No. 694,894. Patented Mar. 4, 1902.

R. W. SCOTT.

GUN CARTRIDGE.

(Application filed July 3, 1900.)

(No Model.)

Fig. 1.

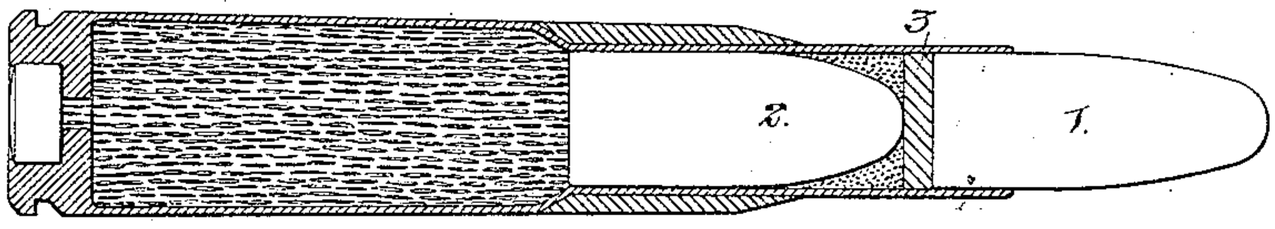


Fig. 2.

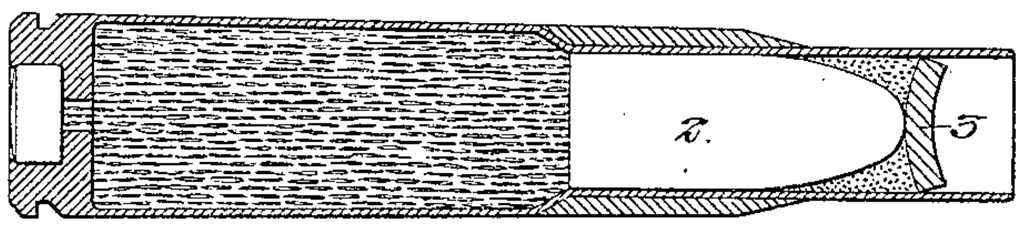
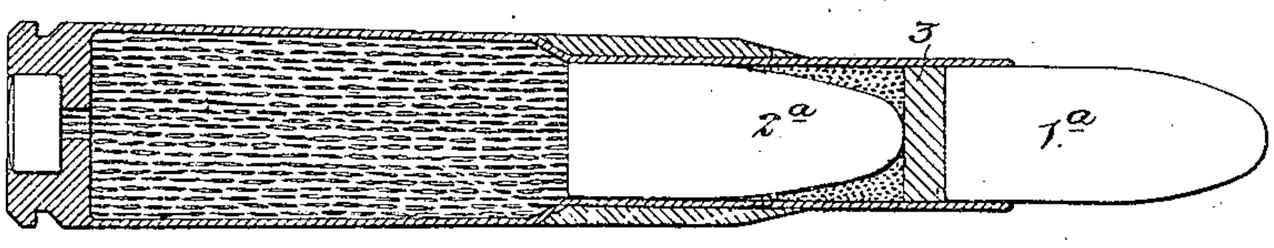


Fig. 3.



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UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

GUN-CARTRIDGE.

SPECIFICATION forming part of Letters Patent No. 694,894, dated March 4, 1902.

Application filed July 3, 1900. Serial No 22,441. (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 Gun-Cartridges, of which the following is a specification.

My invention consists of certain improvements in the gun-cartridge forming the subject of my application for patent, Serial No. 690,155, filed September 3, 1898, the object of my present invention being to better control the lateral and vertical distances between the projectiles at the target and to protect and render more efficient the explosive charge interposed between the foremost projectile of the series in the cartridge and that in the rear of it. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is an enlarged sectional view of a cartridge constructed in accordance with my present invention. Fig. 2 is a similar view illustrating a certain step in the manufacture of the same; and Fig. 3 is a view similar to Fig. 1, but illustrating another method of carrying out my invention.

In my application before alluded to I have shown, described, and claimed a cartridge containing a series of projectiles disposed one in advance of another and having provision for interposing a barrier of elastic fluid under pressure between them when the series is simultaneously fired by a projecting agent at the rear of the series, the preferable method of accomplishing this result being to generate a volume of gas between successive projectiles as the cartridge is fired, which gas is dissipated in the atmosphere at or near the muzzle of the gun, thus leaving a definite space between successive projectiles and insuring an accuracy of flight which is impossible if the projectiles are permitted to come into contact with each other as they leave the gun-barrel. An extended horizontal line of fire is of the first importance in military operations, and this can be secured in a marked degree by the use of the multishot-cartridge described in my said former application. Assuming that but two projectiles are used in the cartridge and assuming also that the twist or rifling is in a right-hand direction, the drift or lateral deviation of the projectiles from a straight line will be to the right of the object aimed at and, conversely, if the rifling be in a left-hand direction the drift or deviation of the projectile will be to the left. There exists a wide difference of opinion as to the cause of this lateral drift or deviation; but experiments indicate that it is increased in proprortion to the increased density of the fluid, such as the atmosphere, through which the projectile takes it flight. It has been found in practice that where the cartridge has two projectiles of the same sectional density the forward projectile has a greater tendency to drift than the rear projectile, and the latter exhibits a tendency to drop below the forward one at all ranges, the drop being increased as the range is increased. By "sectional density" is meant the relation between the weight and the transverse sectional area of the projectile, this being usually determined by dividing the weight in pounds by the square of the diameter in inches. The tendency of the rear projectile to drop below the forward one and of the forward projectile to drift more than the rear one may be accounted for as follows: In cartridges intended for use with modern smokeless powder of high power and generating enormous pressure reliance for exploding the charge interposed between the forward and rear projectiles is placed upon the initial expansion of the material of the shell or casing under the action of the power developed on the explosion of the projecting charge, this expansion of the shell providing sufficient space around the rear projectile to insure ignition of the interposed charge ahead of it by communication from the explosive projecting charge behind it. The passage of the gas of the explosive projecting charge around and beyond the rear projectile robs the latter of just so much of the projecting force, while the front projectile, being seated in the rifling, receives the full generated pressure. This difference of projecting force, while slight, is sufficient to cause the rear projectile to drop below the front one and is most marked at the longer ranges—say from five hundred to one thousand yards. The same is true when the rear projectile has passages formed in it for the flow of gas from the projecting charge to the explosive charge in front of said rear projectile. The

tendency of the front projectile to drift or deviate laterally to a greater extent than the rear one may be explained as follows: As the two projectiles approach the muzzle of the gun there is an intervening column of gas between them of the same pressure as but of less volume than the column of gas generated by the combustion of the main projecting charge. This column of gas is traveling at the same speed as the projectiles. Hence when the said projectiles emerge from the muzzle of the gun there is not the same resistance offered to the forward flight of the rear projectile as is offered by the atmosphere to the flight of the forward projectile. Hence the drift or lateral deviation of the forward projectile due to this obstruction to its flight is more marked than is the drift or lateral deviation of the rear projectile. The same is true of two projectiles without an interposed separating medium, the forward projectile forcing a path through the air, which the rear projectile has only to follow. The difference in drift or deviation of the two projectiles does not increase proportionally to the increase of the range, but is substantially the same at, say, five hundred to one thousand yards, thus indicating that the difference in the deviating influence is not exerted continuously throughout the flight of the projectile, but only at the beginning of its flight, and that the movement is more a bodily movement in a horizontal plane and in a direction at a right angle to the line of flight than an angular deviation along diverging lines.

I find that the lateral deviation or drift of the rear projectile in respect to that of the forward projectile can be controlled by increasing or diminishing the interposed charge, never, of course, passing below the point where separation is assured, the rule being that the heavier this interposed charge the greater will be the difference in the drift of the two projectiles, and I find, further, that the drop of the rear projectile can also be measurably controlled by varying the sectional form or sectional density of the projectiles. If the rear projectile is of greater sectional density than the front one, this heavier projectile, although not at the beginning of its flight describing so flat a trajectory as the forward and lighter projectile, has after a certain point is reached less drop than said lighter projectile, or, in other words, has greater ranging power. Hence by increasing the sectional density of the rear projectile by a few grains in weight its tendency to drop is corrected to such an extent that the difference in the height of the two projectiles when they strike the target may be kept well within a space corresponding to the height of a man, even up to and beyond a range of one thousand yards—that is to say, at all those ranges where accurate and effective fire is possible. In Fig. 1 the lighter forward projectile is represented at 1 and the heavier rear projectile at 2. In a cartridge intended for a gun of about .30 caliber and having two projectiles there may be a difference of as much as six or seven grains in the weight of the two; but in a cartridge for a like gun having three projectiles the difference in weight between the first and second and between the second and third is preferably considerably less than this. Another means of accomplishing the desired result is to change the sectional form of the projectile. For instance, as shown in Fig. 3, the forward projectile 1^a may be blunter than the rear projectile 2^a, so as to meet with greater atmospheric resistance in its flight and have a greater drop, or variation both in sectional form and sectional density may be resorted to in order to attain the result. By the term "different sectional character" as used in the claims, therefore, I intend to cover either difference in sectional form, difference in sectional density, or both.

In some cases the variation in the character of the projectiles may be the reverse of that before described in order to increase the vertical distance between the projectiles at the target, so that in shooting game there will be a greater chance of hitting the target when the exact range is not known.

In order to protect and retain the charge interposed between the front and rear projectiles in a two-ball cartridge or between the first and second projectiles of a cartridge having more than two balls, I prefer to use a wad 3, which is pressed tightly against the inner wall of the contracted neck of the shell at the base of the forward projectile, this pressure being effected by making the wad in the first instance of slightly-dished form, as shown in Fig. 2, and flattening it by longitudinal pressure upon it after it has reached its proper position in the neck of the shell.

All of the projectiles in my improved cartridge are intended to be "full-caliber" projectiles, by which term is meant projectiles which will engage with the rifling of the gun or in the case of a smooth-bore gun will fit so snugly to the bore as to prevent undue escape of the propulsive gases around the projectile in its passage through said bore.

Other means than an explosive charge may be used as the projecting force. For instance, such force may be air or other fluid under high pressure, as in the case of guns for throwing dynamite or other high explosives; and the cartridges may have other than explosive charges interposed between the projectiles—such, for instance, as permanently-maintained volumes of air or gas under pressure—or certain features of my invention may even be applied to multishot-cartridges which are without means for separating the successive projectiles.

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

1. A multishot-cartridge having a series of full-caliber projectiles disposed one before

another in advance of a single projecting charge, said projectiles being of different sectional character, substantially as specified.

2. A multishot-cartridge having a series of full-caliber projectiles disposed one in advance of another and of different sectional character, successive projectiles being separated from each other by a medium which interposes a barrier of elastic fluid under pressure between them when the series is simultaneously fired by a projecting agent at the rear of said series, substantially as specified.

3. A multishot-cartridge having a single explosive projecting charge and a series of full-caliber projectiles disposed one beyond another in advance of said charge, said projectiles being of different sectional character, substantially as specified.

4. A multishot-cartridge having an explosive projecting charge and a series of full-caliber projectiles disposed one beyond another in advance of said charge, said projectiles being of different sectional character and successive projectiles being separated by a medium which interposes a barrier of elastic fluid under pressure between them when the series is simultaneously fired, substantially as specified.

5. A multishot-cartridge having a series of full-caliber projectiles disposed one before another in advance of a single projecting charge, said projectiles being of different sectional density, substantially as specified.

6. A multishot-cartridge having a series of full-caliber projectiles disposed one in advance of another and of different sectional density, successive projectiles being separated from each other by a medium which interposes a barrier of elastic fluid under pressure between them when the series is simultaneously fired by a projecting agent at the rear of said series, substantially as specified.

7. A multishot-cartridge having a single explosive projecting charge and a series of full-caliber projectiles disposed one beyond another in advance of said charge, said projectiles being of different sectional density, substantially as specified.

8. A multishot-cartridge having an explosive projecting charge and a series of full-caliber projectiles of different sectional density disposed one beyond another in advance of said charge, successive projectiles being separated by a medium which interposes a barrier of elastic fluid under pressure between them when the series is simultaneously fired, substantially as specified.

9. A multishot-cartridge having a series of full-caliber projectiles disposed one in advance of another, said projectiles being of different sectional density, and such sectional density being least in the forward projectile, greater in the next, and so on if the series comprises more than two, substantially as specified.

10. A multishot-cartridge having a series of full-caliber projectiles disposed one in advance of another and of different sectional density, successive projectiles being separated from each other by a medium which interposes a barrier of elastic fluid under pressure between them when the series is simultaneously fired by a projecting agent in the rear of said series, and the sectional density of the projectiles being least in the forward projectile, greater in the next, and so on if the series comprises more than two, substantially as specified.

11. A multishot-cartridge having an explosive projecting charge and a series of full-caliber projectiles disposed one beyond another in advance of said charge, said projectiles being of different sectional density, and the sectional density of the projectiles being least in the forward projectile, greater in the next, and so on if the series comprises more than two, substantially as specified.

12. A multishot-cartridge having an explosive projecting charge and a series of full-caliber projectiles of different sectional density disposed one beyond another in advance of said charge, successive projectiles being separated by a medium which interposes a barrier of elastic fluid under pressure between them when the series is simultaneously fired, and the sectional density of the projectiles being least in the forward projectile, greater in the next, and so on if the series comprises more than two, substantially as specified.

13. A multishot-cartridge having a chamber for the explosive projecting charge, and a contracted neck in advance of the same, a series of projectiles disposed one in advance of another in said contracted neck, successive projectiles being separated by an interposed explosive charge, and a wad interposed between the forward projectile and the charge in the rear of the same, and fitting snugly in the contracted neck of the shell, substantially as specified.

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

ROBERT W. SCOTT.

Witnesses:
WILL. A. BARR,
JOS. H. KLEIN.