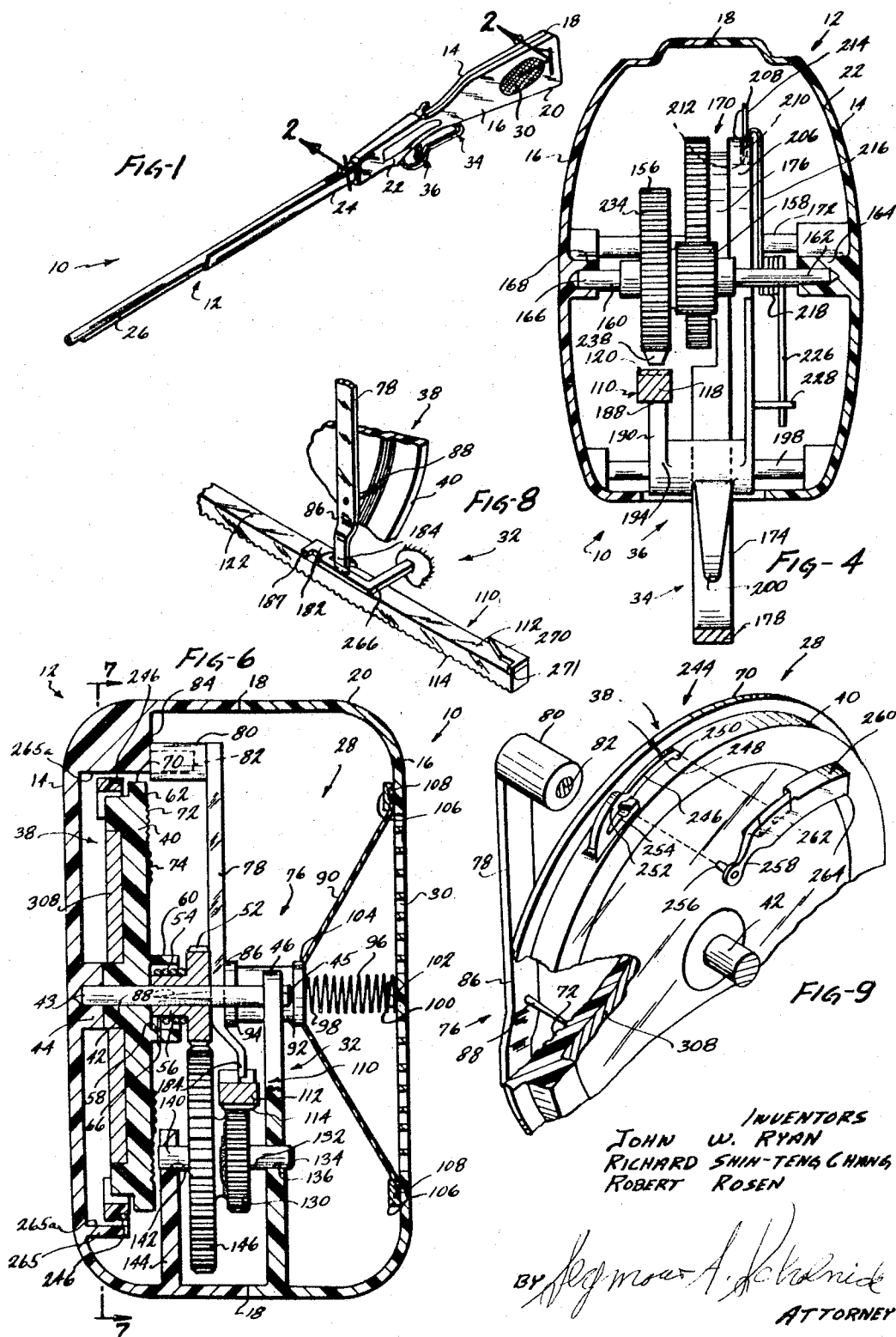


J. W. RYAN ET AL

GUN TOY HAVING SOUND PRODUCING MEANS

3 Sheets-Sheet 1



Sept. 2, 1969

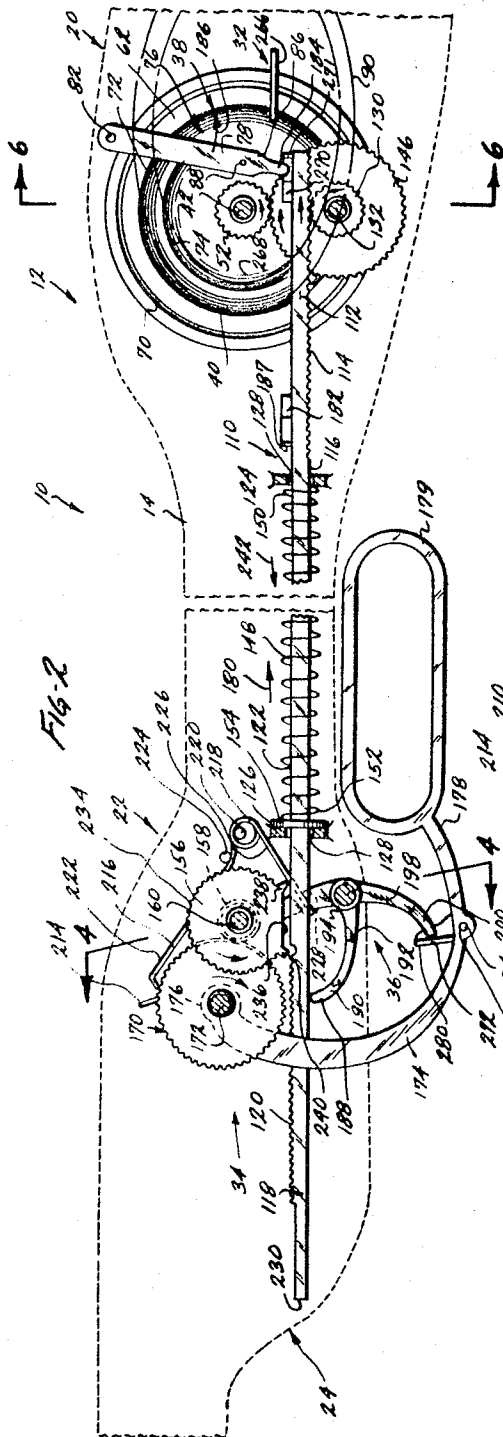
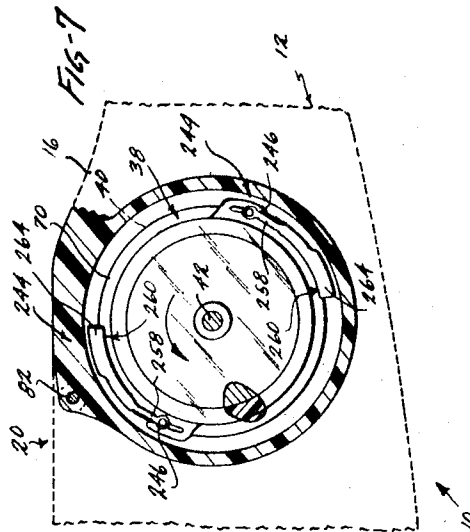
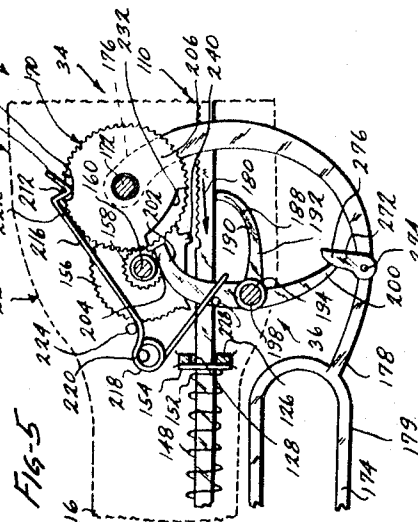
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3,464,152

GUN TOY HAVING SOUND PRODUCING MEANS

Original Filed Dec. 28, 1965

3 Sheets-Sheet 2



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3,464,152

GUN TOY HAVING SOUND PRODUCING MEANS

Original Filed Dec. 28, 1965

3 Sheets-Sheet 3

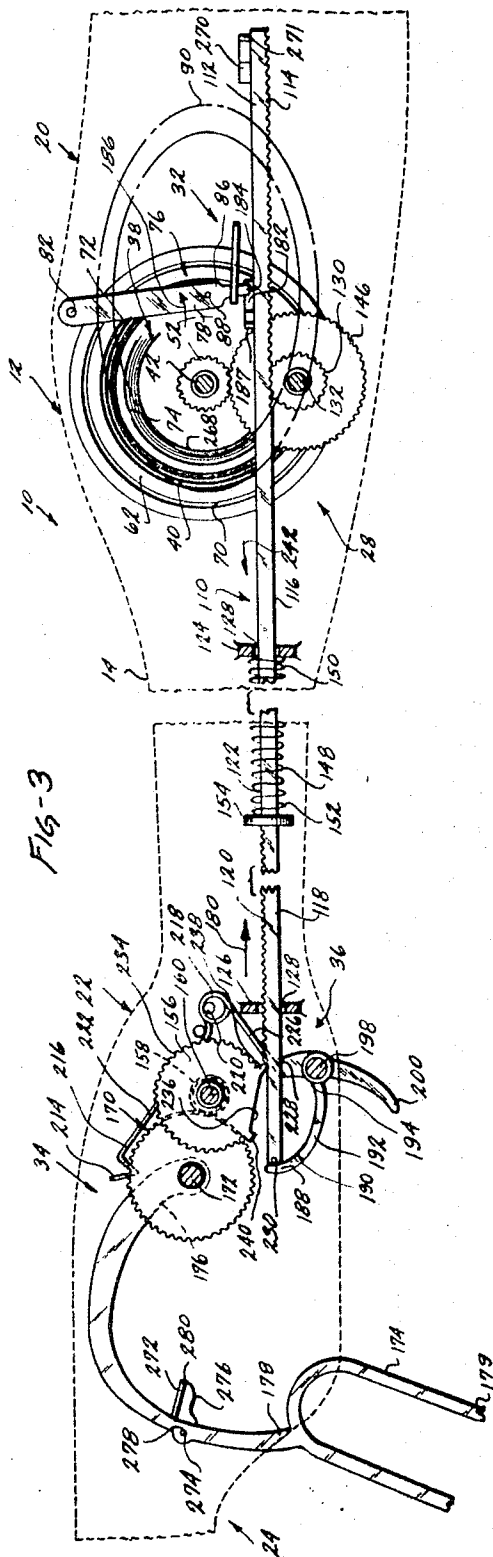


FIG-3

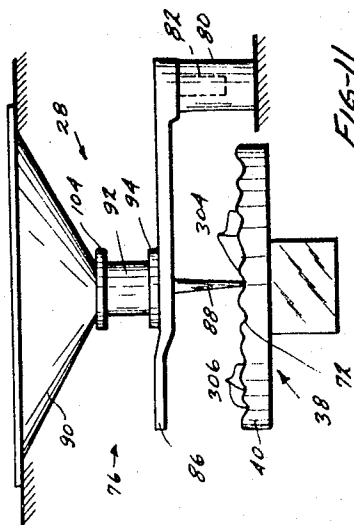


FIG-11

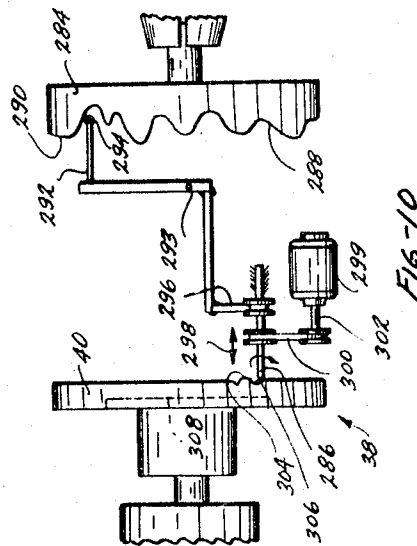


FIG-10

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3,464,152

GUN TOY HAVING SOUND PRODUCING MEANS
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Original application Dec. 28, 1965, Ser. No. 516,927, now
Patent No. 3,420,530, dated Jan. 7, 1969. Divided
and this application Sept. 24, 1968, Ser. No. 762,045

Int. Cl. A63h 5/04

U.S. Cl. 46—175

5 Claims

ABSTRACT OF THE DISCLOSURE

A toy gun with a recording of a gun shot sound cut into a rotatable record, the cutting being of amplified depth, and a spring-loaded rack for rotating the record. A manually operable gear cocks the rack and a trigger releases the same. The rack acts to retract and release a tone arm having a needle for reproducing the recorded sound. Integral resilient means on the record serve to bias weights of a centrifugal governor.

CROSS REFERENCE TO RELATED APPLICATION

This application is divided from an application entitled "Gun Toy Having Sound Producing Means" filed Dec. 28, 1965 under Ser. No. 516,927, now patent No. 3,420,530.

BACKGROUND OF THE INVENTION

A good many toys have been developed for placing the child user in an imaginary adult world. Toy cap guns have always been a favorite toy for accomplishing this. While generally satisfactory, cap guns have the disadvantage that the sound produced by the exploding cap is not very simulative of the real gun-shot sound the child has become accustomed to hearing in the movies and on television. This is attributable, in part, to the fact that the exploding cap does not sound like an exploding bullet. In addition, a cap gun is not capable of producing a sound simulating the whine of a traveling bullet with accompanying ricochet sounds which are used so extensively in moving pictures and television shows to heighten the realism of the action taking place.

It is known to record actual gun shot sounds on a phonograph record which is rotated one complete revolution by a clock-type spring each time the gun is fired. The recorded sound is reproduced by a sound-producing cone which is mounted in the body of the gun and which carries an inwardly projecting needle. The needle engages the sound-recording groove on the phonograph record. While generally satisfactory, guns of this type have the disadvantage that the recorded sound is not reproduced by the sound-producing cone and the needle arrangement with sufficient volume to make it realistic. This stems from the fact that the sounds are recorded electronically producing a sound wave of small amplitude which, for satisfactory reproduction, should be amplified electronically. Of course electronic amplification would make a toy too expensive. Thus, this known toy has a direct mechanical connection between the needle and the sound-producing

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cone. With this arrangement, the amplitude of the electronic recording is not great enough to move the needle up-and-down sufficiently to excite the sound-producing cone with a high level of sound. The resulting sound, as heard by the child user, does not stimulate his imagination as much as it would if the sound had a higher intensity.

SUMMARY OF THE INVENTION

In view of the foregoing factors and conditions characteristic of toy guns, it is the primary object of the present invention to provide a new and useful toy gun not subject to the disadvantages enumerated above and having a new and useful sound-producing means for simulating gun-shot sounds realistically, safely and economically.

Another object of the present invention is to provide a new and useful toy gun having phonograph record means of the present invention mounted therein, sound reproducing means connected to the phonograph record means and means operatively associated with the gun's trigger for returning a tone arm to the beginning of a recorded gun shot sound.

Yet another object of the present invention is to provide a toy gun of the type described having a new and useful actuating means for controlling the operation of a phonograph record, tone arm and sound-reproducing cone of the present invention.

Yet another object of the present invention is to provide a new and useful gun of the type described simulating a lever-action type rifle having new and useful means of the present invention for automatically firing the rifle each time the lever is actuated.

According to the present invention a phonograph record means is provided with a synthesized gun-shot sound cut into the record by mechanical cutting techniques using a photograph of an amplitude wave from an actual gun-shot sound as a pattern which is followed visually in directing the cutting knife. The phonograph record means is rotatably mounted in a toy gun simulating a lever-action type rifle. A tone arm and needle combination is swingably mounted in the gun housing for operative engagement with the phonograph record means and with a sound-reproducing cone which is also mounted in the rifle housing.

The phonograph record is rotatably driven by a rack-and-pinion arrangement of the present invention. The rack is mounted in the rifle housing in association with a spring which is compressed when the cocking lever for the rifle is actuated. The rack is held against the force of the compressed spring by a sear provided on a trigger. When the trigger is squeezed, the force of the spring drives the rack into driving engagement with a pinion gear connected to the phonograph record means. A first cam means is provided on the rack for properly positioning the tone arm above the proper groove on the phonograph record when the gun is cocked. The rack also includes a second cam means for lifting the tone arm from the record at the end of the recorded gun shot sound to eliminate the noise which would be otherwise produced by permitting the needle to ride in an un-recorded groove during the free-spinning of the record means due to the momentum imparted thereto by the rack during firing of the toy gun.

A new and useful governor means of the present invention is connected to the record means for controlling its rate of rotation. In addition, a predetermined mass in the form of a weighted, annular member is affixed to the

phonograph record means for minimizing vibration of the record in a vertical direction, whereby the amplitude of the recorded sound wave is more effective in vibrating the tone arm in a vertical direction to reproduce the sound recorded on the phonograph record means.

The cocking lever is provided with a selective trigger release in the form of a pawl of the type disclosed in Patent No. 3,101,703. This pawl may be swung to an operative position wherein it will automatically actuate the trigger each time the cocking lever is actuated.

A ricochet sound is also recorded on the record. However, the ricochet sound is preferably recorded electronically because a softer fade-out is desirable for a ricochet sound than can be obtained by the mechanical recording method of the present invention.

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.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of the gun toy of the present invention;

FIGURE 2 is an enlarged partial cross-sectional view taken along line 2—2 of FIGURE 1.

FIGURE 3 is a cross-sectional view similar to FIGURE 2 showing the operating mechanism of the gun of the present invention in a different operative position than that shown in FIGURE 2;

FIGURE 4 is an enlarged cross-sectional view taken along line 4—4 of FIGURE 2;

FIGURE 5 is an enlarged, partial cross-sectional view of the gun of FIGURE 1 showing the opposite side portion of the actuating mechanism shown in FIGURE 2;

FIGURE 6 is an enlarged, cross-sectional view taken along line 6—6 of FIGURE 2;

FIGURE 7 is a reduced, partial cross-sectional view taken along line 7—7 of FIGURE 6;

FIGURE 8 is an enlarged, partial perspective view showing somewhat diagrammatically certain details of construction of the sound-reproducing means and its associated actuating mechanism;

FIGURE 9 is an enlarged, exploded perspective view of a tone arm and a phonograph record means of the present invention showing the relationship of a governor means of the present invention to the phonograph record means;

FIGURE 10 is a diagrammatic view showing the record cutting method of the present invention; and

FIGURE 11 is a diagrammatic view showing the vertical reciprocation of the tone arm needle during operation of the sound-reproducing means of the present invention.

Referring again to the drawings, a gun toy constituting a presently embodiment of the invention, generally designated 10, includes a gun body portion 12 simulating the appearance of a rifle which may be conveniently manufactured from a suitable plastic material by molding a first body half 14 and a second body half 16. The body halves 14, 16 may be joined together by a suitable weldment 18 to form a hollow housing for accommodating a mechanism to be hereinafter described in detail. The body portion 12 includes a stock 20, a grip 22, a receiver 24 and a barrel 26 which are formed integrally in each body half 14, 16 during the molding of a particular body half.

A sound-producing means 28 is mounted in the stock 20 adjacent a grill 30 provided in the body half 16 for producing gun shot and ricochet sounds closely simulating the sounds produced by a real rifle.

The sound-producing means 28 is actuated by a suitable actuating means 32 which is mounted in the body portion 12 in opposite association with a cocking mechanism 34 and a trigger means 36.

The sound-producing means 28 includes a phonograph record means 38 having an integrally formed turntable-record 40 (FIG. 6) which is rotatably mounted on a shaft 42 having one end 43 rotatably mounted in a boss 44 provided in the body half 14 and another end 45 which is rotatably mounted in a partition 46 provided in the body half 16. A drive gear 52 is affixed to the shaft 42 for imparting rotation to the turntable-record 40 through the medium of a clutch-spring 54 which is coiled about the hub portion 56 of the gear 52 within cylindrical cavity 58 formed by a skirt 60 provided in the upper surface 62 of the turntable record 40. The coil spring 54 frictionally surrounds the hub 56 and an end 66 thereof is connected to the skirt 60 for coiling the spring 54 tightly about the hub 56 when the gear 52 is rotated in one direction and for uncoiling the spring 54 when the gear 52 is rotated in the opposite direction. When the spring 54 is tightly coiled about the hub 56, it imparts rotation to the turntable-record 40. However, when the gear 52 is rotated in the opposite direction for unwinding the spring 54, the turntable-record 40 does not rotate.

Gun-shot and ricochet sounds are recorded on the upper surface 62 of the turntable-record 40, in a manner to be hereinafter described, with the gun-shot sounds being recorded near the outer periphery 70 of the turntable-record 40, as indicated by the grooves 72 and the ricochet sounds being recorded on the turntable-record 40 radially inwardly from the grooves 72, as indicated by the grooves 74. These recorded sounds are reproduced by a vibratable sound-reproducing means 76 including a tone arm 78 swingably mounted by a post 80 on a pin 82 affixed to the body half 14 in stock 20 by a land 84. The tone arm 78 includes an end 86, remote from the post 80, which is laterally offset somewhat and which carries a phonograph-record needle 88 engageable with the grooves 72 and 74 for receiving vibrations therefrom. These vibrations are transmitted to a speaker cone 90 through a coupling piston 92 (FIG. 6) having a disc-like member 94 biased into engagement with the tone arm 78 by a spring 96 having one end 98 disposed within the coupling member 92 and another end 100 bearing against a boss 102 provided on the grill 30. The member 92 is reciprocally mounted in the apex portion 104 of the speaker cone 90 for transmitting vibrations from the record means 38 to the speaker 90 through the needle 88, tone arm 78 and member 92. The cone is given flexibility by providing its peripheral edge portion 106 with a plurality of corrugations 108. The speaker cone 90 may be made from any suitable material such as cardboard, paper, plastic and the like and is shown herein for purposes of illustration, but not of limitation, as being made from a plastic material.

The actuating means 32 actuates the sound-producing means 28 by simultaneously moving the tone arm 78 into proper playing position and setting the record means 38 into rotation; and includes a non-circular rack means 110 having a first end 112 provided with a first set of teeth 114 on its under surface 116 and a second end 118 provided with a second set of teeth 120 on its upper surface 122. The rack means 110 is reciprocally mounted in the body 12 by a pair of spaced-apart plates 124 and 126 each of which has a non-circular aperture 128 provided therein for preventing rotation of the non-circular rack means 110.

The teeth 114 on the rack means 110 drivingly engage a pinion gear 130 which is rotatably mounted in the stock 20 by a shaft 132 having a first end 134 rotatably received in an aperture 136 provided in partition 46 (FIG. 6) and a second end 140 rotatably received in an aperture 142 provided in a partition 144 which is mounted in the body half 14. A driving gear 146 is rigidly

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affixed to the pinion 130 for rotation thereby and drivingly engages the turntable gear 52 for imparting rotation thereto. The pinion gear is, in turn, rotated by the rack means 110 when it is reciprocated in a first direction by a compression spring 148 and in a second direction by the cocking means 34.

The spring 148 encompasses the rack means 110 and has a first end 150 bearing against the plate 124 and a second end 152 bearing against a plate 154 rigidly affixed to the rack means 110 for movement therewith from the position shown in FIG. 3 where the spring 148 is fully compressed to the position shown in FIG. 2 where the plate 154 is stopped by the plate 126.

The cocking means 34 includes a rack-gear 156 to which a pinion gear 158 is rigidly affixed. The gears 156 and 158 are rotatably mounted in the receiver 24 by a shaft 160 having a first end 162 rotatably mounted in a hollow boss 164 provided in the body half 14 and a second end 166 rotatably mounted in a hollow boss 168 provided in the body half 16. The pinion gear 158 is rotated by a cocking-lever gear 170 which is rotatably mounted in the receiver 24 by a shaft 172. The gear 170 is rotated by a cocking lever 174 having an arcuate end 176 rigidly affixed to the gear 170 and another end 178 rigidly affixed to a handle member 179 which may be grasped by a user of the toy 10 to swing the cocking lever 174 from the position shown in FIG. 2 to the position shown in FIG. 3 where the toy 10 is fully cocked by moving the rack means 110 in the direction of arrow 180 until the spring 148 is fully compressed. In this position, a wedge-shaped cam lobe 182 engages a lifting tab 184 provided on the end 86 of tone arm 78 and swings it in the direction of arrow 186 to the beginning of the recorded gun-shot sound provided on the record means 38.

The rack means 110 is maintained in a fully cocked position by a sear 118 provided on the end 190 of an arcuate lever 192 having another end 194 rigidly affixed to the trigger means 36 which, in turn, is pivotally mounted in the receiver 24 by a pin 198. The trigger means 36 includes a first end 200 forming a finger-engaging portion and a second end 202 having a projection 204 extending substantially at right angles to the end 202 toward a hub member 206 carried by a cocking-lever gear 170. The hub member 206 includes an outer periphery 208 which is provided with a first recess 210 engageable by a detent 212 provided on the end 214 of a spring 216. The spring 216 includes a body portion 218 which is coiled about a stationary pin 220 provided in the body portion 12, a first arm 222 which is engaged behind a fixed pin 224 for biasing the detent 212 into engagement with the hub member 206 and a second arm 226 which is engaged behind a pin 228 provided on the trigger means 36 for creating a moment about the pin 198 to bias the sear 188 into engagement with the end 230 of the rack means 110. When the cocking lever 174 is in the position shown in FIGS. 2 and 5, the detent 212 is seated in the recess 210 for maintaining the hand grip 179 in a position closely adjacent the grip portion 22 of the body portion 12.

The periphery 208 of the hub 206 is also provided with a second recess 232 into which the projection 204 of trigger means 36 may be relieved only when the cocking lever 174 is in its FIGS. 2 and 5 position. When the cocking lever 174 is in its FIG. 3 position, the trigger means 36 cannot be actuated because the projection 204 will engage the uninterrupted portion of the periphery 208. Should it be possible to actuate the trigger means 36 with the rack means 110 in the fully cocked position shown in FIG. 3 before the cocking lever 174 is returned to its FIGS. 2 and 5 position, the rack means 110 would not only drive the phonograph record means 38 in a manner to be hereinafter described, but would also rapidly rotate the cocking lever 174 toward its FIG. 2 position

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because, as will be seen in FIG. 3, the teeth 234 on rack driving gear 156 are still engaged with the teeth 120 on the rack means 110. However, when the cocking lever 174 is returned to its FIG. 2 position, a flat face 236, provided on the gear 156, is positioned over the rack means 110 providing clearance between the teeth 234 and the teeth 120 so that the rack means 110 will proceed without interference from the cocking means 34 when the trigger means 36 is actuated to energize the sound-producing means 28. Clearance between the teeth 120 and the teeth 234 on gear 156 is assured during return of the cocking lever from its FIG. 3 position to its FIG. 2 position by an enlarged tooth 238 which is provided on the gear 156 for engaging the teeth 120 to push the rack means 110 in the direction of arrow 180 sufficiently to latch the end 230 of rack means 110 behind the sear 188 in such a position that the teeth 120 will be out of reach of the teeth 234 during rotation of the gear 156 by the lever 174 as it is returned from its FIG. 3 position to its FIG. 2 position. The gear 156 is also provided with a pickup tooth 240 which is somewhat larger than the teeth 234 for minimizing the force required to start the rack means 110 moving in the direction of arrow 180 during a cocking operation.

With the rack means 110 in its FIG. 3 position fully loading spring 148 and with the cocking lever 174 in its FIG. 2 position, the gun 10 may be "fired" by squeezing trigger means 36 to release rack means 110 whereupon the force stored in spring 148 moves the rack means 110 in the direction of arrow 242 imparting rotation to the record means 38 through teeth 114 on rack means 110, the pinion gear 130, the driving gear 146 and the turntable gear 52. The angular velocity of the turntable-record 40 is regulated by a governor means 244 (FIGS. 7 and 9) which includes a pair of cantilever springs, such as the one shown at 246 in FIG. 9. Each spring 246 is formed integrally with the turntable-record 40 and includes an arcuate arm 248 extending along the outer periphery 70 of the turntable-record 40 at positions located approximately 180° from each other. Each arm 248 includes a free end 250 which is biased in the direction of arrow 251 toward the periphery 70 by the configuration of its fixed end 252 forming a continuation of its fixed end 252 forming a continuation of the periphery 70. The end 252 of each spring 246 is provided with a slot 254 which receives an associated pin 256 pivotally connecting an end 258 of a governor weight 260 to the turntable-record 40. An arcuate slot 262 is provided in each weight 260 for receiving the end 250 of an associated spring 246 so that each weight 260 will have its free end 264 biased toward the turntable-record 40. When the angular velocity of the turntable-record 40 exceeds a predetermined amount, centrifugal force moves the free end 264 of each weight 260 into engagement with the inner surface 265a of a cylindrical member 265, so that frictional engagement of the weight 260 with the surface 265a controls the angular velocity of the turntable-record 40.

At the beginning of the power stroke, wherein the rack means 110 is moved in the direction of arrow 242 by the spring 148, the tab 184 on tone arm 78 is in engagement with the lobe 182. The tone arm 78 is prevented from moving with the lobe 182 by a hook means 266 (FIG. 8) which engages the tone arm 78 in such a manner that it is free to drop vertically downwardly but is restricted from swinging horizontally until it drops down into engagement with the record means 38. This happens when the rack means 110 moves in the direction of arrow 242 sufficiently to remove the lobe 182 from its position subjacent the tab 184. During rotation of the record means 38 by the rack means 110, the tone arm 78 follows the grooves 72 and 74 radially inwardly toward the shaft 42 until the needle 88 reaches an unrecorded, silent groove 268 at which time the plate 154 is approaching its

FIG. 2, arrested position against the plate 126. At this time a second cam lobe 270 engages the tab 184 lifting the tone arm 78 from the silent groove 268. This eliminates any noise that might be transmitted to the speaker cone 90 by continued rotation of the record means 38 after movement of the rack means 110 has been arrested. The tab 184 is prevented from sliding off the trailing end of cam lobe 270 by a stop member 271.

The gun 10 may be automatically fired when the cocking lever is swung from its FIG. 3 position to its FIG. 2 position by a selective trigger release in the form of a pawl 272 of the type disclosed in Patent No. 3,101,703. The pawl 272 is pivotally connected to the cocking lever 174 by a pin 274 and includes an arm 276 having an aperture 278 extending therethrough for receiving the pin 274 and a transverse tab portion 280 engageable with the trigger means 36. The pawl 272 may be swung to a position where no contact is made between the tab 280 and the trigger means 36 when the cocking lever 174 is returned to its normal FIG. 2 position adjacent the body 12, if desired.

The gun-shot sound recorded on the record means 38 may be given sufficient volume for imparting a high degree of realism to the "firing" of the gun 10 without employing electronic amplifying means by cutting a synthesized gun-shot sound into the record means 38 by the method of the present invention. This method comprises integrating one or more times the signal received from an actual gun-shot sound and displaying the integrated signal on an oscilloscope. A photograph is then made of the displayed sound pattern. The photograph may be enlarged to any desired degree to produce a sound pattern having a very large amplitude. The photograph is then used as a trace for mechanically reproducing the sound pattern on the phonograph record means 38. For example, the photograph may be used to make a template 284 (FIG. 10) serving as a trace for a cutting knife 286 which follows the sound pattern 288 formed on the edge 290 of the template 284 by motions imparted thereto by a template-follower 292 which is pivotally mounted adjacent the template 284 by a pin 293 and which includes a first end 294 engaging the sound pattern 288 and a second end 296 engaging the cutting knife 286 for reciprocating it, as indicated by the double headed arrow 298, while the knife 286 is simultaneously rotated by a motor means 299 connected to the knife 286 by a belt 300 and the output shaft 302 of the motor means 299. Thus, as the cutting knife 286 is rotated, it is reciprocated by the sound pattern 288 in such a manner that it reproduces the sound pattern on the record means 38 during rotation thereof. This produces a hill-and-dale recording, as indicated in FIG. 11, wherein the groove 72 provided on the record means 38 has peaks 304 and valleys 306 defining a sound pattern of sufficient amplitude to vibrate the needle 88 with enough force that the tone arm 78 excites the cone 90 through the disc 94 in such a manner that a gun-shot sound having a satisfactory volume is heard by a user of the gun 10 without using electronic amplifying equipment.

If desired the template 284 may be eliminated and the photographic trace of the sound may be followed visually. The gun-shot sound need not follow the trace exactly because the introduction of masking noises from following the trace inaccurately is not particularly detrimental to the reproduction of the gun-shot sound. The record means 38 may be made from any suitable material which is readily machineable by the knife 286. Nylon has been found to be satisfactory and has the advantage that the cantilever springs 246 satisfactorily bias the weights 260 toward the record means 38. The mechanical method of cutting records herein described can be used to cut cylinders, discs, and the like with equal facility. Also, concentric and spiral grooves can be cut.

In actual practice, a gun-shot sound was recorded on magnetic tape. On playback, this produced the desired pressure wave. However, the "cam shape" required to

produce such a pressure wave through the acoustical system formed by the sound-producing means 28 is, in general, different from the pressure wave. Therefore, appropriate equalization is introduced between the tape and the oscilloscope picture so that the shape of the amplitude wave (cam shape) is depicted rather than the pressure wave. Then on playback from record means 38, the resultant pressure wave is similar to the original.

The operating characteristics of the tone arm 78 are enhanced by maximizing the amount of up-and-down motion imparted to the tone arm by vertical vibrations in the turntable-record means 40. This is accomplished by adding mass to the turntable-record means 40 in the form of a metal, annular ring 308 so that it takes more force to overcome the inertia of the turntable-record 40. Thus, the mass of the turntable-record 40 being much greater than that of the tone arm, the turntable-record 40 does not move much and imparts most of the motion derived from the grooves 72 and 74 to the tone arm 78. The turntable-record means 40 is desirably made as light as possible to minimize the likelihood of the turntable crashing through the housing or body portion 12 when the gun is subjected to dropping and other rough treatment. The annular ring 308 is designed to add sufficient mass to the turntable-record 40 to minimize the vibrations therein while not adding an excessive amount of mass sufficient to cause the turntable-record means 40 to break through the gun body portion 12 should the gun 10 be accidentally dropped.

While the particular gun toy herein shown and described in detail is fully capable of attaining the objects and providing the advantages hereinbefore 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, design or method steps herein shown and described other than as defined in the appended claims.

What is claimed is:

1. A gun toy comprising:

- a phonograph record means having sounds recorded thereon in a groove having a beginning point and an end point;
- a needle adapted to track said groove from said beginning point to said end point;
- means normally biasing said needle into engagement with said groove;
- actuating means for energizing said record means;
- trigger means controlling the operation of said actuating means; and
- means operatively associated with said trigger means for separating said needle and said groove, whereby said needle may be moved from said end point to said beginning point.

2. A gun toy as defined in claim 1 wherein said operatively associated means is a part of said actuating means.

3. A gun toy as defined in claim 2 wherein said actuating means includes a spring-driven rack for rotating said record means.

4. A gun toy as defined in claim 3 wherein said sounds include a gun-shot sound followed by a ricochet sound.

5. In a toy gun: a rotatable grooved record having sounds recorded thereon; sound reproducing means for reproducing sounds recorded on said record; a movable toothed rack bar and gear means drivingly connecting said rack bar to said record; spring means urging said rack bar to move in one direction to drive said record; trigger means mounted in said gun, said trigger means having a first position holding said rack bar against the bias of said spring means and the second position releasing said rack bar; manually operable means for moving said rack bar in the other direction to energize said spring means; said sound reproducing means comprising a movable tone arm, a needle carried by said tone arm and engageable in said record groove, and a speaker cone operatively connected to said tone arm; said rack bar having means thereon en-

gageable with said tone arm for retracting said needle from said groove and moving said tone arm to position the needle at the start of said groove, in response to movement of said rack bar in said other direction.

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U.S. Cl. X.R.

46—177