June 30, 1959 J. W. RYAN 2,892,289

VIBRATOR TOY GUN

Filed March 18, 1957 4 Sheets-Sheet 1

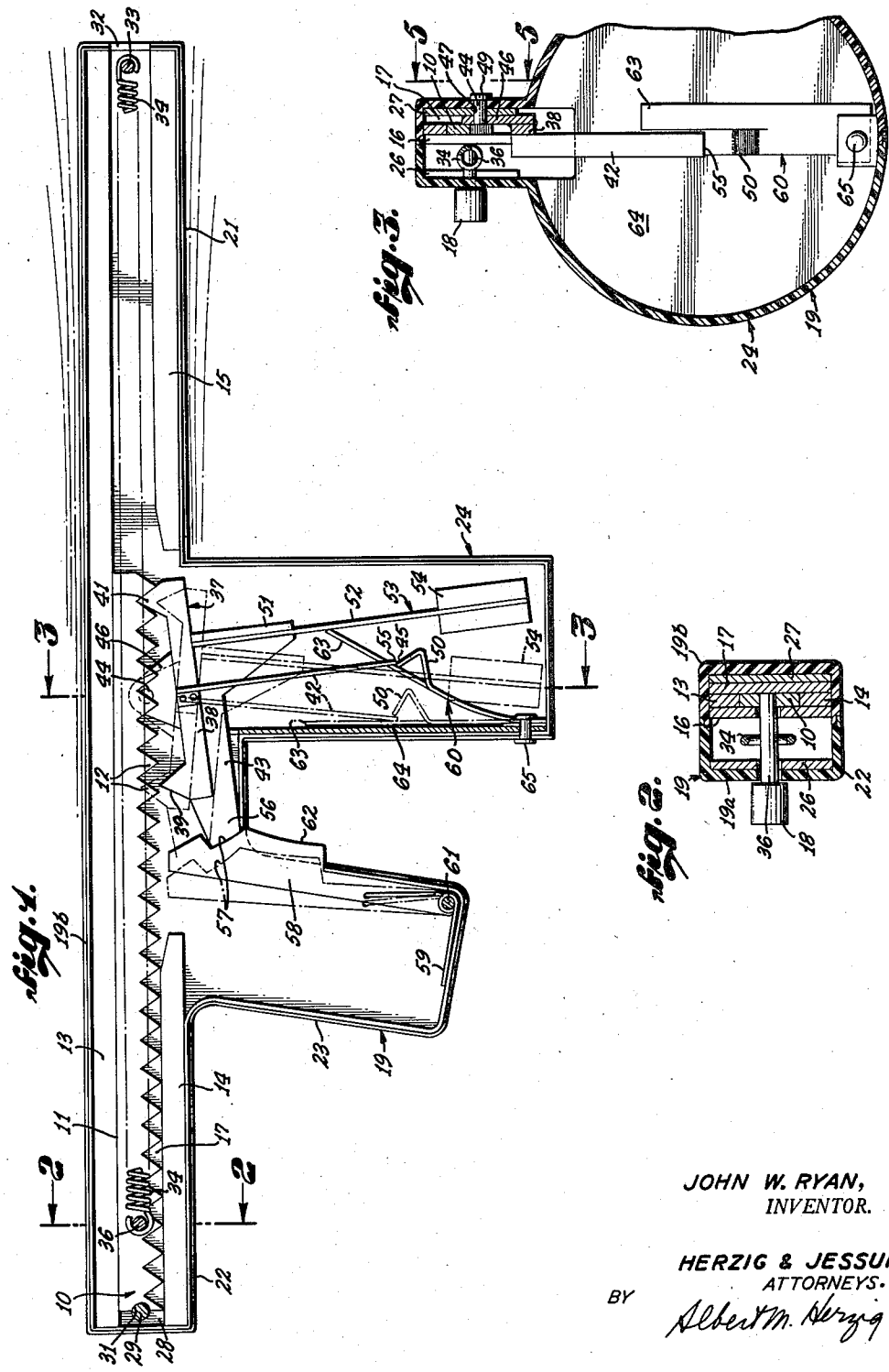

Fig. 1.

Fig. 3.

Fig. 2.

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Fig. 4.

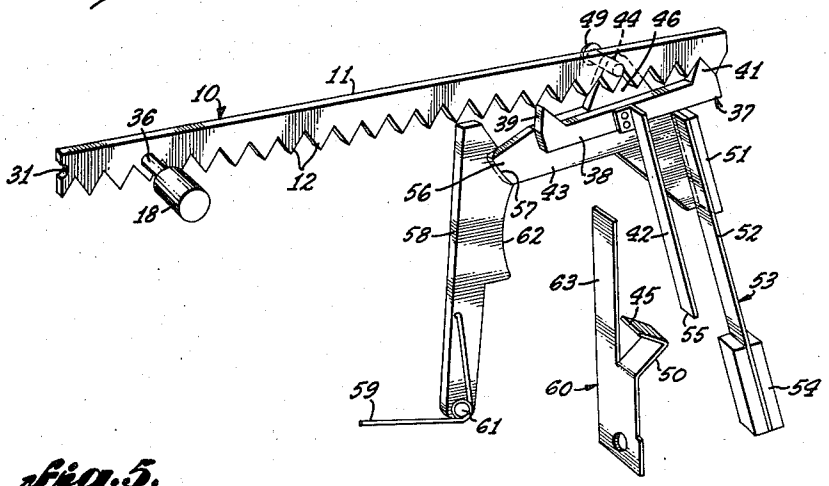


Fig. 5.

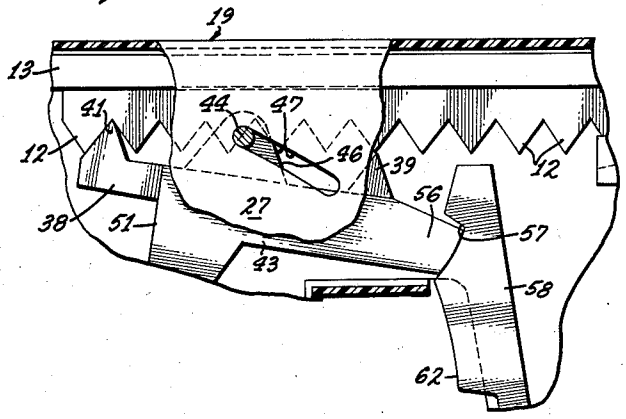
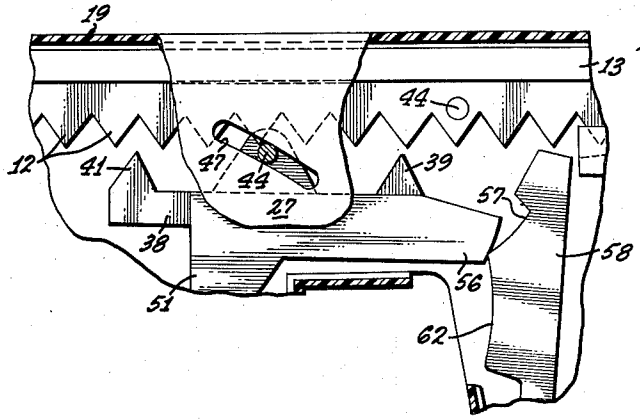


Fig. 6.



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VIBRATOR TOY GUN

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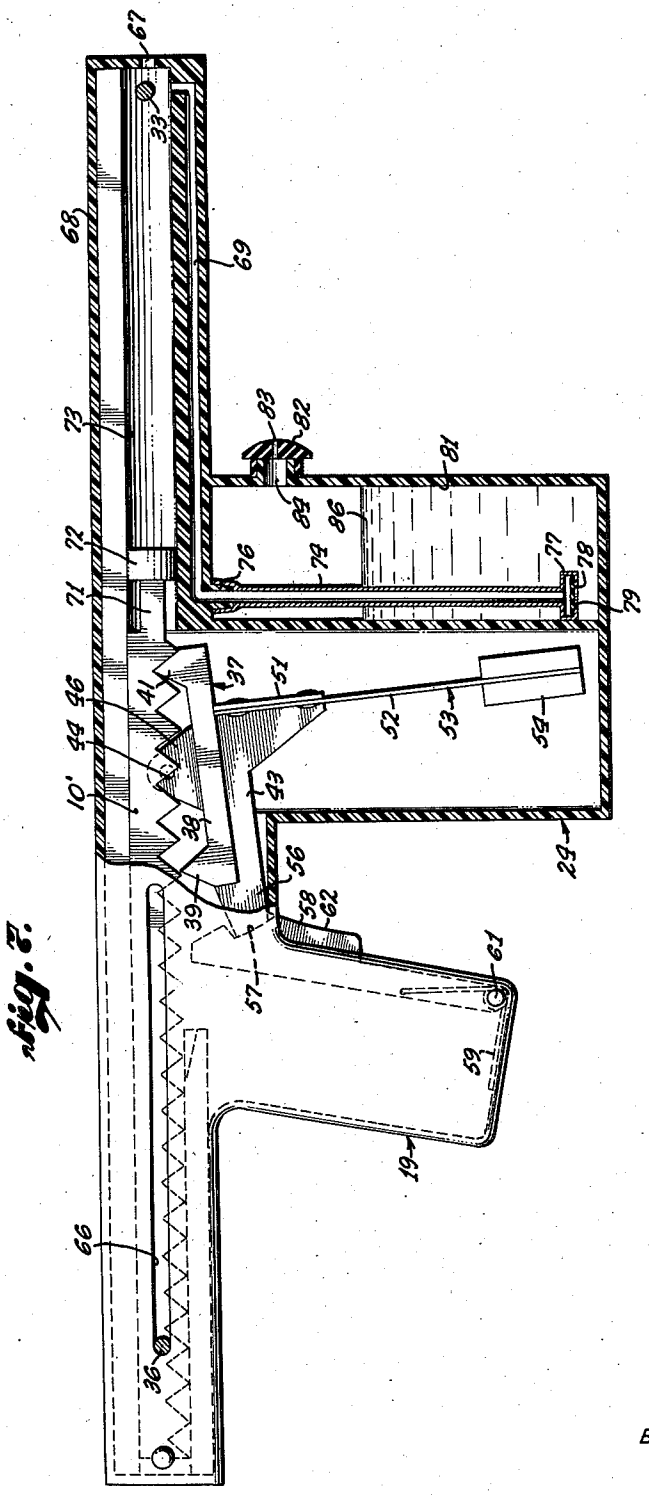

Fig. 2.

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VIBRATOR TOY GUN

Filed March 18, 1957 4 Sheets-Sheet 4

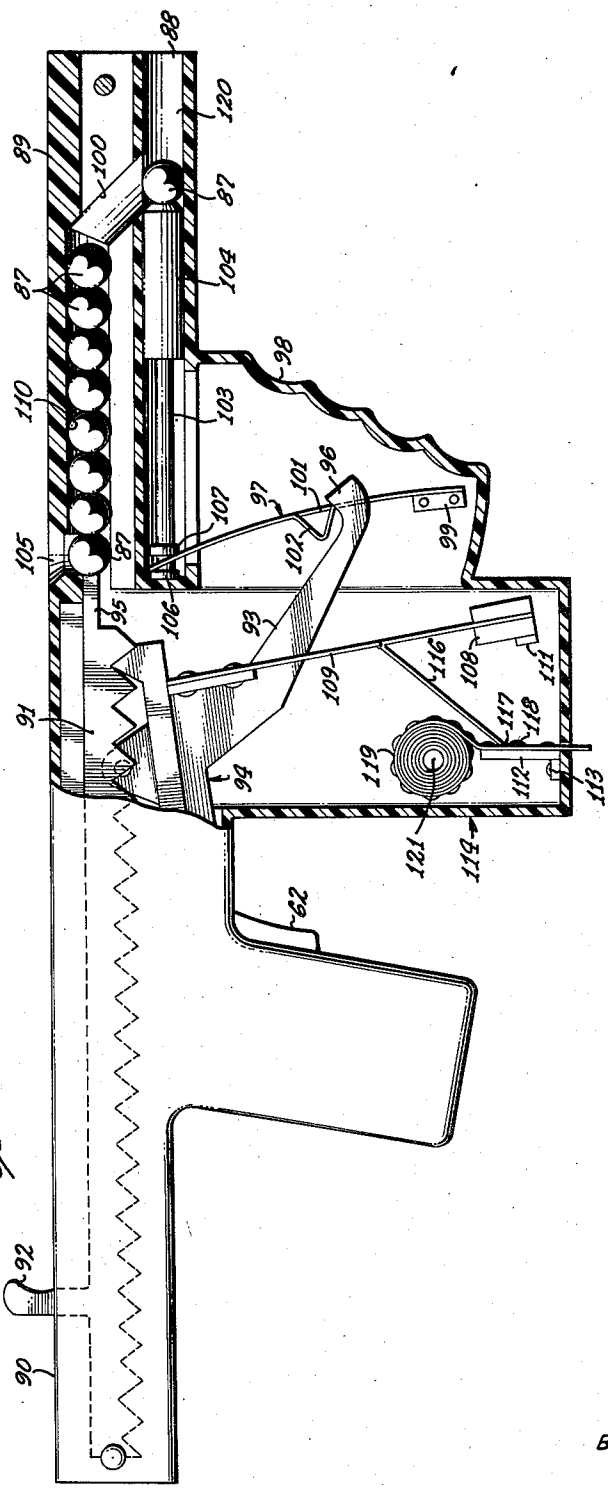

Fig. 8.

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United States Patent Office 2,892,289 Patented June 30, 1959

2,892,289

VIBRATOR TOY GUN

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Application March 18, 1957, Serial No. 646,834

7 Claims. (Cl. 46—175)

This invention relates to a toy made to simulate a gun, and more particularly an automatic gun, such as an automatic rifle or portable machine gun.

A toy gun should be made of relatively few parts of simple design for rapid and efficient mass production and assembly operations. It should be simple in operation so that very young children can play with it. To appeal to older children it should very closely resemble its prototype in appearance and mode of operation, including sound and other effects.

At the same time, the toy gun should be perfectly safe for a child to play with, with minimal possibility of injury to himself or his companions when used in play. Furthermore the toy gun mechanism should be rugged and durable in construction to withstand the rough treatment and mishandling to which children typically subject toys in play.

Accordingly, it is an important object of my invention to provide a toy gun of efficient design and simple operation so that a relatively young child can play with it.

Another object is to provide a toy gun of rugged and durable construction, including a minimum number of parts, which is capable of economical mass-production.

A further object is to provide such a gun which will dramatically simulate its prototype, and will at the same time be perfectly safe for a child and his companions in all sorts of play.

Additional objects will become apparent from the following description.

Stated in general terms, my invention comprehends the provision of a toy gun containing a mechanism comprising a rack means together with an operatively associated rocker means wherein linear motion of the former is converted into oscillating movement of the latter. Clapper means, cap firing means, water squirting means, or other means, individually or in combination, are operatively associated with the rocker means. Power means, such as resilient power spring means for example, are included to impart linear movement to the rack means. This mechanism is suitably housed in a frame means simulating a gun, preferably of the automatic rifle or portable machine gun type.

A more detailed description of specific embodiments of my invention is given with reference to the drawings, wherein:

Figure 1 is a side elevational view in section showing one embodiment of the toy gun mechanism;

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a partial perspective view showing the toy gun mechanism of the embodiment shown in Figure 1;

Figure 5 is a partial side elevational view with portions broken away taken as along a line 5—5 of Figure 3;

Figure 6 is a view similar to that of Figure 5, but showing the mechanism in a cocking position;

Figure 7 is a side elevational view with portions broken away showing another specific embodiment of the invention; and

Figure 8 is a view similar to that of Figure 7 showing still another embodiment of the invention.

In the embodiment of the invention shown in Figures 1 to 6, inclusive, of the drawings, a rack 10 having a straight edge 11 on its upper side and teeth 12 on its lower side is slidably disposed between an upper guide strip 13 and lower guide strips 14 and 15, as well as between two guide strips 16 and 17. The guide strips 13, 14, 15, 16 and 17 form a guide slot wherein the rack 10 is slidable longitudinally. The rear lower guide member 14 extends only part way along the slot and the front lower guide member 15 also extends only part way. A cocking knob 18, designed for convenient grasping by the fingers, is fixed to the rear portion of the rack 10.

The assembled guide members and rack are mounted in portions of a toy gun frame 19 simulating a gun barrel 21 and receiver 22. The housing 19 also comprises a hand grip 23 and a magazine 24. The housing 19 preferably is made of two half portions 19*a* and 19*b* which can conveniently be fitted together after the gun mechanism is mounted therein, as shown. A pair of side strips 26 and 27 preferably are mounted inside the barrel 21 and receiver 22 to reinforce the same. The rack 10, guide members 13, 14, 15, 16, and 17 and the side strips 26 and 27 preferably are made of metal, such as steel, but can be made of other materials, such as plastics materials. The housing 19 preferably is made of plastics materials, but may be made of laminated wood, metal or other materials, as desired.

The rear end of receiver 22 is preferably closed and contains a reinforcing block 28. A pin 29 is mounted transversely in the rear portion of receiver 22 to serve as a stop for the rack 10. The rack 10 is provided with a notch 31 to strike against the pin 29 when the rack is pulled backward in the cocking action to be described. The forward end of the barrel 21 is provided with an aperture 32 for insertion or removal of the rack 10. A pin 33 is mounted transversely in the barrel 21 near the forward end thereof. A coil spring 34 serves as the power means for imparting linear motion forcefully to the rack 10. The forward end of the spring 34 is mounted on pin 33 and the rearward end is mounted on a shank 36 of cocking knob 18 between the rack 10 and the knob 18.

A rocker 37 is associated in operative relationship with the rack 10 so that linear motion of the rack imparts a rocking or oscillating motion to the rocker 37. The rocker 37 comprises a beam 38 having an upwardly extending tooth 39 on one end thereof, and another upwardly extending tooth 41 on the other end thereof. Each of the teeth 39 and 41 is adapted to fit between a pair of adjacent teeth 12 extending downwardly from rack 10 as best shown in Figures 4 and 5. Fastened to beam 38 is a resilient or springy clapper actuator 42. Also fastened to beam 38 is a rocker support 43. A pivot pin 44 is fixed transversely in an upward extension 46 of the rocker support 43.

The pin 44 extends transversely through a downwardly extending arcuate slot 47 cut through the side wall of the toy gun housing 19 at the rear of barrel 21. The slot 47 is positioned and dimensioned so that when the pin 44 is in the upward end of the slot, as shown in Figure 5, teeth 39 and 41 of the rocker 37 are in operative position with respect to the teeth 12 of the rack 10. As best shown in Figure 6, when the pin 44 is lowered in the slot 47, the teeth 39 and 41 are removed from operative position with respect to the teeth 12 of the rack. As shown in Figure 4, a head 49 is formed on the outer end of pin 44 to retain the pin in the slot 47.

On a forward extension 51 of the rocker support 43,

bent at right angles thereto, is attached the upper end 52 of a spring mass member 53 having a mass 54 fastened to the lower end thereof. The spring mass member 53 is made to impart inertial force to the rocker 37 so that a desired frequency of oscillation will be imparted to the rocking motion as the rack 10 is impelled from a rearward position in receiver 22 to a forward position in barrel 21 by the tension in coil spring 34.

A rearwardly extending portion 56 of rocker 37 is pointed to fit into a notch 57 cut in the upper end of trigger 58. The notch 57 is cut at a co-operating angle similar to that of the point on the rearward extension 56 so that the trigger will tightly engage the rearward extension 56 and stop any rocking motion of the rocker 37 when the trigger 58 is in a forward position as urged under the tension in a loaded spring 59 mounted on a pivot point 61. The spring 59 normally is loaded with one end thereof bearing against the bottom of grip 23 and the other end thereof bent transversely and bearing against the backside of trigger 58, as shown in Figure 1.

An arcuate portion 62 of the trigger 58, formed on the forward side thereof, extends through a slot cut in the forward end of the grip 23, near the top thereof. When the trigger 58 is urged rearwardly to the position shown in phantom in Figure 1, the rocker support 43 is disengaged at the rearward extension 56 thereof, and the beam 37 is set into a rocking or oscillating motion, as shown in phantom in Figure 1. When the pressure on trigger 58 is again released by removing the finger from arcuate finger portion 62 thereof, the spring 59 again urges the trigger and notch 57 forward into engagement with the rearward portion 56 of the rocker support 43 to stop the rocking motion.

While the rocking motion is in progress, the clapper actuator 42, on its rearward swing, strikes the upper side of an angular member 50 of a spring clapper 60. The clapper 60 is secured as by riveting at its lower end to the rear wall or diaphragm 64 of magazine 24 as by a rivet 65. The lower end 55 of the clapper actuator 42 strikes the side of angular member 50, and, because of the flexibility of the clapper actuator 42, and the material in the angular member 50, the lower end 55 of the actuator slips over the upper angular surface of angle 50 and snaps behind the end 45 thereof, as best shown in phantom in Figure 1. During its forward swing, the lower end 55 of actuator 42 carries the angular member 50 forward part of the way through its forward swing because of its engagement with the end 45, as best shown in Figure 1. Because of the resilience of actuator 42, the end 55 thereof again slips free of the end 45 of the angular member 50.

When the angular member 50 is released from the lower end 55 of the actuator 42, it snaps rearward sharply causing a resilient strip portion 63 of the clapper to strike resoundingly against the diaphragm 64 of the magazine 24. This results in the production of a sharp clap resembling the sound of a shot or an exploding cap. As the rocking motion of rocker 43 continues, this sharp clapping sound is repeated cyclically. These clapping sounds are produced in rapid succession as long as the trigger 58 is pressed into the grip 23. Each sound accompanies each cyclic movement of the rocker 37 until the rack 10 is fully drawn forward, or until the trigger 58 is again released so that spring 59 urges it to engage and hold the rearward extension 56 of rocker support 43 in notch 57.

To cock the gun, the cocking knob 18 is grapsed between the fingers and pulled rearwardly. When the rear end of the rack 10 engages the pin 29, as shown in Figure 1, the spring 34 is fully cocked. As a rearward pull is applied to rack 10, the teeth 12 of the rack engage the forward tooth 41 of the rocker 37 and urge the rocker backward against the trigger 58. In so doing, the pivot pin 44 of the rocker is caused to slide downward in slot 47, as best shown in Figure 6. This permits a free motion of the rack 10 rearward into the receiver 22 as force is applied to cocking pin 18 to pull it toward the rear of the gun. The gun is then cocked and ready for the initiation of a series of rapid fire sounds by pressing the curved portion 62 of the trigger 58 into the grip 23, as previously described. Manifestly the gun can be partially cocked to any desired extent as well as fully cocked at the option of the user to give long or relatively short bursts by this means as well as by selective trigger manipulation to achieve variability in the play action.

The shank 36 of the cocking knob 18 extends through an elongate slot 66 in the housing 19. This is best shown in Figure 7. The forward end of the slot 66 and the transverse pin 33 at the forward end of barrel 21 serve as stops and prevent any possibility of the rack 10 shooting forward through the opening 32 in the front end of the barrel 21 when the cocking operation is being performed. This feature and the other features of the gun described above render it safe for the operator and his companions in play.

In Figure 7 is shown an embodiment of the invention wherein the gun mechanism is employed in a toy gun to squirt fluids such as water through a hole 67 in the forward end of a barrel 68. The rack 10′ differs from the rack 10 of the embodiment shown in Figures 1 to 6 in that a piston rod 71 is made to project forward on the front end of the rack and has fastened thereto a piston 72. The piston 72 is operatively associated with a cylinder 73 formed in the barrel 68. The cylinder 73 is preferably positioned alongside of and parallel to the front part of spring 34.

A fluid passage 69 is formed in the lower portion of the wall of barrel 68 to extend from the front end of cylinder 73 to the rear end of the barrel 68, as shown in Figure 7. A vertically positioned tubular member 74 is attached at its upper end to a nipple 76 formed on the end of the tubular passage 69. At the lower end of the tubular member 74 is attached a valve body 77 containing a flutter valve 78. The flutter valve moves upwardly from a seat 79 when suction is produced in the cylinder 73 by the withdrawal of piston 72. A fluid or water supply chamber 81 is formed within the housing 19, shown here in the front end of the integral magazine 24. A filler cap 82 having an air inlet hole 83 therein is positioned over a filler hole 84 formed in the supply tank in an upper region thereof, as shown.

Water or other fluid indicated at 86 is charged to the supply tank 81 and the filler cap is placed over the filler hole 84. The rack 10′ is drawn backward to cock the gun in the same manner as described above in connection with the embodiment of Figures 1 through 6. Upon cocking the gun, the fluid 86 is drawn up into cylinder 73 by atmospheric pressure as a result of the suction in the cylinder. The suction acts through passage 69 and causes flutter valve 78 to open upwardly so that fluid can move up through tube 74 through passage 69 and into cylinder 73.

It will be seen, therefore, that the cylinder 73 is charged with fluid when the gun mechanism is cocked. The gun is fired as described previously by pressing trigger 58 into the grip 23 at finger portion 62. This causes rocker 37 to rock or oscillate as previously described. As the rocker oscillates, the rack 69 is urged forwardly by spring 34 and fluid is intermittently ejected in spurts from hole 67 as piston 72 is intermittently forced farther and farther into cylinder 73. The fluid is ejected in the form of a series of spurts corresponding to the stepwise forward movement of the rack 10′.

In the embodiment shown in Figure 7, a clapper actuator and clapper may be included in association with the rocker to provide a repetitive clapping or cracking action accompanying the spurts of fluid from the opening 67; this apparatus is most clearly shown in Figures 1 through 6. In other respects, the toy gun mechanism is

similar to or identical with that described in connection with the embodiment of Figures 1 through 6 above.

Another embodiment of the invention is shown in Figure 8 as applied to a toy gun that fires pellets **87** through an opening **88** in the front end of a barrel **89**. In this embodiment, the rack **91** is cocked by pulling rearwardly a cocking knob **92** extending through a longitudinal slot formed in the top of the receiver **90**. A rod **95** is formed to extend forward from the front end of the rack **91** and to touch the rearmost pellet **87**. The pellets are loaded into the gun barrel through an opening **105** until a magazine **110** is filled with pellets and an additional pellet **87** is positioned for firing at the rear end of passage **120**. The magazine **110** and passage **120** are joined by an inclined connecting passage **100**.

A plucking member **93** is made to extend forwardly from the front end of rocker **94**. The outer end of the plucking member **93** preferably extends forwardly and upwardly as and for a releasable catch or plucker **96**. A leaf spring **97** is riveted to the side of hand grip **98** at **99**. The spring **97** is provided with a slot **101** to receive the portion **96** of plucking member **93**. Above the slot **101** is formed an angular portion **102** positioned so that the outer end **96** of the plucking member, when urged forwardly in the rocking cycle, slides over the lower side of angular member **102** and through slot **101** to thus engage the spring **97**.

When the plucking member **93** is forced to swing backward in the backward half of the oscillatory cycle of the associated rocker mechanism, the spring **97** is flexed rearwardly by the application of a pull through the end **96** of the plucking member **93**, until the loading of the spring is sufficient to cause it to slip free of the flared end **96** and to thus snap free of the end **96**. As the spring **97** snaps forwardly forcefully in this cycle of the rocking or oscillating motion of the rocker, the associated piston rod **103** also is snapped forwardly to cause a piston **104**, attached to the forward end of the rod, to snap forwardly and impel pellet **87** forcefully through the chamber **91** and out of the forward opening **88** in the barrel **89**. The upper end of spring **97** is disposed between flanges **106** and **107** so that the piston rod **103** will move back and forth with a back and forth movement of the upper end of the spring **97**.

A sprung mass **108** is attached to the end of a resilient strip member **109** in a manner similar to that described in connection with the embodiment of Figures 1 through 6 described above. In this case, however, a hammer member **111** is formed on the mass **108**. An anvil **112** is mounted at **113** to the bottom of the cartridge chamber **114** adjacent the hammer member **111** so that the hammer strikes the forward side or face of the anvil **112** when the mass **108** swings rearwardly under the rocking or oscillating action of the rocker **94**.

Advancement of caps in the strip **119** is accomplished through direct coupling to the rack **91**, or by coupling to the rocker mechanism. In a simplified version of the latter, a flexible cap advancing member **116** extends down from the rocker **94**. As the front end of the rocker **94** swings down and the mass **108** swings rearwardly, the front end **117** of the cap advancing member **116** engages behind an explosive charge **118** in a strip of caps in a roll **119**. The roll of caps **119** is mounted on a pin **121** fixed in the side wall of the ammunition chamber **114**. As the hammer member **111** strikes the surface of the anvil **112**, it discharges an explosive cap charge **118**. Before the hammer member **111** falls each time on the anvil **112**, a fresh charge is moved into position for that firing operation by the cap advancing member **116**.

It will be seen, therefore, that the action of firing each explosive cap charge takes place simultaneously on the rearward swing of mass **108** with the rearward swing of the plucking member **93** when a pellet **87** is projected from the opening **88** by spring **97** slipping free from the flared end **96** of the plucking member. Thus, the gun fires a cap synchronously or substantially simultaneously with the shooting of each pellet.

In another embodiment, the cap firing mechanism of the embodiment in Figure 8 is replaced by the clapping mechanism shown in the embodiment of Figures 1 through 6, and likewise synchronously shoots pellets and produces an accompanying shot-like report from the snapping action of the clapper **60** against diaphragm **64**.

In yet another embodiment, the cap firing mechanism described above and shown in Figure 8 is incorporated in the fluid-ejecting gun previously described and shown in Figure 7, which employs the rocker mechanism described above and shown in Figures 1 through 6. The gun employing this combined mechanism fires a cap in synchronism with the ejection of each spurt of fluid.

In still another embodiment, the gun mechanism described above and shown in Figures 1 through 6, including the clapper and diaphragm, is employed in conjunction with the fluid-ejection apparatus described above and shown in Figure 7, and produces an accompanying shot-like report from the snapping action of the clapper **60** against diaphragm **64** synchronously, as stated, with the ejection of each spurt of fluid from the gun.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiments, it is recognized that departures can be made therefrom within the scope of my invention. By way of example, but not by way of limitation of such departures, the power means may take the form of a compression spring suitably arranged, or optionally, a torque spring transmitting a force to a rotary rack instead of a linear rack to actuate the rocker means. It is likewise recognizable that the actuator like **42** may directly transmit a clapping sound to a diaphragm, omitting the clapper such as **60**. The invention is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent structure.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A toy gun comprising rack means, power means associated with the rack means for imparting linear motion thereto, rocker means operatively associated with the rack means for translating linear motion of the latter into oscillatory motion of the former, and clapper means associated with the rocker means for generating a clapping sound from the oscillatory motion of the rocker means.

2. A toy gun comprising rack means, power means associated with the rack means for imparting linear motion thereto, rocker means operatively associated with the rack means for translating linear motion of the rack means into oscillatory motion of the rocker means, clapper means associated with the rocker means for converting the oscillatory motion of the rocker means into a clapping sound, and trigger means associated with the rocker means for starting and stopping the oscillatory motion thereof.

3. A toy gun comprising rack means, power spring means connected to the rack means for imparting linear motion thereto, rocker means operatively associated with the rack means for translating linear motion of the rack means into oscillatory motion of the rocker means, clapper means associated with the rocker means for converting the oscillatory motion of the rocker means into a clapping sound, trigger means associated with the rocker means for starting and stopping the oscillatory motion thereof, and frame means simulating a gun for housing the said means.

4. A toy gun comprising actuator means, power means associating with the actuator means for imparting motion thereto, rocker means operatively associated with the actuator means for translating the motion of the actuator means into oscillatory motion of the rocker

means, clapper means associated with the rocker means for converting the oscillatory motion of the rocker means into clapping sound, and trigger means associated with the rocker means for starting and stopping the oscillatory motion thereof.

5. In a toy gun, a longitudinally movable elongated rack, power means moving said rack in one longitudinal direction, means driven by said rack for converting said longitudinal movement into cyclical movement to operate a cyclical sound-producing means connecting with and operated by said driven means, and oscillating inertia means connected with said driven means to limit the rate of cyclical movement of said driven means and the rate of longitudinal movement of said rack.

6. The device of claim 5 wherein said power means comprises a tension spring and manually operable means are provided to move said rack longitudinally against the force of said tension spring, and wherein trigger means

are provided to selectively hold said rack against longitudinal movement by said spring.

7. The device of claim 5 wherein said inertia means comprises an inertia mass driven in oscillating movement by said rack.

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