Feb. 8, 1955 F. MURPHY 2,701,558

MOTOR-OPERATED BALL PROJECTOR

Filed April 25, 1951 2 Sheets-Sheet 1

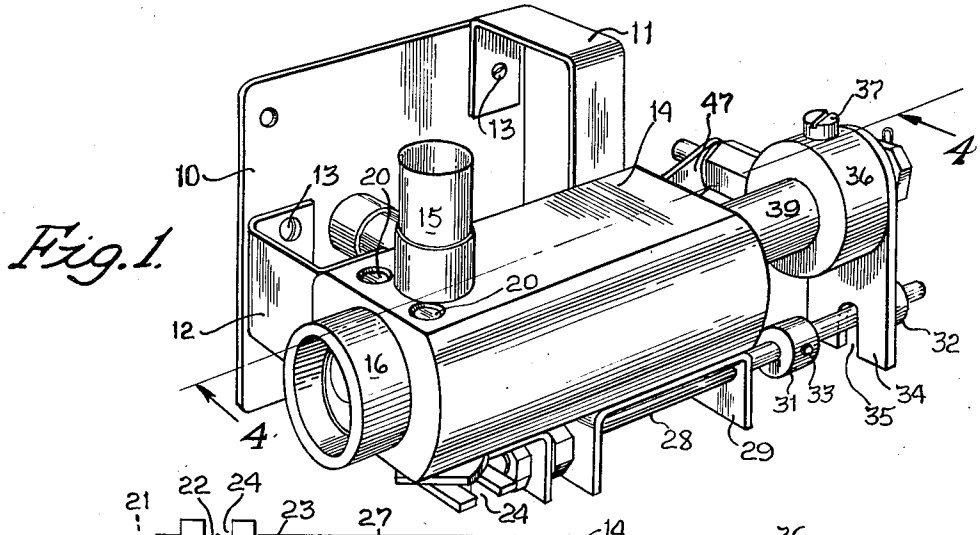


Fig. 1.

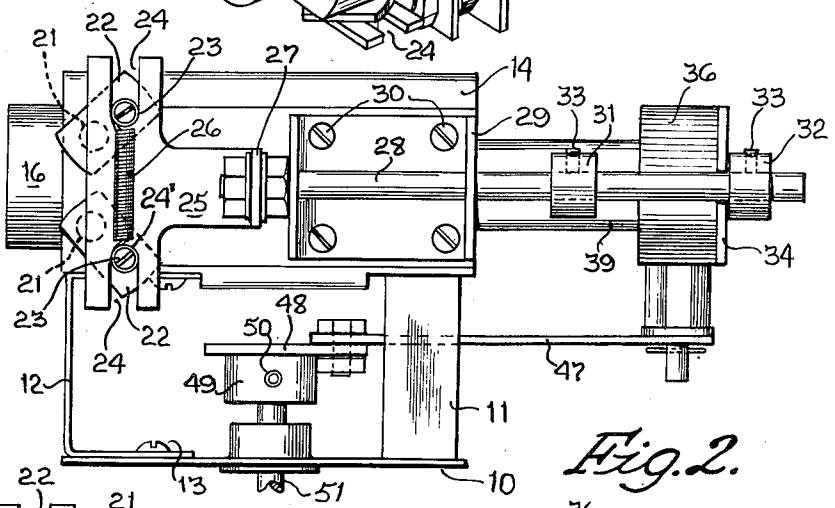


Fig. 2.

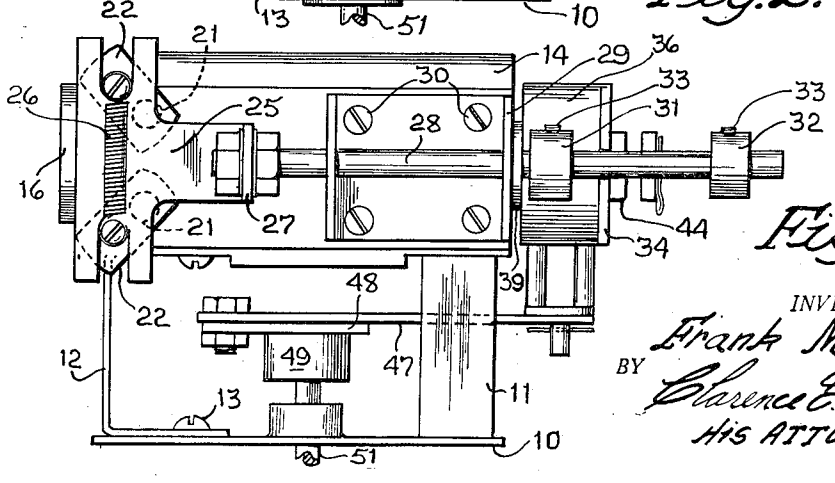


Fig. 3.

INVENTOR.
Frank Murphy
BY Clarence E. Shrudy
HIS ATTORNEY.

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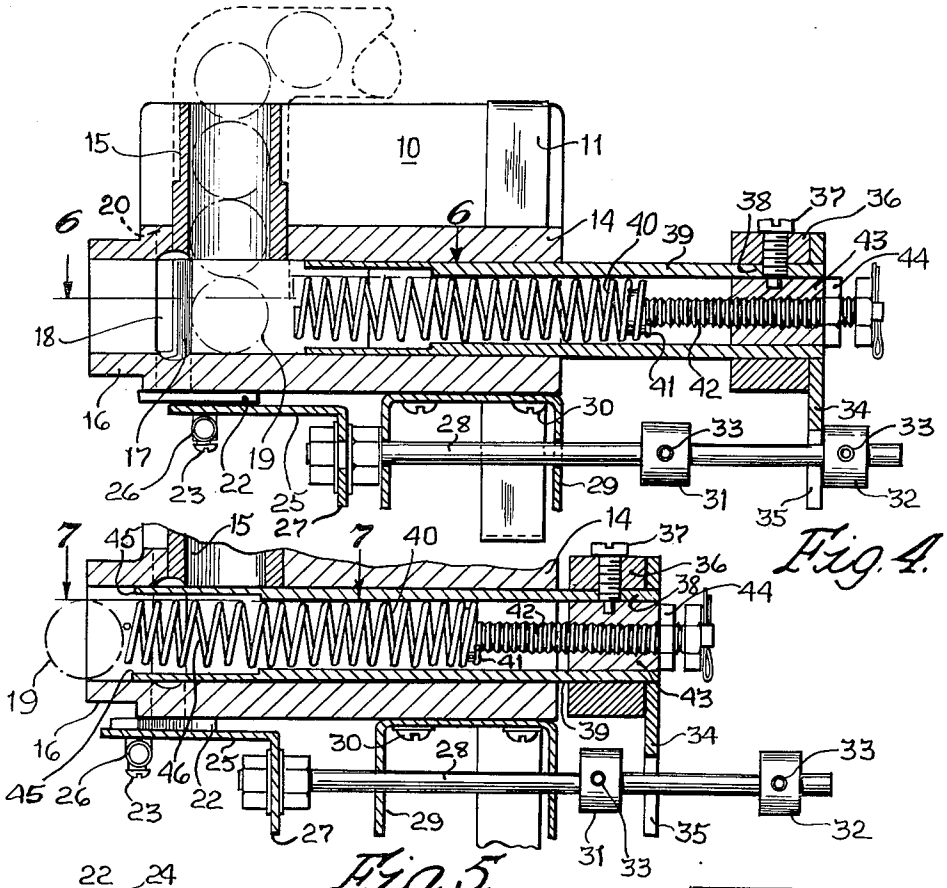


Fig. 4.

Fig. 5.

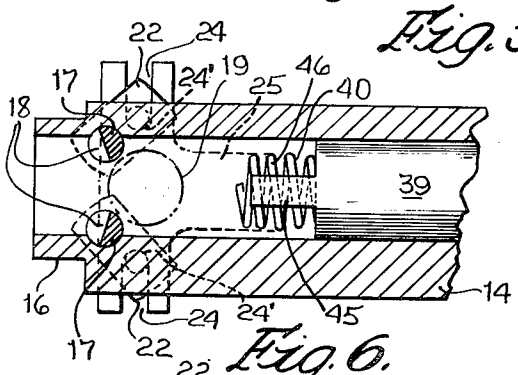


Fig. 6.

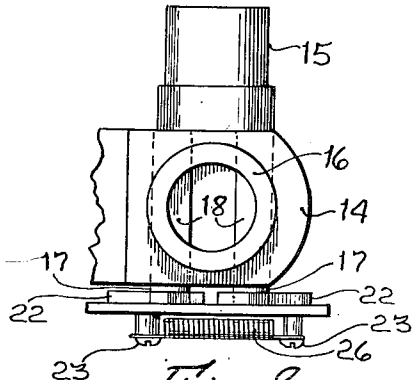


Fig. 8.

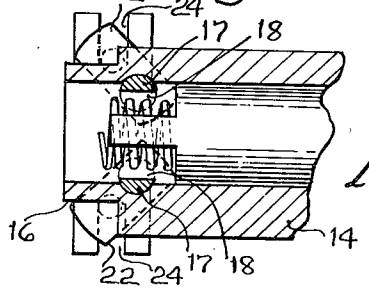


Fig. 7.

INVENTOR.
Frank Murphy
BY Clarence E. Shreedy
HIS ATTORNEY.

United States Patent Office

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MOTOR-OPERATED BALL PROJECTOR

Frank Murphy, Chicago, Ill., assignor to Republic Patent Corporation, Chicago, Ill.

Application April 25, 1951, Serial No. 222,827

5 Claims. (Cl. 124—29)

This invention relates to a motor-operated ball projector and has for its principal object the provision of an improved construction of this character which will be highly efficient in use and economical in manufacture.

This invention is especially designed for use in amusement game apparatuses where it is desired to project balls in rapid succession at a moving target. The invention has for its object the provision for compressing a spring against a ball removably held against projection until the spring has been tensioned or compressed to that degree necessary for the projection of the ball toward the target, at which time the ball obstructing means is moved from ball obstructing position to permit the ball to be projected by such compressed spring.

It is contemplated that the above objects be accomplished by a device which comprises a minimum number of parts, a device which may be utilized for projecting successively a large number of balls without interruption of operation.

Yet another and equally important object of the invention is the provision of a device of the character hereinafter described by which balls are successively projected with such rapidity as to simulate machine gun action.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a perspective view of the invention;

Fig. 2 is a bottom plan view of the same;

Fig. 3 is a view similar to Fig. 2, but showing the parts thereof in different positions;

Fig. 4 is a sectional detail view taken substantially on lines 4—4 of Fig. 1;

Fig. 5 is a fragmentary sectional detail view similar to Fig. 4 but showing the parts thereof in different position;

Fig. 6 is a fragmentary detail view taken substantially on lines 6—6 of Fig. 4;

Fig. 7 is a fragmentary sectional detail view similar to Fig. 6 but showing the parts thereof in different positions taken on lines 7—7 of Fig. 5; and

Fig. 8 is a fragmentary forward end view of the barrel of the device embodied in my invention.

I preferably accomplish the several objects of my invention by the preferred form of construction shown in the accompanying drawings.

Such construction comprises a mounting plate 10 which preferably is mounted for movement in a vertical as well as a horizontal plane so as to enable the marksman to direct the barrel properly in line with the target. The means for mounting the plate 10 for such movement is not here disclosed because it does not constitute any part of the present invention. From this plate 10 extend two brackets 11 and 12 secured to the plate as at 13. The outer end portions of these brackets carry a barrel 14. This barrel 14 extends in spaced parallel relation with respect to the plate 10. Balls to the interior of the barrel 14 are fed by gravity through a tube 15. At the forward end portion 16 of the barrel and forwardly of the tube 15 are parallelly extending ball obstructing pins 17. These pins 17 have portions 18 thereof

removed so that when these portions 18 are arranged in parallel confronting relation with respect to each other a ball 19 may be projected therebetween from the barrel 14. The opposite end portions 20 of these pins are journaled in the walls of the barrel 14 for rotation in a vertical plane. The lower end portions of the pins are secured as at 21 to links 22 disposed at the bottom side of the barrel 14. Extending from these links 22 are stud shafts 23 which project through open slots 24 formed in a plate 25. A spring 26 has its end portions secured to the stud shafts 23 and tends to bear such stud shafts against the base 24' of the slots 24.

The plate 25 has a depending portion 27. This depending portion 27 is fixedly connected to a shaft 28. This shaft is supported for reciprocation by a bracket 29 secured to the bottom side of the barrel as at 30.

On this shaft 28 are two collars 31 and 32 adjustably connected to the shaft 28 by set screws 33.

Between these collars 31 and 32 projects an arm 34, the arm 34 having an open slot 35 which receives the shaft 28. This arm 34 is fixedly secured to a collar 36 which in turn is secured by a set screw 37 to the end portion 38 of a plunger 39. This plunger 39 is mounted to reciprocate in the bore of the barrel 14. Arranged in the plunger 39 is an elongated coil spring 40. One end portion of this coil spring is connected as at 41 to a screw shaft 42 adjustably threaded in a plug 43 mounted in the end 38 of the barrel and retained therein by the screw 37. The screw shaft 42 is latched in an adjusted position by a lock nut 44.

The forward end portion of the plunger 39 provides oppositely disposed parallelly extending fingers 45 between which the outer end portion 46 of the spring is exposed and between which fingers 45 the ball 19 is adapted to be confined when the spring 40 is compressed against the ball held in the barrel by the ball obstructing pins 17.

A link 47 connects the collar 36 with an eccentric arm 48 having a hub 49 fixedly secured as at 50 to a shaft 51 journaled in a suitable bearing carried by the plate 10. This shaft 51 is adapted to be rotated either by an electrically operated motor or a spring motor (not shown), the object being that the shaft 51 is contiuuously rotated during the projection of the balls.

In operation a plurality of balls are fed by gravity to the forward end of the barrel to the rear of the ball obstructing pins 17. By operation of the shaft 51 the plunger 39 is moved toward the ball to compress the spring thereagainst. The distance between the collars 31 and 32 is such that the plunger 39 may be moved to substantially compress the spring against the arrested ball before effecting rotation of the ball obstructing pins to rotate such pins with their reduced portions in confronting relation. After the spring has been thus compressed the arm 34 will bear against the collar 31 and move the shaft 28 forwardly to oscillate the links 22 and thus rotate the obstructing pins to dispose their reduced portions in confronting relation to permit the ball to be projected under the expansion action of the spring 40. As fast as the balls are delivered by gravity to the barrel they are projected from such barrel by the continuous operation of the motor which effects the reciprocation of the plunger 39 and the movement of the pins 17 from and into ball obstructing position.

From the foregoing description it is clear that I have provided a simple yet effective arrangement for rapidly and successively projecting balls in a manner such as to simulate machine gun action.

The device, comprising a minimum number of parts, may be manufactured at an economical cost.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. A device for projecting a plurality of balls in rapid

succession comprising a barrel to which said balls are successively delivered, a reciprocating plunger in the barrel and having a spring movable therewith, said spring being normally expanded with one end portion projecting forwardly of the barrel, ball obstructing means at the forward end of the barrel, said spring adapted to be moved into engagement with a ball obstructed in said barrel by said obstructing means and be compressed against said ball by movement of the plunger toward the forward end of the barrel, means operatively connecting said ball obstructing means and said plunger whereby said ball obstructing means is rotated by said plunger from ball obstructing position after said plunger has been moved to compress said spring a predetermined degree, said operative connection including a reciprocatory shaft supported by an exterior of said barrel, said shaft at one end operatively connected to said plunger and at the opposite end provided with a plate having laterally oppositely extending arms, said arms having formed in their ends open slots adapted to receive a portion of said ball obstructing means to rotate the same upon reciprocatory movement of said shaft, means for moving said plunger to compress said spring against said ball held in said barrel by said ball obstructing means, said ball obstructing means comprising a pair of spaced parallelly extending pins carried by and transversing said barrel, and said pins having reduced portions adapted to be rotated into confronting relation between which said ball is adapted to be projected.

2. A device for projecting a plurality of balls in rapid succession comprising a barrel to which said balls are successively delivered, a reciprocating plunger in the barrel and having a spring movable therewith, said spring being normally expanded with one end portion projecting forwardly of the barrel, ball obstructing means at the forward end of the barrel, said spring adapted to be moved into engagement with a ball obstructed in said barrel by said obstructing means and be compressed against said ball by movement of the plunger toward the forward end of the barrel, means operatively connecting said ball obstructing means and said plunger whereby said ball obstructing means is rotated by said plunger from ball obstructing position after said plunger has been moved to compress said spring a predetermined degree, said operative connection including a reciprocatory shaft supported by an exterior of said barrel, said shaft at one end operatively connected to said plunger and at the opposite end provided with a plate having laterally oppositely extending arms, said arms having formed in their ends open slots adapted to receive a portion of said ball obstructing means to rotate the same upon reciprocatory movement of said shaft, motor-driven means for moving said plunger to compress said spring against said ball held in said barrel by said ball obstructing means, said ball obstructing means comprising a pair of spaced parallelly extending pins carried by and transversing said barrel, and said pins having reduced portions adapted to be rotated into confronting relation between which said ball is adapted to be projected.

3. A device for projecting a ball comprising a barrel to which said ball is delivered, a reciprocating plunger in the barrel, means for reciprocating said plunger, an elongated coil spring carried by and movable with said plunger, ball obstructing means rotatably mounted at the forward end of the barrel, said spring being adapted to be compressed against said ball by movement of the plunger in said barrel by said plunger moving means, an operative connection between said ball obstructing means and said plunger to move said ball obstructing means from ball obstructing position when said plunger has been moved in said barrel by said plunger moving means to compress said spring a predetermined degree against a ball obstructed in said barrel by said ball obstructing means, said ball obstructing means comprising a pair of spaced parallelly extending pins carried by and transversing said barrel, and said pins having reduced portions adapted to be rotated into confronting relation between which said ball is adapted to be projected, said operative connection including a reciprocatory shaft supported by and exterior of said barrel, said shaft at one end operatively connected to said plunger and at the opposite end provided with a plate having laterally oppositely extending arms, said arms having formed in their free ends open slots adapted to receive a portion of said pins to rotate the same upon reciprocatory movement of said shaft.

4. A device for projecting a ball comprising a barrel to which said ball is delivered, a reciprocating plunger in the barrel, motor-driven means for reciprocating said plunger, an elongated coil spring carried by and movable with said plunger, ball obstructing means rotatably mounted at the forward end of the barrel, said spring being adapted to be compressed against said ball by movement of the plunger in said barrel by said plunger moving means, an operative connection between said ball obstructing means and said plunger to move said ball obstructing means from ball obstructing position when said plunger has been moved in said barrel by said plunger moving means to compress said spring a predetermined degree against a ball obstructed in said barrel by said ball obstructing means, said ball obstructing means comprising a pair of spaced parallelly extending pins carried by and transversing said barrel, and said pins having reduced portions adapted to be rotated into confronting relation between which said ball is adapted to be projected, said operative connection including a reciprocatory shaft supported by and exterior of said barrel, said shaft at one end operatively connected to said plunger and at the opposite end provided with a plate having laterally oppositely extending arms, said arms having formed in their free ends open slots adapted to receive a portion of said pins to rotate the same upon reciprocatory movement of said shaft.

5. A device of the class described comprising a barrel section to which a ball is delivered for projection therefrom, a plunger mounted for reciprocation in the barrel, a spring carried by and movable with the plunger, a pair of pin elements rotatably supported by and transversing said barrel at the forward end thereof and having portions adapted to obstruct projection of a ball from the barrel, said pin elements also having reduced portions adapted to be rotated into confronting relation to permit said ball to be projected from said barrel, said spring being adapted to be compressed against a ball obstructed in said barrel by the first-named portions of said pin elements, a reciprocatory shaft supported by and exterior of the barrel, and operative connection between the shaft and the plunger, and operative connection between said shaft and said pin elements, said last named means including a plate carried at one end of said shaft and provided with laterally oppositely extending arms, said arms having formed in their free ends open slots adapted to receive said pin elements to rotate the same upon reciprocatory movement of said shaft, a motor connection between said motor and said plunger for effecting reciprocation of the plunger in said barrel by operation of said motor, said operative connection between the plunger and the shaft permitting the plunger to be moved a predetermined distance within said barrel before effecting movement of said shaft to rotate said pin elements from ball obstructing position.

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