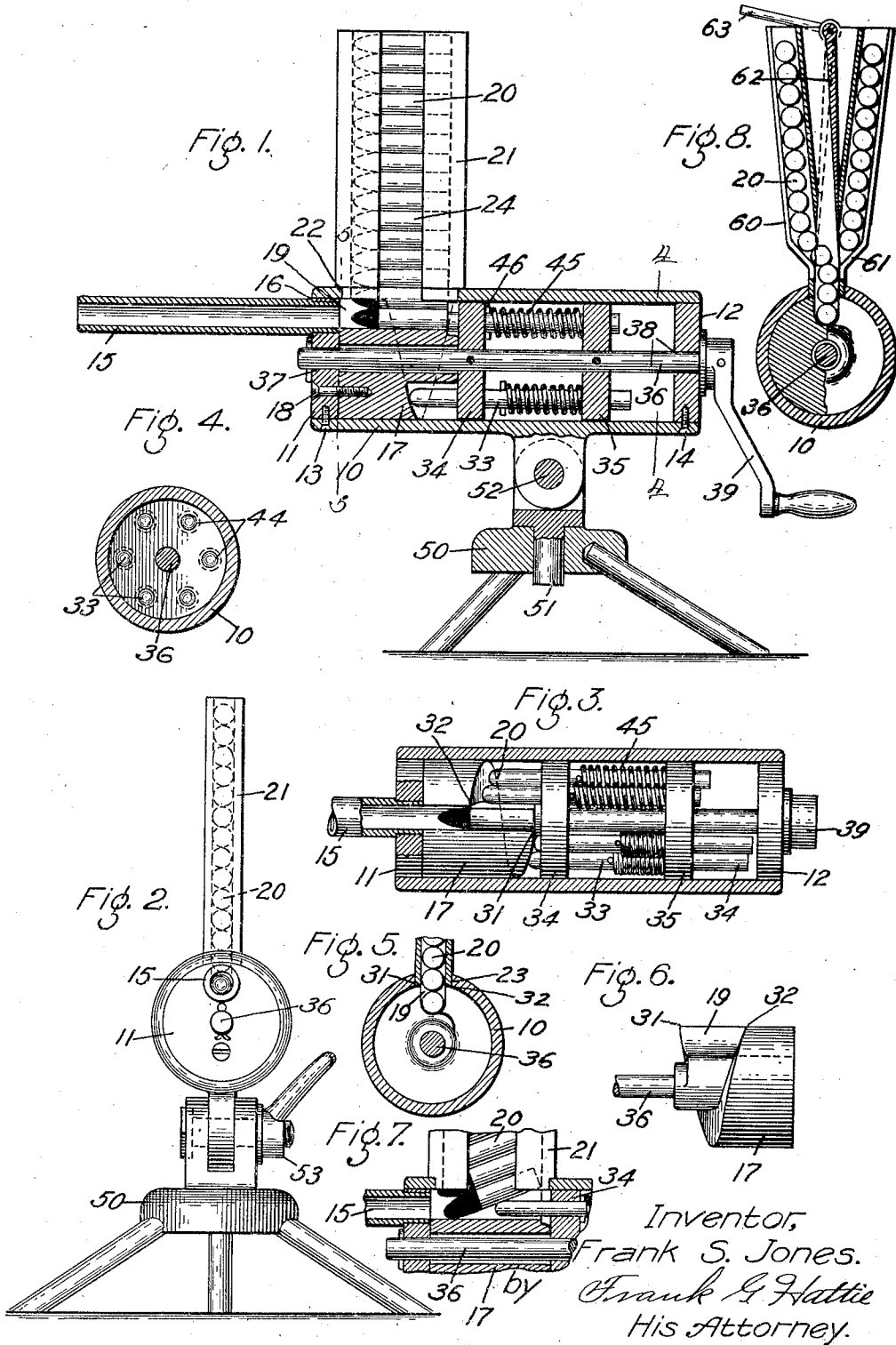


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TOY RAPID FIRE GUN.
APPLICATION FILED DEC. 3, 1918.

1,360,410.

Patented Nov. 30, 1920.



UNITED STATES PATENT OFFICE.

FRANK S. JONES, OF LYNN, MASSACHUSETTS.

TOY RAPID-FIRE GUN.

1,360,410.

Specification of Letters Patent.

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Application filed December 3, 1918. Serial No. 265,173.

To all whom it may concern:

Be it known that I, FRANK S. JONES, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Toy Rapid-Fire Guns, which improvements are fully set forth in the following specification and accompanying drawings.

My invention relates to rapid fire guns, of the type where projectiles are propelled mechanically by devices located in the said gun, which consist of a stationary cam, so arranged as to cooperate with a plurality of spring pressed plungers secured axially to a rotating shaft, which permit a corresponding number of projectiles to be propelled from the gun, in succession as there are plungers in operation against the cam, each revolution of the said shaft on which the plungers are located.

The object of the invention is to provide a rapid fire toy gun which will propel projectiles with high velocity and with absolute accuracy in feeding and propelling, and which is attractive and cheap to manufacture.

A further object of the invention is to provide an inexpensive toy gun which is pleasing and instructive and eliminates all the dangers that are common to toy guns of this type.

Figure 1 represents a longitudinal section of a rapid fire gun embodying my invention. Fig. 2 shows an end view of the same. Fig. 3 shows a horizontal section of the same with certain parts broken away. Fig. 4 is a cross section taken on the line 4-4. Fig. 1 showing particularly the position of the projectile propelling plungers. Fig. 5 is a cross section taken on the line 5-5. Fig. 1 showing the position of the projectile.

Fig. 6 is a side elevation of the cam for operating the plungers. Fig. 7 is a fragmentary view showing part of the magazine and operating barrel and the method for feeding the projectiles into position to be propelled. Fig. 8 is an alternative construction of the magazine.

Referring to the drawings, 10 indicates a chamber or cylinder in which the operating mechanism is located.

The cylinder 10 is provided with end disks 11 and 12 which are secured thereto, by the screws 13 and 14 respectively. Mounted in the disk 11 is the directing gun

barrel 15, which can be secured thereto in any suitable manner. In the present instance a hole 16 is bored in the end disk 11 and the gun barrel inserted therein and is either glued or nailed rigidly in position. Also secured to the end disk 11 and located in the chamber 10 is a stationary cam 17, which is held in place by the screw 18. Formed in the cam 17 is a U-shaped slot 19, which is adapted to receive the projectile 20. The projectiles are successively propelled from the slot and gun barrel 15 by a suitable mechanism, which will be described hereafter. Mounted on the cylinder 10, is a magazine 21 in which the projectiles are stored. They are fed into position automatically by gravity as the projectiles are discharged in succession. Formed on the lower end of the magazine are shoulders 22, which rest against the outer surface of the cylinder 10 and permit the magazine to be inserted into a hole 23 of rectangular formation for holding the magazine in position or allowing it to be readily removed for adjusting the projectiles if at any time they should get out of alinement. As a further precaution an opening 24 is provided, the length of its vertical dimension for adjusting the projectiles or placing them in position.

The cam 17 is provided on one end with a cam surface formed on a helical curve. The two ends of the curve 31 and 32 commence and end on either side of the U shaped slot 19 and extend beyond each other in an axial direction and as the U shaped slot holds the projectile to be propelled, it marks the position of feeding and discharging the projectile.

The cam surface is adapted to cooperate with a plurality of plungers 33, as they are identical in construction, a description of one will be sufficient. The plungers 33 are mounted in disks 34 and 35, which in turn are mounted on the shaft 36. They can be held in position by either glue or pins. The shaft 36 is supported at 37 and 38 in the end plates 11 and 12. Rigidly secured to one end of the shaft 36, is an operating crank handle 39. At the other extremity of the shaft, is a cotter pin inserted through the said shaft for holding the rotating structure in position. The plungers 33 have a reciprocal movement and are mounted in holes 44 machined in the disks 34 and 35. Interjacent to the disks 34 and 35 and en-

circling the plungers, 33 are springs 45, one end of which abuts against the disk 35 and the opposite end against the pin 46, which extends diametrically through the plungers.

5 By this construction the thrust of the reciprocal movement of the plungers is exerted on the disk at one end and at the other against the pins, which stores up the energy for propelling the projectile.

10 The shaft 36, disks 34 and 35, plungers, 33, with springs 45 mounted thereon, are free to be rotated by the manually operated handle 39. The plungers in their path of rotation start from the point 32, of the cam 15 19 as shown in Fig. 3 and wipe against the cam surface, which forces them backwardly against the tension of the springs 45, which causes them to be charged with energy for propelling the projectile.

20 When the plunger reaches the point 31 of the cam 17, it is forced into the slot 19, which holds the projectiles. The stored up energy of the spring is instantly imparted to the plunger, which causes it to propel the projectile through the gun barrel 15. The 25 force which is exerted against the projectiles is determined by the strength of the spring and as a toy gun should be made within the limits of safety a spring is used sufficiently strong to produce the desired results, but too weak to do harm. The gun is 30 mounted on a tripod 50 and can swing on the pivot 51 in a horizontal plane and also swings vertically on the pivot 52 for direct or indirect firing. The latter is pro- 35 vided with a lock nut 53. Fig. 8 illustrates an alternative construction of a magazine for the purpose of increasing the capacity of the said magazine and consists of double chambers 60 and 61 for holding the 40 projectiles. The novel feature being that one pile of projectiles are held in storage until the other pile is exhausted, after which the stored pile is released, this is accomplished by a swinging gate 62, which is 45 operated by the handle 63. Fig. 8 shows the projectiles in storage and those in the chamber 60 are free to slide into the slot 19 of the gun. When the projectiles in the cham- 50 ber 60 are exhausted it can be readily seen that by swinging the gate 62 in the opposite position the projectiles in the chamber 61 can be used.

The operation is as follows:—The crank 55 handle 38 is rotated carrying with it the plungers 33. The ends of the plungers cooperate with the surface formed on the cam 17 and impart a reciprocating movement, thereto for propelling the projectiles 60 20. The movement of rotation of the plungers causes the springs 45 to be compressed due to the action of the cam 17. This movement stores up kinetic energy in the springs to propel the projectile. The projectiles 20 65 are fed down from the magazine 21 to the

slot 19 by gravity and when the rotating plungers pass the point 30 on the long side of the slot of the cam 17 they are free to be discharged outwardly due to energy 70 stored up in the springs and propel the projectiles, after which the plunger passes on by the short side of the slot to the path of the cam. Each plunger is successively re- 75 tracted and released and as many projectiles can be discharged each revolution of the shaft 36 as there are plungers. After one projectile has been discharged the next one falls against the plunger located in the slot at an angle which prevents it from fall- 80 ing against the side of the magazine or from throwing it out of alinement and places it in a position that when the plunger is rotated from beneath the projectile it drops into the slot in perfect alinement with 85 the next plunger which insures a rapid feeding of the projectile in conformity with the rapid rotation of the plungers. This is an important function and the success of a rapid fire gun depends upon the accuracy 90 of feed of the projectile. As the plunger reaches the high surface on the cam it is released by the opening caused by the slot and instantly propels the projectile. The low place in the cam allows the plunger to pass from under the succeeding projectile 95 and into the path of the cam.

To enlarge the capacity of the magazine two chambers are used as shown in Fig. 8 which allow one chamber to be in use while the other chamber filled with projectiles is 100 held in reserve and can be used after the first chamber is exhausted. A gate 62 is used, which is pivotally secured and is free to swing and control the outlet of both chambers. 105

In accordance with the provisions of the statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus 110 shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:— 115

1. A rapid fire gun having an operating cylinder, a magazine connected to the said operating cylinder, a rotating shaft mounted in the operating cylinder, a stationary cam secured to the operating cylinder, a plurality 120 of spring pressed plungers secured to the shaft and cooperating with the cam, thereby discharging a plurality of projectiles each revolution of the shaft.

2. A rapid fire gun having an operating 125 cylinder, a magazine secured to the said operating cylinder, a rotating shaft mounted in the operating cylinder, a stationary cam of helical formation secured to the operating cylinder, a U shaped slot formed in the cam, 130

one side of the slot longer than the other due to the helical formation of the cam surface, a plurality of spring pressed plungers co-operating with the cam for discharging a plurality of projectiles.

3. A rapid fire gun having a directing barrel, an operating cylinder to which the directing barrel is secured, a magazine secured to the said operating cylinder, a rotating shaft mounted in the operating cylinder, disks mounted on the shaft, a plurality of spring pressed plungers slidably mounted in the disks, a stationary cam of helical formation secured to the operating cylinder, a U shaped slot formed in the cam, one side of the slot being longer than the other side due to the helical formation of the cam surface, for permitting the plungers to coöperate with the cam for discharging a plurality of projectiles.

4. A rapid fire gun having an operating cylinder, a magazine secured to the said operating cylinder, a rotating shaft, disks mounted on the shaft concentric with the operating cylinder, a plurality of spring pressed plungers slidably mounted in the disks, a stationary cam of helical formation secured to the operating cylinder and connected with the shaft, a U shaped slot formed on the cam, one side of the slot being longer than the other, and forming a point at which the plunger is retracted the maximum amount and released for discharging the projectile, the opposite or short side of the slot making provision for clearance after the plunger is released, and permitting the plunger to rotate in the path of the cam for compressing the spring.

5. A rapid fire gun having an operating cylinder, a magazine connected to the said operating cylinder, a rotating shaft mounted

in the operating cylinder, a stationary helical cam secured to the operating cylinder and concentric with the shaft, a plurality of spring pressed plungers coöperating with the cam surface for discharging a plurality of projectiles each revolution of the shaft, a U shaped slot formed in the cam, one side being longer than the other for releasing the plunger and for clearance, an opening from the magazine into the slot, a plunger extending into the slot and allowing the succeeding projectile to drop into the slot at an angle, further rotation of the plunger allowing same to lie parallel with the slot in a position to be discharged by the next plunger.

6. A rapid fire gun having an operating cylinder, a magazine connected to the said operating cylinder, a rotating shaft mounted in the operating cylinder, a stationary cam secured to the operating cylinder, a plurality of spring pressed plungers secured to the shaft and coöperating with the cam, thereby discharging a plurality of projectiles each revolution of the shaft, two chambers in the magazine, and means for closing one chamber while the other is in use.

7. A rapid fire gun having an operating cylinder, a magazine connected to the said operating cylinder, a rotating shaft mounted in the operating cylinder, a stationary cam secured to the operating cylinder, a plurality of spring pressed plungers secured to the shaft and coöperating with the cam, thereby discharging a plurality of projectiles each revolution of the shaft, two chambers in the magazine, a gate between the chambers for closing one while the other is in use.

In witness whereof I have hereunto set my hand this 20th day of November 1918.

FRANK S. JONES.