Nov. 25, 1930. B. F. S. BADEN-POWELL 1,783,053

CENTRIFUGAL GUN

Filed Nov. 26, 1929 2 Sheets-Sheet 1

FIG. 1.

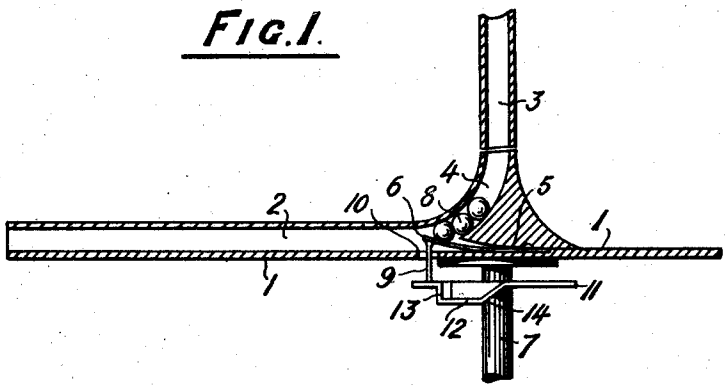


FIG. 2.

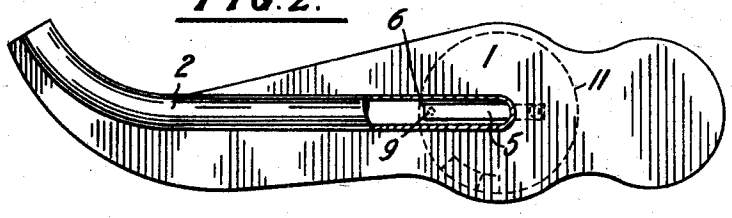
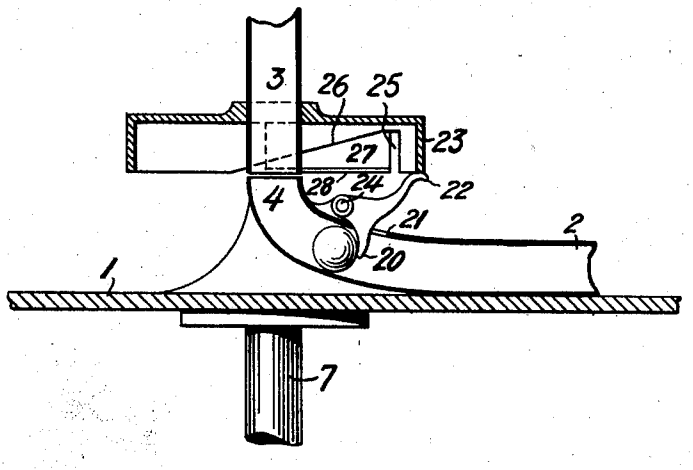


FIG. 3.



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FIG. 4.

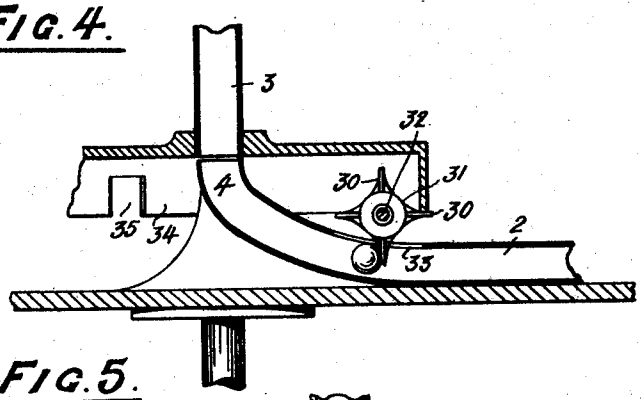


FIG. 5.

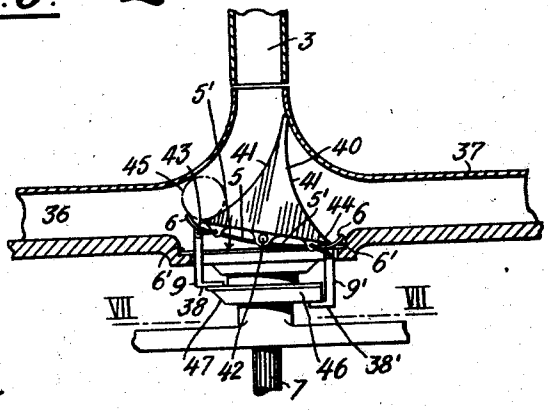


FIG. 6.

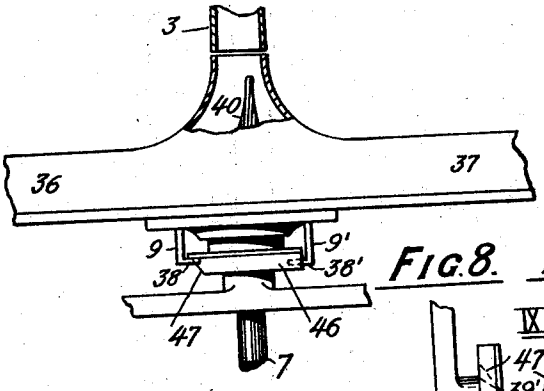
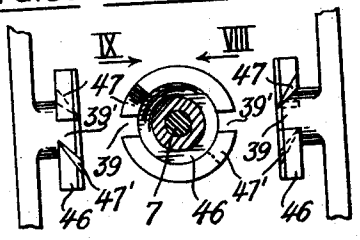


FIG. 8. FIG. 7. FIG. 9.



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UNITED STATES PATENT OFFICE

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CENTRIFUGAL GUN

Application filed November 26, 1929, Serial No. 409,887, and in Great Britain January 28, 1929.

This invention relates to improvements in centrifugal guns and refers more particularly to release mechanism for projectiles which are discharged by centrifugal force from a barrel or barrels radiating from a centre or axis about which they are rotated in order to impel the projectile from the barrel or barrels by centrifugal force.

Hitherto it has been proposed to retain the projectile until the barrel from which the projectile is to be discharged, during the course of its rotation, has arrived in the exact position necessary for the projectile to be released into the barrel and thereafter discharged properly in order to be projected at the target, and also, in the case of such guns with two barrels, to provide means for guiding the projectiles alternatively into the barrels.

One of the objects of the present invention is to provide release mechanism which being operated by the centrifugal force or energy of the projectile itself, will ensure greater accuracy in the timing of the projectile.

A further object is to provide improved means for guiding the projectile in a multi-barrel arrangement whereby the projectile will be properly fed to and discharged from the barrels and co-related to the movement of the guiding means so as to prevent jamming.

Referring to the drawings:—

Figs. 1 and 2 show in vertical part sectional elevation and in plan, respectively, a gun with a single barrel having release mechanism according to the invention.

Figs. 3 and 4 show fragmentary sectional elevations of modifications of release mechanism.

Figs. 5 and 6 show fragmentary part sectional elevations of the release mechanism in its application to guns with two barrels.

Fig. 7 is a sectional view on line VII—VII in Fig. 5 showing the under side of the stationary cam.

Fig. 8 is an elevation of one side of the cam looking in the direction of the arrow VIII in Fig. 7.

Fig. 9 is an elevation of the opposite side of the cam to that shown in Fig. 8, looking in the direction of the arrow IX in Fig. 7.

In the construction shown in Figs. 1 and 2 the gun 1 has a single barrel 2 to which the projectiles are fed from a magazine tube 3 through a breech chamber 4. In this breech chamber 4 is mounted a retaining member in the form of a leaf spring 5, the end 6 of which is free and is located at a point which is spaced apart from the shaft 7 about which the gun rotates, and this spring is also arranged so as normally to project into the breech end of the barrel and thus arrest the projectiles 8 at the breech end of said barrel. The end 6 of the spring is formed with a projection 9 which extends through an elongated slot 10 and co-operates with retaining control means consisting of a fixed cam disc 11 mounted co-axially with the shaft 7. This cam disc is provided with a depressed portion 12 having a vertical wall 13 at one side and an inclined wall 14 at the other side. In this arrangement when the gun is rotated, the projectiles in the projecting chamber are impelled towards the barrel by centrifugal force, but they are retained by the end 6 of the spring until the centrifugal force is sufficient to move the spring. Immediately the centrifugal force has reached the required amount, the projectile tends to turn the spring out of its projecting position, but this movement is prevented by the projection 9 until the projection comes opposite the depressed part 12 of the stationary cam at which point the spring is allowed to be turned outwardly by the centrifugal force of the projectile so that the projectile is released. Immediately the projectile has passed the end 6 of the spring, this will move back so as to arrest the next projectile, but in order to ensure this movement, the inclined surface 14 is provided on the cam and this inclined surface, through the projection 9, tends to return the spring positively to its projecting position within the barrel. The next projectile then moves against the spring, and if the speed of the rotating barrel is unchanged, the centrifugal force on this projectile will be sufficient to move the spring, and immediately the projections 9 again comes into position opposite the depression 12, this next pro-

jectile will be released. Thus the projectiles are released successively, one at each revolution of the rotating barrel, and each projectile will be released in exactly the same position and will be impelled by equal centrifugal force to that of the other projectiles so as to ensure accuracy in the timing and propulsion of the projectiles. It will be readily seen that by angularly adjusting the cam plate 11 the position at which the projectile is released can be determined at will.

In the modified form shown in Fig. 3, the retaining member is in the form of a two-armed lever, one arm 20 of which projects into the barrel through a slot 21 therein, while the other arm 22 extends outwardly and rests against the under side of an annular flange 23. The two-armed lever is pivotally mounted at 24 on the barrel of the gun, and it is so arranged that its weight tends to hold it in a position in which the arm 20 projects into the barrel so as to arrest the projectile until the latter has acquired sufficient centrifugal force to turn the two-armed lever about its pivot. Alternatively instead of arranging that the weight of the two-armed lever holds it in the position stated, a spring may be provided for this purpose. In this case, in order to control the position at which the two-armed lever is turned to release the projectile, the arm 22 bears against the annular flange 23 forming the retaining control means until this arm 22 comes opposite a notch 25 which permits the two-armed lever to turn. The notch 25 is provided with an inclined portion 26 which serves positively to ensure the return of the catch to its projecting position as in the previous construction. A bracket 27 having an inwardly extending part 28 is provided below the inclined part of the notch 26 to prevent the retaining member from being released except at the notch 25.

In Fig. 4 the arrangement is similar to Fig. 3, but in this case a multi-armed retaining member 31 is provided which is rotatably mounted upon the fixed pin 32. This member 31 has four arms marked 30, one of which projects through a slot 33 in the barrel and serves to arrest the projectile as before. The retaining member may be so mounted that its inertia may act to arrest the projectile until the latter has acquired sufficient cetrifugal force or a spring may be provided for this purpose. The retaining control means in this case comprise an annular flanged member 34 having a notch 35.

The invention also applies to guns having two barrels, an application of the construction as described with reference to Figs. 1 and 2, to which, is shown in Figs. 5, 6 and 7. In this case like reference numerals are employed to denote like parts with those in Figs. 1 and 2. Two leaf spring retaining members 5 and 5′ are provided, one for each barrel. These members 5, 5′ are fixed at one end 6′ to the breech of the barrel and are free at their other ends 6. The free end of each member 5 or 5′ is spaced apart from the shaft about which the gun rotates and tends normally to project into the breech end of the barrel and thus arrest the projectiles at the breech end of each barrel. These retaining members are entirely independent the one of the other, and each acts in a similar way to retaining member 5 in Figs. 1 and 2. Each of said members 5, 5′ is provided with projections 9 and 9′ respectively. These projections 9 and 9′ have laterally extending parts 38 and 38′ for a purpose which will be hereinafter explained. In order to direct the projectiles to one barrel and cut off the other barrel, a guide 40 is provided having curved guide surfaces 41 and being rockably mounted on the pivot 42. This guide member is connected by means of links 43 and 44 at its ends to the projections 9 and 9′ on the retaining members 5, 5′. The arrangement is such that the retaining member 5 as before stated tends to arrest the projectile, such as that shown in dotted lines in Fig. 5 and marked 45, until the centrifugal force of this projectile has reached the required amount when the projectile tends to turn the spring 5 out of its projecting position. When this happens the projection 9 is moved down. This movement of the projection 9 is, however, normally prevented by engagement of the lateral extension 38 with the cam plate 46 until a point in the movement of the barrels is reached at which the projection 38 comes opposite to a slot 39 (Figs. 7, 8 and 9) in said cam plate. At this point the member 9 is permitted to move down so as to release the projectile, and in this movement the lateral end 38 is brought into contact with an inclined cam surface 47 on the cam plate 46, which cam surface imparts further downward movement to the projection 9 and causes this, through the link 43, to rock the guide member 40 over to the left hand side. While this is taking place the lateral extending end 38′ of the projection 9′ at the opposite side of the cam plate 46, which has been held down by the cam plate 46, comes opposite to a slot 39′ (Figs. 7, 8 and 9) and is allowed to move upwardly under the pull of the link 44. The cam plate is cut away at 47′ to allow for the gradual upward movement corresponding to the downward movement imparted to the end 38 by the incline 47. This upward movement of the extending end 38′ brings the spring 5′ of the barrel 37, which had previously been depressed by the cam acting on the end 38′, into its projecting position so that when the barrel 37 in its rotation gets into the position occupied by the barrel 36 in Fig. 5 and 6 the retaining member 5′ and its associated parts will occupy the same position as the retaining member 5 in these figures, and the cycle of operations will be repeated.

What I claim as my invention and desire to secure by Letters Patent is:—

1. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means for preventing the discharge of the projectile until the centrifugal force of the projectile has reached a predetermined amount when the projectile will be released, and retaining control means acting to determine the position of the barrel at which the release takes place.

2. Apparatus for discharging projectiles by centrifugal force comprising a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means in each barrel for preventing the discharge of projectiles until the centrifugal force has reached a predetermined amount when the projectile will be released, and retaining control means acting to determine the position of the barrel at which the release takes place.

3. Apparatus for discharging projectiles by centrifugal force comprising a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means for preventing the discharge of the projectile until the centrifugal force of the projectile has reached a predetermined amount when the projectile will be released, and a stationary cam acting to prevent the release of the projectile until a certain position of the barrel is reached.

4. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means in each barrel for preventing the discharge of the projectile until the centrifugal force has reached a predetermined amount when the projectile will be released, and a stationary cam acting to prevent the release of the projectile until a certain position of the barrel is reached.

5. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means for preventing the discharge of the projectile until the centrifugal force of the projectile has reached a predetermined amount when the projectile will be released, and an angularly adjustable retaining control means to enable the position at which the release takes place to be determined at will.

6. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means in each barrel for preventing the discharge of the projectile until the centrifugal force has reached a predetermined amount when the projectile will be released, and an angularly adjustable retaining control means to enable the position at which the release takes place to be determined at will.

7. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means for preventing the discharge of the projectile until the centrifugal force of the projectile has reached a predetermined amount when the projectile will be released, and an angularly adjustable stationary cam for preventing the release until the barrel reaches a certain position determined at will by adjusting said cam.

8. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, retaining means for preventing the discharge of the projectile until the centrifugal force of the projectile has reached a predetermined amount when the projectile will be released, and a stationary cam to prevent the release of the projectile until a certain position of the barrel is reached, and to ensure return of the retaining means after the projectile has passed.

9. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, a spring catch projecting into said barrel and acting normally to prevent the projectile from passing until its centrifugal force has reached a predetermined amount, but allow the projectile to deflect it and be discharged through said barrel when the centrifugal force has reached said amount, and control means to determine the position of the barrel at which release can take place.

10. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, guiding means for diverting the projectiles to one of said barrels and cutting off the other of said barrels, and projectile controlled actuating means for rocking said guiding means to charge the barrel to which the projectile is diverted.

11. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means

for feeding projectiles into said chamber, guiding means for diverting the projectiles to one of said barrels and cutting off the other of said barrels, retaining means for preventing the discharge of the projectile until the centrifugal force of the projectile has reached a predetermined amount when the projectile will be released, retaining control means acting to determine the position of the barrel at which the release takes place, and actuating means controlled by said retaining means for rocking said guiding means to change the barrel to which the projectile is diverted.

12. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, guiding means for diverting the projectiles to one of said barrels and cutting off the other of said barrels, a spring catch projecting into said barrel and acting normally to prevent the projectile from passing until its centrifugal force has reached a predetermined amount, but allow the projectile to deflect it and be discharged through said barrel when the centrifugal force has reached said amount, control means to determine the position of the barrel at which release can take place, and actuating means engaged by said spring catch for rocking said guiding means to change the barrel to which the projectile introduced into said chamber is diverted each time said spring catch is deflected to discharge a projectile through the barrel.

13. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, guiding means for diverting the projectiles to one of said barrels and cutting off the other of said barrels, a spring catch projecting into said barrel and acting normally to prevent the projectile from passing until its centrifugal force has reached a predetermined amount, but allow the projectile to deflect it and be discharged through said barrel when the centrifugal force has reached said amount, and a stationary cam acting to permit said spring catch to be deflected only when the barrel has reached a certain position and also acting after the spring has been deflected to rock said guiding member and thereby charge the barrel to which the projectile is diverted.

14. Apparatus for discharging projectiles by centrifugal force comprising a central chamber rotatably mounted, a barrel carried by and radiating from said chamber, means for feeding projectiles into said chamber, a catch projecting into the path of the projectile to retain it until the centrifugal force has reached a predetermined amount, and means for determining the position of the barrel at which the projectile is discharged.

15. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber rotatably mounted, barrels carried by and radiating from said chamber, means for feeding projectiles into said chamber, catches projecting into the path of the projectile to retain it until the centrifugal force has reached a predetermined amount, and means for determining the position of the barrel at which the projectile is discharged.

16. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber having an opening through which the projectiles can be introduced into it, a barrel carried by and radiating from said chamber, a catch projecting into the path of the projectile to retain it until the centrifugal force has reached a predetermined amount, and means for determining the position of the barrel at which the projectile is discharged.

17. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber having an opening through which the projectiles can be introduced into it, barrels carried by and radiating from said chamber, catches projecting into the path of the projectile to retain it until the centrifugal force has reached a predetermined amount, and means for determining the position of the barrel at which the projectile is discharged.

18. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber having an opening through which the projectiles can be introduced into it, barrels carried by and radiating from said chamber, catches projecting into the path of the projectile to retain it until the centrifugal force has reached a predetermined amount, guiding means for diverting the projectiles to one of said barrels and cutting off the other of said barrels, and actuating means engaged by said spring catch for rocking said guiding means to charge the barrel to which the projectile introduced into said chamber is diverted each time said spring catch is deflected to discharge a projectile through the barrel.

19. Apparatus for discharging projectiles by centrifugal force comprising, a central chamber having an opening through which the projectile can be introduced into it, barrels carried by and radiating from said chamber, catches projecting into the path of the projectile to retain it until the centrifugal force has reached a predetermined amount, guiding means for diverting the projectile to one of said barrels and cutting off the other of said barrels, projections on said catches, links connecting said catches to the rockable member, and a peripherally slotted

stationary cam co-operating with said projections to prevent the catches moving until the barrel has reached a predetermined position in which the projections come opposite the slots in the cam and after the catch has moved adapted positively to engage the cam with one of the projections and thereby through the links to rock the guiding member and thus charge the barrel to which the projectiles are diverted.

In witness whereof I have hereunto set my hand.

BADEN FLETCHER SMYTH BADEN-POWELL.