing the advantages hereinafter stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention and that no limitations are intended to the details of construction or design herein shown other than as defined in the appended claims.

What is claimed is:

1. A gun toy comprising:
   means for reproducing recorded gun-shot sounds, said reproducing means including a movable element, said gun-shot sounds being audibly reproduced upon actuation of said movable element;
   constant-force spring means operatively associated with said movable element for moving the movable element in response to movement of said movable element;
   rack means operatively associated with said spring means for movement of said rack means from one position to another;
   first gear means operatively associated with said spring means for storing rack energy in said spring means during movement of said rack means from one position to another;
   trigger means for releasing said stored energy to actuate said movable element; and
   first clutch means operatively associated with said spring means and said rack means for disconnecting said rack means from said operative association with said spring means during movement of said rack means from one position to another, whereby said spring means may be loaded in increments by repeated movement of said rack means between said positions.

2. A gun toy as stated in claim 1 wherein said movable element includes a phonograph record having gun shot sounds recorded thereon and wherein said reproducing means includes speaker-cone means and phonograph-needle means operatively associated with said record.

3. A gun toy as stated in claim 1 wherein said first clutch means comprises:
   an inside-out ratchet means provided on said first gear means;
   a rack gear meshed with said rack, said rack gear including a shaft extending through the center of rotation of said first gear; and
   pawl means afixed to said rack gear shaft for rotation thereby, said pawl means extending into operative engagement with said ratchet, said ratchet and said pawl means cooperating to rotate said first gear means only in one direction.

4. A gun toy as stated in claim 2 including turntable means supporting said record and roller means supporting said turntable means in approximate alignment with said phonograph needle means for minimizing flexing of said turntable means by said needle means.
5. A gun toy as stated in claim 2 including: first and second endless sound tracks provided on said phonograph record, said first sound track having normal machine gun shot sounds recorded thereon and said second sound track having muffled machine gun sounds recorded thereon for simulating a machine gun being fired normally and with a silencer, respectively; and means for positioning said phonograph needle means in operative association with either of said sound tracks, selectively.

6. A gun toy as stated in claim 1 wherein said toy gun includes:

- a small drum rotatably mounted in said toy adjacent said movable element; a large drum rotatably mounted in said toy adjacent said small drum and in alignment therewith; said spring means comprising a spring strip normally biased to wind itself on said small drum, said spring strip having one end connected to said small drum and another end connected to said large drum; and means connecting said large drum to said movable element;
- ratchet wheel means operatively associated with said large drum;
- a trigger member swingably mounted adjacent said ratchet wheel; and
- swingable pawl means connecting said trigger member to said ratchet means for releasing said drum for rotation when said trigger is actuated and for engaging said ratchet wheel to interrupt rotation of said drum when said trigger is released.

7. A gun toy as stated in claim 1 wherein said constant-force spring means comprises: a small drum rotatably mounted in said toy adjacent said movable element; a large drum rotatably mounted in said toy adjacent said small drum and in alignment therewith; a spring strip normally biased to wind itself on said small drum, said spring strip having one end connected to said small drum and another end connected to said large drum; and means connecting said large drum to said movable element; said means connecting said large drum to said movable element comprises: a driving gear connected to said large drum; a driven gear meshed with said driving gear; and one-way clutch means connecting said driven gear to said movable element.

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