

No. 694,674.

Patented Mar. 4, 1902,

R. W. SCOTT.
FIRING MULTISHOT GUNS.

(Application filed Aug. 8, 1899.)

(No Model.)

Fig. 1.

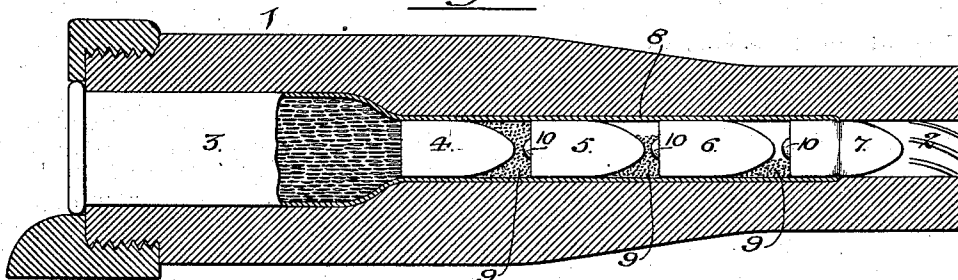


Fig. 2.

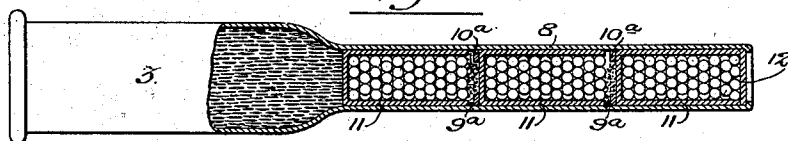


Fig. 3.

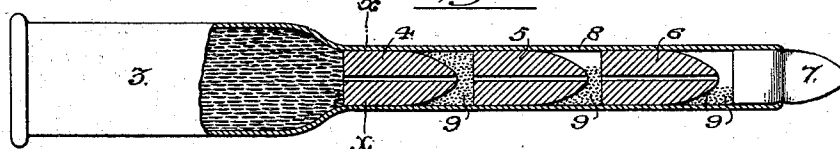


Fig. 4.

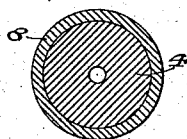


Fig. 5.

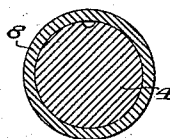


Fig. 6.

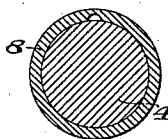


Fig. 7.

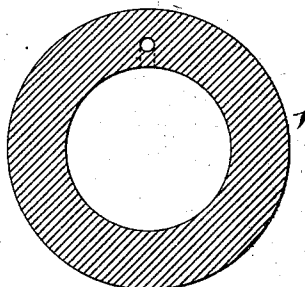


Fig. 8.

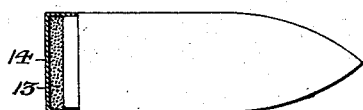
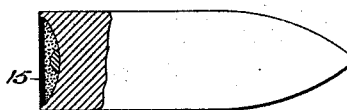


Fig. 9.



Witnesses:-

Hamilton D. Turner
Wm. H. F. Whithead.

Inventor:-

Robert W. Scott,

by his Attorneys:-

Hawson & Hawson.

UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO LOUIS N. D. WILLIAMS, OF ASHBOURNE, PENNSYLVANIA.

FIRING MULTISHOT GUNS.

SPECIFICATION forming part of Letters Patent No. 684,674, dated March 4, 1902.

Application filed August 8, 1899. Serial No. 726,558. (No model.)

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain improvements in Firing Multishot Guns, of which the following is a specification.

The object of my invention is to provide for the firing with one aim and at one discharge from the single bore of a gun of a series of projectiles in such manner that a true flight of each projectile will be maintained and close shooting thereby insured. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view of the breech portion of a gun having inserted therein a multiple-shot cartridge prepared for carrying out my invention. Fig. 2 is a view of a small-shot or grape-shot cartridge prepared for carrying out my invention. Fig. 3 is a view of a cartridge similar to Fig. 1, but illustrating another method of carrying out my invention. Fig. 4 is an enlarged transverse section on the line *xx*, Fig. 3. Figs. 5, 6, and 7 are like transverse sections illustrating modifications of the idea embodied in Figs. 3 and 4. Fig. 8 is a view of a large-caliber projectile constructed for use in carrying out my invention, and Fig. 9 is a view of still another form of projectile for the purpose.

Heretofore in order to effect the simultaneous firing of a multiplicity of projectiles at one discharge from the rifled bore of a gun a barrel has been used containing as many bores as there are projectiles to be fired, each bore receiving a separate projectile. Experience has demonstrated, however, that it is mechanically impossible to form a number of rifle-bores of required length and maintain even approximate parallelism of the same, and the consequence has been that while one of the projectiles might go true as aimed the others would be deflected in the same measure that the other bores deviated from true alinement with the one which was in alinement with the sights of the gun. This is exemplified in double-barreled rifles, which when used with a sight common to both barrels can seldom be made to shoot true, even ap-

proximate truth only being attained after tedious and careful adjustment.

In certain rapid-fire automatic small-arms controlled by delicate and complicated mechanism the attempt has been made to fire a series of bullets in rapid succession, so as to amount practically to simultaneous projection; but in this case also the bullets will not strike a target close together, although issuing from a bore common to them all, for the simple reason that the recoil caused by each shot tends to deflect the bullet fired by the succeeding shot. If an attempt is made to fire a series of projectiles from the single bore of a gun at one discharge by disposing the series of projectiles one in advance of another in the bore of the gun and the series in advance of the projecting charge, accurate shooting is impossible, because the contact of the projectiles, one with another as they leave the muzzle of the gun causes wide deflection of the projectiles, and in the case of elongated projectiles most, if not all, of them will "keyhole"—that is to say, will strike the target sidewise. I have found by experiment, however, that if the projectiles are separated one from another when they leave the muzzle of the gun this difficulty is overcome and the projectiles will proceed end on and will remain so closely grouped that very effective shooting even at long range can be accomplished, the truth of the aim being maintained, while at the same time the danger zone is so greatly increased, both vertically and laterally, that much greater execution is possible than with a single shot. The most effective method of separating the projectile I find to be by interposing a small explosive charge between each projectile and that in front of it, so that when the projecting charge is fired these interposed charges will also be exploded and gas will be generated under such pressure between the successive projectiles that the desired separation of the same will be accomplished. Other means of obtaining the result within the scope of my invention may, however, be adopted. For instance, air or gas under such pressure as to resist the impulse of the projecting charge may be introduced between the suc-

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cessive projectiles in preparing the cartridge and maintained until the cartridge is fired; but as this would necessitate the use of a cartridge-shell of such thickness as to resist the expansive force of the pressure thus maintained the plan of generating the pressure between successive projectiles only at the moment of firing is much to be preferred. In certain cases it might be possible to separate the projectiles in the firing-chamber, so that as they were made to approach each other by the action of the projecting charge the air contained between the projectiles would be sufficiently compressed to insure the desired separation of the projectiles as they left the muzzle; but this would require an additional length of firing-chamber and cartridge.

In Fig. 1 of the drawings, 1 represents the breech portion of a gun-barrel; 2, part of the rifled bore of the same; 3, the powder-chamber of the cartridge, and 4, 5, 6, and 7 a series of projectiles disposed one in advance of another in the contracted projectile-receiving portion 8 of the cartridge-casing. Between the point or nose of each of the projectiles 4, 5, and 6 and the butt of the projectile in advance of it is a space containing a mass of explosive material 9 and a mass of fulminate 10, the latter being in position to be acted upon by the point of the following projectile when the charge in the powder-chamber of the projectile has been exploded and the projectiles start to move forwardly through the bore of the gun as the result of such explosion. By this means each of the masses of explosive material 9 is fired, and in consequence a volume of gas under high tension is produced between the successive projectiles which has the effect of maintaining the separation of the projectiles while in the gun and after they leave the muzzle. Hence I find that each projectile maintains substantially as true a flight as though separately fired. I have found, moreover, that with a certain powder charge and a series of projectiles each of given weight the extent of penetration of each projectile is as great as that of a single projectile of the same weight as one of the series fired with a like powder charge, and as a result of repeated experiments I find that there are no "keyhole-shots," thus indicating that the effect of the rifling in causing the projectile to maintain a true line of flight is preserved in the case of each of the series of projectiles. It has further been demonstrated that the trajectory common to the series of projectiles is as flat as that of the usual single shot. My invention requires that each of the projectiles shall be "full-caliber" projectiles—that is to say, they must be of such diameter as to be acted upon by the rifling in the case of a rifled gun or to fit so snugly to the bore of a smooth-bore gun as to prevent the pressure between the successive projectiles from being dissipated by leakage around the projectile or projectiles in advance.

In firing grape-shot or other projectiles containing small shot I can adopt the form of cartridge shown in Fig. 2, each projectile in this case consisting of a light cup-shaped casing 11, of thin metal or other available material containing the particles of shot, a mass of explosive 9^a and fulminate 10^a being interposed between the front end of each casing 11 and the rear end of the casing in advance. As shown in Fig. 2, the fulminate is disposed so as to be fired by contact with the front edge of the casing as the latter moves forward on the explosion of the projecting charge; but it may, if desired, be exploded by contact with the shot contained in the casing. The casings 11 are held in the portion 8 of the cartridge-case by means of a wad 12, similar to that of an ordinary shot-cartridge; but any other means of retaining the same may be employed. When a cartridge of this character is fired, it is contemplated that the light cup-shaped shells 11, owing to the resistance of the air, will be thrown out of the path of the small shot, and thus will not interfere with the direct forward flight of the latter. Each mass of shot, with its containing-case, is to be regarded as a "projectile" in the sense in which that term is herein used, it being immaterial to certain embodiments of my invention whether the projectile is a single or a multiple body.

In Fig. 3 I have shown a cartridge in which the use of fulminate between the successive projectiles is abandoned, each projectile except the leading one having a central longitudinal opening, whereby each of the interposed explosive masses 9 is placed in communication with the main explosive charge 3 of the cartridge. Hence when the latter is fired the explosive charges 9 will also be fired and the desired generation of gas under extreme tension between the successive projectiles will be effected. The same result may, it will be evident, be attained by making the projectile very slightly less in diameter than the internal diameter of the cartridge-case, so as to provide an annular passage between the two or by forming a groove in the periphery of the projectile, as shown in Fig. 5, for instance, or in the interior of the cartridge-case, as shown in Fig. 6, or, especially in case of guns of large caliber, the opening may be formed in the breech portion of the gun itself, as shown in Fig. 7, this opening communicating with each of the masses of explosive 9 and also with the main explosive charge 3, and being, if desired, the means through which said main explosive charge as well as the supplementary charges may be fired, or there may be a series of independent openings, one for each explosive charge, the aim being to explode the charges 9 simultaneously with the explosion of the main charge 3 or as soon thereafter as possible. If desired, a suitable fuse may connect the main and supplementary charges or the latter may be such as to be exploded by pressure, in which case the

use of a fulminate intended to be exploded by impact will be unnecessary. In the absence of any special passage or passages for effecting the explosion of the interposed charges the expansion of the cartridge-shell when the gun is fired may be relied upon to provide sufficient space between the projectiles and said cartridge-shell to permit a flow of gas sufficient to insure the ignition and explosion of the interposed charges.

In the case of projectiles of large caliber, where the projectile and powder charge do not form one cartridge, but are introduced independently into the gun, each of the series of projectiles, except that immediately in advance of the projecting charge, may carry at the butt-end a supplementary explosive charge 13, contained in a casing 14 of textile or other readily permeable or destructible material, as shown in Fig. 8, this supplementary charge being adapted to be fired either by concussion, as in Fig. 1, or by communication with the exploding agent through a suitable passage, and in some cases the supplementary charge may be placed in a recess in the butt-end of the projectile and held therein by a cap or cover 15 of tin-foil or other suitable material, as shown, for instance, in Fig. 9. When fulminate is employed for the purpose of exploding the charges interposed between the projectiles, I prefer to separate the projectiles from each other to such an extent that the fulminate is not normally in contact with the projectile, which explodes the same on firing, so that if the cartridge is accidentally dropped in handling none of the interposed charges will be exploded. I also prefer to graduate the supplementary charges, using the lightest charge at the forward end and the heaviest at the rear, as shown, so that the volumes of gas generated by the explosion of these interposed charges will offer a graduated resistance to the forward movement of the projectiles behind them, the resistance being least at the forward end of the cartridge and greatest at the rear end. In some cases the leading supplementary charge may be exploded first through the medium of a passage in the gun, as in Fig. 7, or in any other available way, the rear charges being exploded by the recoil of the projectiles in advance of the same. The main or projecting charge need not necessarily be an explosive charge, as it may consist of air or gas compressed, as in the case of the modern dynamite-gun.

Of course it will be understood that the shape and character of the projectiles may be varied as desired without departing from the spirit of my invention, so long as the projectiles are such as to be acted upon by the rifling in the case of a rifled gun or to fit snugly to the bore in the case of a smooth-bore gun, and thus prevent undue escape of gases around the same.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another, discharging them by means of a projecting agent at the rear of the series, and interposing between successive projectiles a barrier of elastic fluid under pressure when the series is being fired.

2. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another in advance of an explosive projecting agent, discharging the series of projectiles by firing said explosive agent, and interposing a barrier of elastic fluid under pressure between successive projectiles when the series is being fired.

3. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another, discharging them by means of a projecting agent at the rear of the series, and exploding supplementary charges between the successive projectiles as they are being fired.

4. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another in advance of a main explosive projecting agent, discharging the series of projectiles by firing said explosive agent, and exploding supplementary charges between the successive projectiles as they are being fired.

5. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another, discharging them by means of a projecting agent at the rear of the series, and interposing between successive projectiles, when the series is fired, a barrier of elastic fluid under pressure, the pressure being least between the two foremost projectiles, and gradually increasing between successive projectiles in the rear thereof.

6. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another in advance of the explosive projecting agent, discharging the series of projectiles by firing said explosive projecting agent, and interposing between successive projectiles, when the series is being fired, a barrier of elastic fluid under pressure, the pressure being least between the two foremost projectiles and gradually increasing between the successive projectiles in the rear thereof.

7. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another, discharging them by means of a projecting agent at the rear of the series, and ex-

ploding between the successive projectiles, as the series is being fired, graduated supplementary charges, least between the two foremost projectiles, and of gradually-increasing explosive force between the successive projectiles in the rear thereof.

8. The mode herein described of firing a series of full-caliber projectiles from the single bore of a gun at one discharge, said mode consisting in disposing the projectiles one before another in advance of a main explosive projecting agent, discharging the series of projectiles by firing said explosive agent, and ex-

ploding between successive projectiles as the series is being fired, graduated supplementary charges, least between the two foremost projectiles and gradually increasing in explosive force between successive projectiles in the rear thereof.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT W. SCOTT.

Witnesses:

J. E. SCOTT,
SUE L. ROHRMAN.