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SOUND PRODUCING DEVICE FOR TOY GUNS AND THE LIKE

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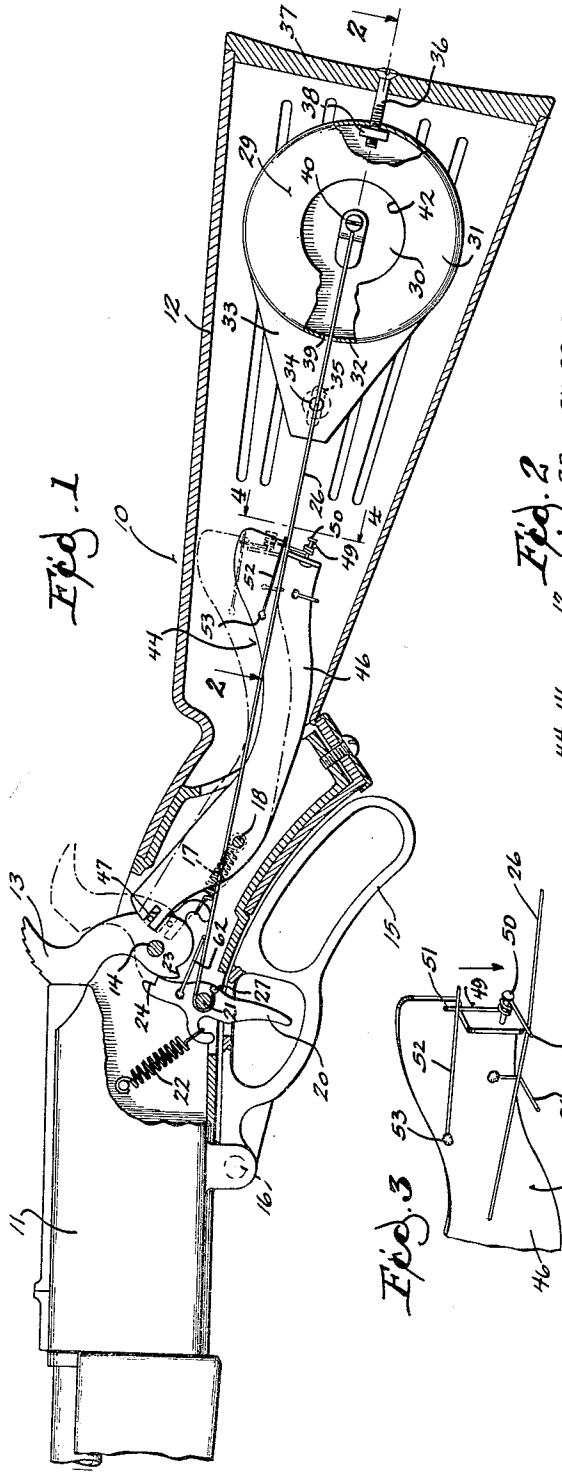


Fig. 1

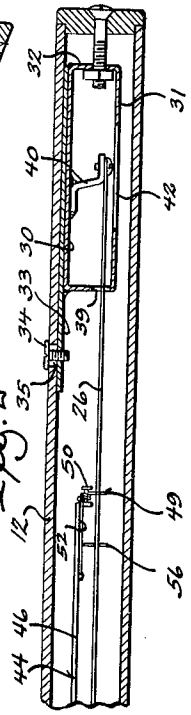


Fig. 2

Fig. 3

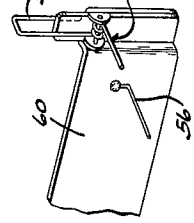


Fig. 8

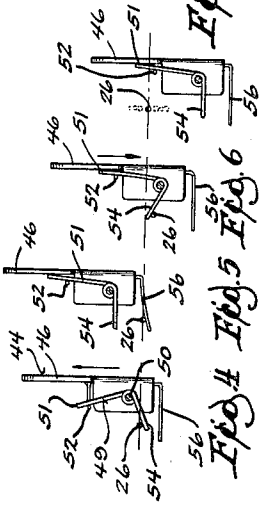


Fig. 7 Fig. 6 Fig. 5 Fig. 4

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SOUND PRODUCING DEVICE FOR TOY GUNS AND THE LIKE

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This invention relates to toy guns and more particularly to a sound effect device therefor which simulates the whining sound or ricochet noise of a bullet.

Devices of this general character are primarily used by children and must therefore be foolproof in operation and durable in construction. In order to hold the attention of the youthful users, these guns should be capable of stimulating the child's imagination.

In accordance with the present invention, a sound producing device for a toy gun is provided, the sound effect of which may be varied by the child each time the device is used.

The invention provides a sound producing device which may be cocked by the hammer of the gun and which is then actuated by pulling the trigger of the gun. As well as actuating the sound producing device, the sound produced thereby may be varied by changing the rate at which the trigger is released after firing.

The invention further contemplates the use of an amplifier for the sound producing means, which amplifier is positioned within the gun so as to produce realistic bullet whine noise. This amplifier may be of the mechanical, electrical or electronic type.

These and other objects and advantages of the invention will appear hereinafter as this disclosure progresses, reference being had to the accompanying drawings, in which:

FIGURE 1 is a fragmentary side elevational view in section, of a toy gun embodying the invention, certain parts being broken away for clarity of the drawings;

FIGURE 2 is a sectional view taken on line 2—2 of FIGURE 1;

FIGURE 3 is a perspective view, on an enlarged scale, of part of the actuating means shown in FIGURE 1;

FIGURES 4 to 7 inclusive are taken generally from line 4—4 of FIGURE 1, but on an enlarged scale and show the actuating means in various positions; and

FIGURE 8 is a perspective view similar to FIGURE 3 but showing a modification.

Referring in greater detail to the drawings, the invention has been illustrated, by way of example, as applied to a toy rifle 10 which is generally hollow and includes a breech 11, and stock 12 rigidly secured together. A hammer 13 is pivoted on pin 14 within the gun and may be cocked by pulling rearwardly on its upper portion. The hammer may also be cocked by mechanism (not shown) which is actuated by swinging the lever 15 downwardly about its pivot 16 in the well known manner. A spring 17 is attached at one end to an anchor pin 18 and at its other end engages the hammer 13 to urge it in a counterclockwise position (FIG. 1) to the firing position.

A trigger 20 is pivoted on pin 21 and spring 22 urges the trigger in a clockwise direction (FIG. 1) to a forward position. As shown by the full lines in FIGURE 1, the hammer is uncocked and the trigger is released.

The hammer has a projection or stop 23 which is adapted to engage a complementary stop 24 on the trigger when the hammer is rotated to the dotted line or cocked position. In this latter position the trigger prevents the spring 17 from snapping the hammer to the firing position. When the trigger 20 is pulled rearwardly (to the right in FIG. 1), the stop 24 moves forwardly and is

disengaged from hammer stop 23, allowing the hammer to snap or rotate under the influence of spring 17.

A sound producing means is provided within the gun and takes the form of a vibrating means or wire 26 the tension of which is controlled by pivotal movement of the trigger 20. The wire is trained partially around the trigger pivot pin 21 and is anchored to the trigger by any suitable means, for example, such as welding as at 27. The other end of the wire is secured within a resonating or vibrating chamber 29. This chamber has been shown for illustrative purposes as a relatively flat metal can having a bottom 30, top 31 and a circular side wall 32. The bottom 30 is secured to a mounting plate 33 which in turn is adjustably secured to the stock 12 by the set screw 34 extending through a slot 35 in the stock. The screw 34 is threadably engaged in the plate 33 and, when the screw is loosened, the plate and its associated chamber 29 may be adjustably positioned within the stock by the adjusting screw 36. Screw 36 extends freely through the butt 37 and chamber wall 32 and has a nut 38 on its inner end. The screw 36 is adjustable from the outside of the gun to vary the tension of the sounding wire 26 and, as a result, the sound produced thereby. The wire passes through an aperture 39 in wall 32 and is secured to post 40 within the can, the post being welded to the inside of bottom 30. The top of the vibrating chamber 29 has an opening 42 through which the sound waves in the can eventually pass. A series of slots has been provided in the sides of the stock to permit these waves to be emitted from the gun.

The hollow stock 12 may in itself act as a mechanical amplifier, particularly if made from metal. However, experience has shown that another amplifier is highly desirable, such as the resonating chamber 29 shown, especially if a higher pitch sound of a bullet whine is to be produced. The mechanical amplifier may be replaced by an electrical amplifier having a speaker and battery, or an electronic amplifier may be utilized such as a transistor having a speaker and an audio oscillator, the latter of which being adjustable by the trigger.

In the illustration shown, means are provided for actuating the sound producing means 26. More particularly, a strumming means 44 is actuated by the hammer 13 to strum or pluck the wire 26, causing the wire to vibrate and thereby produce sound waves, as follows.

A strumming lever 46 is pivotally mounted within the gun on pin 18. The forward end of the lever is bifurcated to receive a pin 47 which is carried by the hammer. By this means, movement of the hammer from the full line position (FIG. 1) to the cocked position causes the lever to pivot from the solid line position to the cocked position shown by dotted lines.

The other end of the lever 46 carries the wire contacting means which plucks or strums the wire when the trigger is pulled out as the lever swings from the cocked position to the uncocked position. However, when the lever is being pivoted in the other direction, that is, to the cocked position, means must be provided to prevent the plucking means from causing the wire to vibrate, as will appear.

In the illustration of the invention as shown in FIGURES 1 to 7 inclusive, the wire contacting means comprises a bell-crank shaped spring 49 which is mounted on a pin 50. Pin 50 is carried by the lever and extends through the central coiled portion of the spring. The spring 49 has a leg 51 that is adapted to be resiliently held against the lever 46 by the leaf spring 52. Spring 52 is welded at one end 53 to the lever and acts to yieldingly hold the spring 49 in the upright position shown in FIGURES 3, 5 and 7.

The spring 49 also includes a generally upright leg 54 which contacts the wire 26 as follows.

FIGURE 4 shows the actuating lever 44 as it is being

swung to the cocked position and as the leg 54 of the plucking spring contacts the wire 26. The leaf spring is only of such strength so as to permit the spring 49 to rotate or tilt when it is contacted by the wire 26 in moving to the cocked position. Thus the spring may freely pass the wire 26 without causing it to vibrate. If for some reason the wire 26 is strummed slightly as the lever is cocked, the wire will be stopped from vibrating by the sound deadening member 56. Member 56 is attached to lever 46 and extends outwardly therefrom and, as shown in FIGURE 5, contacts the wire 26 to prevent it from vibrating, when the mechanism is cocked. With the leaf spring release device, which in the majority of cases permits the plucking spring to be moved to the cocked position without strumming wire 26, the damping member 56 is not always necessary.

FIGURE 6 illustrates the relationship of the lever to the wire 26 at the moment after the trigger has been pulled and when the lever is starting its downward movement. As the lever descends, the spring leg 54 contacts the wire 26, causing the coil spring 49 to "wind up" slightly and also pushing the wire 26 downwardly from its normal position. Continued downward movement of the spring 49 causes it to be compressed to a point where wire 26 will slip off leg 54 and vibrate as shown in FIGURE 7.

Instead of a spring 49, other plucking members may be employed, but with the embodiment shown, wherein a resilient spring 49 is utilized, a highly desirable sound is produced. Furthermore, the diameter and therefore the resilience of the spring 49 may be varied to produce different magnitudes of wire vibration.

FIGURE 8 shows a modified form of plucking means wherein one end 58 of spring 59 is bent under the lever 60 and anchored thereto. In this case the use of damping member 56 becomes more important because the spring 59 cannot freely pass wire 26 in the cocking direction. Member 56, therefore, prevents wire 26 from vibrating when the spring 59 contacts it as the spring is moving to the cocked position.

Other forms of resonating chambers may be employed. As previously mentioned the hollow stock may in itself act as a sounding board or chamber. Furthermore, other vibrating means may also be employed and still come within the scope of the invention. The arrangement shown, however, has produced highly satisfactory results, particularly for simulating the high pitch and short wave length noise of a bullet ricochet. The vibrating chamber or can 29 matches in resonance the pitch of the wire 26. In other words, the waves produced in the cam 29 by the wire are reflected back and forth across the short distance between the diaphragm bottom 30 and top 31 and eventually escape via opening 42. The height of the vibrating chamber is approximately the same wave length as the normal resonance of the wire and the result is a high pitched tone.

When the trigger is pulled to release the hammer and thereby release the strumming lever, the tension on the wire is increased because the wire is pulled around the pivot pin 21 by the trigger. Thus the wire is under most tension, for any setting of screw 36, the moment it is struck by the plucking means. The operator then slowly releases the trigger and consequently the tension on the vibrating wire, thereby lowering the tone until it dies out. The rate at which the trigger is released may be varied, thus correspondingly varying the rate at which the tone dies out. The result is a close simulation of the whine of a bullet ricochet.

Means are also provided for stopping the wire from vibrating, that is, damping its movement, when the trigger is fully released, thereby preventing the whinning noise from continuing for an unduly long period of time. As shown in FIG. 1, this means takes the form of a member 62 which is rigidly secured at one end, as by welding, to the trigger. The free end of member 62 contacts the wire 26 only when the trigger is in the fully forward or released position, thus stopping the wire from vibrating further.

Thus a toy gun has been provided which closely simulates the whine of a bullet ricochet. The user may readily vary the effect of the sound producing means because of its connection to the trigger. This connection insures that the wire is sufficiently taut when plucked and then the tone may be varied by releasing the trigger at various rates. Means are provided for the strumming lever to prevent sounding of the wire when the former is being cocked. When in use, the resonating chamber is near the user's ear so as to be particularly effective to him.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

We claim:

1. A toy gun comprising, sound producing means in said gun, means for actuating said sound producing means, and trigger means having a connection with said actuating means for operating the latter and also connected with said sound producing means for varying the tone of the sound produced thereby.

2. In combination with a toy gun having a releasable trigger and also a movable hammer actuated by said trigger, sound producing means in said gun, means operatively connected to said hammer for actuating said sound producing means, said trigger connected to said sound producing means for varying the tone of the sound produced thereby as said trigger is released.

3. A toy gun comprising, a resonating chamber in said gun, a sounding wire in said gun and connected at one end to said chamber, means for vibrating said wire, and means connected at the other end of said wire for varying the tone of the sound produced by said vibrating wire.

4. A toy gun comprising, a resonating chamber in said gun, a sounding wire connected at one end with said chamber, a strumming lever for vibrating said wire, trigger means connected at the other end of said wire for varying the tone of the sound produced by said vibrating wire, and hammer means operable by said trigger means for actuating said lever.

5. A toy gun comprising, a trigger swingable between release and firing positions, a hammer releasable by said trigger, sound producing vibrating means, and shiftable means operable by said hammer for actuating said vibrating means, said trigger connected to said vibrating means for varying the tone produced thereby as said trigger is released.

6. A toy gun comprising, a hollow stock, a trigger, a swingable hammer releasable from a cocked position by said trigger, sound producing vibrating means in said stock, and shiftable means operable by said trigger for actuating said vibrating means, said trigger connected to said vibrating means for varying the tone produced thereby as said trigger is released.

7. A toy gun comprising, a hollow stock, a resonating chamber in said stock, a trigger, a hammer releasable by said trigger, a sound producing wire secured at one end in said chamber, and shiftable means operable by said hammer for vibrating said wire, said trigger connected to the other end of said wire for varying the tone produced thereby as said trigger is released.

8. A toy gun comprising, a hollow stock, a resonating chamber in said stock, a trigger, a hammer releasable by said trigger, a sound producing wire secured at one end in said chamber, and shiftable means operable by said hammer and including a wire plucking member, said member adapted to cause said wire to vibrate only when the former passes the latter in one direction, said trigger connected to the other end of said wire for varying the tone produced thereby as said trigger is released.

9. A toy gun comprising, a hollow stock, a trigger

mounted for swinging between a release and a firing position, a movable hammer releasable from a cocked position by said trigger, a sounding wire in said gun, means operable by said hammer for actuating said sounding wire, said trigger connected with one end of said sounding wire for decreasing the tension on said wire and thereby changing the tone of the latter as said trigger moves to said release position, and a metal can resonating chamber in said hollow stock and connected to the other end of said wire, said chamber being resonant to approximately the same wave length as the normal resonance of said wire.

10. A toy gun comprising, a trigger pivoted for swinging between release and firing positions, a hammer mounted for shifting between cocked and firing positions, said hammer having a detachable connection with said trigger whereby said hammer moves to said firing position when said trigger swings to said firing position, a substantially hollow stock, a sound producing wire anchored at one end in said stock and connected at its other end to said trigger whereby the tension of said wire is decreased as said trigger swings towards said release position and is increased as said trigger swings towards said firing position, and a wire strumming lever pivotally mounted in said stock and connected at one end to said hammer and swingable thereby to cocked and firing positions.

11. A toy gun comprising, a trigger pivoted for swinging between release and firing positions, a hammer mounted for shifting between cocked and firing positions, said hammer having a detachable connection with said trigger whereby said hammer moves to said firing position when said trigger swings to said firing position, a substantially hollow stock, a sound producing wire anchored at one end in said stock and connected at its other end to said trigger whereby the tension of said wire is decreased as said trigger swings towards said release position and is increased as said trigger swings towards said firing position, a wire strumming lever pivotally mounted in said stock and connected at one end to said hammer and swingable thereby to cocked and firing positions, a wire contacting means carried at the other end of said lever and adapted to strum said wire when said lever swings from said cocked to said firing position, and means on said lever for preventing said wire from vibrating when said lever swings from a firing to a cocked position.

12. A toy gun comprising, a trigger pivoted for swinging between release and firing positions, a hammer mounted for shifting between cocked and firing positions, said hammer having a detachable connection with said trigger whereby said hammer moves to said firing position when said trigger swings to said firing position, a substantially hollow stock, a resonating chamber in said stock, a sound producing wire anchored at one end in said chamber and connected at its other end to said trigger whereby the tension of said wire is decreased as said trigger swings towards said release position and is increased as said trigger swings towards said firing position, a wire strumming lever pivotally mounted in said stock and connected at one end to said hammer and swingable thereby to cocked and firing positions, and a wire contacting means carried at the other end of said lever and adapted to strum said wire when said lever swings from said cocked to said firing position.

13. A toy gun comprising, a trigger pivoted for swinging between release and firing positions, a hammer mounted for shifting between cocked and firing positions, said hammer having a detachable connection with said trigger whereby said hammer moves to said firing position when said trigger swings to said firing position, a substantially hollow stock, a sound producing wire anchored at one end in said stock and connected at its other end to said trigger whereby the tension of said wire is decreased as said trigger swings towards said release position and is increased as said trigger swings towards said firing position, a wire strumming lever pivotally mounted in said stock and connected at one end to said hammer and swingable thereby to cocked and firing positions, a wire contacting means carried at the other end of said lever and adapted to strum said wire when said lever swings from said cocked to said firing position, damping means carried by said trigger and adapted to contact said wire when said trigger has moved to a fully released position.

14. In a toy gun of the type having a trigger swingable between release and firing positions, a hammer swingable between cocked and firing positions, resilient means for urging said hammer to the firing position, said trigger and hammer having a connection therebetween whereby said hammer is released from said cocked position by said trigger, the improvement including a sound producing means in said gun, and means operable by said hammer for actuating said sound producing means, said trigger connected with said sound producing means for changing the tone produced thereby as said trigger is moved to said release position.

15. In a toy gun of the type having a trigger swingable between release and firing positions, a hammer swingable between cocked and firing positions, resilient means for urging said hammer to the firing position, a detachable connection between said trigger and hammer whereby said hammer is released from said cocked position by said trigger, the improvement including a sounding wire in said gun, and means operable by said hammer for vibrating said wire, said trigger connected with said wire for decreasing the tension on said wire and changing the tone produced thereby as said trigger is moved to said release position.

16. In a toy gun of the type having a trigger swingable between release and firing positions, a hammer swingable between cocked and firing positions, resilient means for urging said hammer to the firing position, a detachable connection between said trigger and hammer whereby said hammer is released from said cocked position by said trigger, the improvement including a resonating chamber in said gun, a sounding wire in said gun and secured at one end to said chamber and at the other end to said trigger, and means operable by said hammer for vibrating said wire, whereby when said trigger is moved to its firing position said hammer is also moved to its firing position causing said wire to be vibrated, and when said trigger is moved toward said release position the tension in said wire is decreased to thereby change the tone thereof.

17. In combination with a toy gun having a releasable trigger, sound producing means in said gun, actuating means for said sound producing means, said trigger connected with said actuating means for shifting the latter and also connected with said sound producing means for varying the tone of the sound produced thereby as said trigger is released.

18. A toy gun comprising, a sound amplifier in said gun, sound producing vibrating means in said gun and connected to said amplifier, means for vibrating said sound producing means, and adjustable means connected with said vibrating means for varying the tone of the sound produced thereby.

19. A toy gun comprising, a sound amplifier in said gun, a sounding wire connected at one end with said amplifier, a strumming lever for vibrating said wire, trigger means connected at the other end of said wire for varying the tone of the sound produced by said vibrating wire, and hammer means operable by said trigger for actuating said lever.

20. A toy gun comprising, a generally hollow stock, a metal can vibrating chamber mounted within said stock, a sound producing vibrating wire in said stock for engagement with said chamber, and actuating means for causing vibration of said wire.

21. A toy gun comprising, a generally hollow stock, a metal can vibrating chamber mounted within said stock, a sound producing vibrating wire in said stock for engagement with said chamber, a releasable trigger swingable mounted on said gun, and actuating means connected with said trigger and movable thereby for causing vibration of said wire.

22. A toy gun comprising, a generally hollow stock, a metal can vibrating chamber mounted within said stock, a sound producing vibrating wire in said stock for engagement with said chamber, and actuating means for causing vibration of said wire, said actuating means being adapted to permit its movement in one direction past said vibrating means without causing vibration of the latter and then when moving in another direction past said vibrating means engaging the latter to cause vibration thereof.

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