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RIFLE CARTRIDGE

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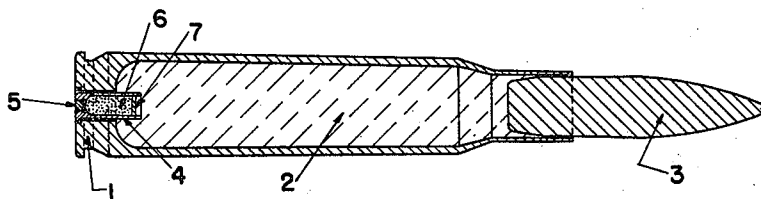


FIG.- 1

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RIFLE CARTRIDGE

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3 Claims. (Cl. 102—12)

This invention relates to an improved center fired rifle cartridge and more especially to an improved center fired rifle cartridge having a black powder ignition primer.

The art has, in recent years, loaded the majority of military and sporting rifle cartridges with surface modified progressive burning smokeless powder. Such powders are surface modified by some coating material such as, for example, a deterrent material as diethyldiphenylurea or with a deterrent explosive as dinitrotoluene or with mixture of the explosive or non-explosive materials. By the use of these surface modified powders, the burning of the powder grains is regulated so that reduced breech pressures are obtained. As is to be expected the surface modified powders are more difficult to ignite than unmodified powders, but the use of stronger primers has largely overcome this difficulty.

Most rifles both military and sporting have increased the bullet velocity to such an extent that maximum limits have had to be placed on the on the breech pressures for safety reasons. The art, due to these limits, experience difficulty in providing the high velocity ammunition required by military and sporting arms. The only solution to this ballistic problem has been in further modifying the grain surfaces of the various types of smokeless powder, but such modification has not solved the problem.

This invention has as an object the production of a rifle cartridge which will give high bullet velocities with breech pressures within the allowable limits. A further object of this invention is the production of a rifle cartridge which will give lower breech pressures than normal cartridges when using the same propellant charges. A still further object of this invention is to produce military and sporting rifle cartridges having an ignition primer comprising a weak detonating primer and a black powder ignition charge. Further objects will appear hereinafter.

In accordance with this invention I have produced improved military and sporting rifle cartridges which contain a black powder ignition primer. By the term ignition primer I mean a primer casing, centrally located within the base of the rifle cartridge, of sufficient size in regard to diameter and length and to the caliber of rifle in which it is to be used, to contain a weak detonating primer and also an ignition charge which is securely confined within the primer casing. The ignition primer of this invention provides a means of producing military and sporting rifle cartridges that have greatly improved bal-

listics. Thus, by the novel ignition means of my invention, the bullet velocity may be maintained constant while the breech pressure is greatly reduced or the breech pressure may be maintained at a fixed value and the bullet velocity increased. It will be at once apparent to those skilled in the art that any means of accomplishing the above ballistic improvements constitutes a material improvement in the production of military or sporting rifle cartridges.

Now my invention includes the preparation of military or sporting rifle cartridges, of the center fire type, which have as primers a black powder loaded casing instead of the normal detonating primer. I have in accordance with this invention constructed rifle cartridge casings which have inserted centrally within the base a center fired ignition primer assembly that includes a shell having a weak detonating primer in its base and a black powder ignition charge, firmly positioned by a wad or similar means, within its body and in contact with the weak detonating primer. This ignition primer is directed into the center of the propellant powder charge contained in the rifle cartridge. The flame from the black powder charge ignites the propellant charge in such manner that the burning characteristics give reduced breech pressures while maintaining the bullet velocity.

This invention, therefore, may be applied to the various military and sporting rifle cartridges using center fired ammunition such as cartridges used in the 22, 25, 30 or 50 caliber rifles with the resulting decrease in breech pressure, but it is to be understood that my invention is not applicable to rim fired cartridges such as are used in 22 caliber rifles.

Having now indicated the broad scope of my invention, there follows a more detailed description of the preferred embodiment thereof with reference to the single figure. The figure represents a cross sectional view of a rifle cartridge including an ignition primer in accordance with this invention.

Figure 1 represents a cross section of a loaded military or sporting rifle cartridge having a cartridge case 1 containing a propellant charge of surface modified powder 2 and a projectile 3. The base of the cartridge case 1 is formed to receive an ignition primer 4 which includes a weak detonating primer 5, and a black powder ignition charge 6 that is securely positioned in place by a retaining wad 7. The ignition primer 4 is sized to the hole in the base of the rifle cartridge case

1 so that a tight pressed joint may be made between the two casings.

Operation of the above cartridge takes place as follows:

A firing pin, not shown, strikes the weak detonating primer 5 which explodes and ignites the black powder charge 6, this charge 6 burns with a long hot flame that projects itself throughout the propellant powder charge 2 and said powder charge 2 is thereby ignited. The propellant charge 2 when ignited forces the projectile 3 through the barrel of the rifle. This propellant powder charge 2 is so regulated by surface modification and in relation to the black powder ignition charge that it is completely burned by the time the projectile leaves the muzzle of the rifle barrel, thus developing the maximum velocity possible.

I have found that this novel means of igniting propellant charges gives greatly improved ballistics in military and sporting rifles. The novel ignition means in accordance with this invention presents no manufacturing difficulties and entails no additional steps in assembling rifle cartridges.

To show the improvement in ballistics obtained by the use of the ignition primer of this invention series of shots were made with old type cartridges and with the new cartridges of this invention. Thus, when a normal rifle cartridge was fired in a large caliber rifle with a selected maximum propellant powder charge, the means breech pressure developed was about 48,200 pounds per square inch, and the mean bullet velocity developed was about 3,138 feet per second, while under the same conditions of testing, but using the ignition primer type cartridges in accordance with this invention, the mean breech pressure developed was about 42,100 pounds per square inch, and the mean bullet velocity developed was about 3,143 feet per second.

The extraordinary decrease in mean breech pressure, amounting to over 6,000 pounds per square inch is very surprising and especially so when the bullet velocity of the two tests were substantially the same. Actually the results show a slight increase in bullet velocity with the 6,000 pounds decrease in pressure. By the method of this invention, therefore, it is possible to decrease the breech pressure of rifle cartridges while maintaining the bullet velocity and this, is a great improvement in the art. Further, as will be apparent, by the use of the ignition primers of this invention, it is possible to maintain the pressure level and raise the bullet velocity by using increased propellant powder charges or higher potential powders.

The ignition primers of my invention are prepared by inserting a weak detonating primer such as a primer similar to those used in small arm center fire cartridges in which black powder propellant charges are used, for example, the Remington U. M. C. #1½ rifle cartridge primers. The selection of a primer depends upon the ignition charge to be used which may be a black powder charge weighing from about 0.2 grain to about 10 grains depending upon the type of surface modified propellant powder used in the rifle cartridge, although for most cartridges I have found that a Remington #1 or #1½ primer in a cartridge loaded with a 3 grain black powder charge is most desirable. The black powder which I find preferable to use is the sporting grade FFFg, but I do not limit myself to this specific ignition compo-

sition as it is obvious that other similar black powder may be used, and that I would use that granulation which by tests would give the best ballistics for the particular cartridge to be loaded. Further, I may substitute other flame producing ignition compounds for black powder providing for each a suitable weak detonating primer.

The type of weak detonating primers which I have used in this invention normally contains an admixture comprising a detonating or ignition compound, an abrasive, and a binder and such primers are well known and accepted by the art.

The use and choice of the proper type was to confine the black powder within the ignition primer casing is well within the skill of the art.

The ballistics obtained by using my improved rifle cartridges provides the art with means of greatly increasing the bullet velocity of the military and sporting rifles without exceeding the maximum pressure limits which have been established. The desirability of increasing bullet velocity is well known to those in the art, and such improvement has been the object of much research. Further, the ignition primer of this invention is advantageous since it permits the use of more heavily deterred propellant powders without the danger of misfires, or ignition difficulties encountered with normally primed cartridges. Also the advantage derived from actually reducing the breech pressures now produced in military and sporting rifles and maintaining the same bullet velocity is a notable advance in the ballistic art.

It will be understood that the details and examples given hereinbefore are illustrative only, and in no way limiting on my invention as broadly described hereinbefore and in the appended claims.

What I claim and desire to protect by Letters Patent is:

1. A center fire rifle cartridge for high velocity rifles which comprises a cartridge casing loaded with a progressive burning, propellant, colloid double base smokeless powder heavily deterred by surface modification, an ignition primer for said deterred powder centrally positioned within the base of said cartridge casing and loaded with fine grain black powder in amount and characteristics to insure substantially central ignition of the heavily deterred smokeless powder and a weak detonating primer not substantially stronger than a #1½ Remington rifle primer, located centrally within the base of the said ignition primer whereby ignition of the said black powder is accomplished.

2. A center fire rifle cartridge for high velocity rifles which comprises a cartridge casing loaded with a progressive burning, propellant, colloid double base smokeless powder heavily deterred by surface modification, an ignition primer for said deterred powder centrally positioned within the base of said cartridge casing and loaded with a flame producing ignition powder in amount and characteristics to insure substantially central ignition of the heavily deterred double base smokeless powder and a weak detonating primer not substantially stronger than a #1½ Remington rifle primer, located centrally within the base of the said ignition primer whereby ignition of the said ignition powder is accomplished.

3. A center fire rifle cartridge characterized by high bullet velocities with comparative low

breech pressures which comprises a cartridge casing loaded with a progressive burning, propellant, colloided double base smokeless powder heavily deterred by surface modification, an ignition primer for said deterred powder centrally positioned within the base of said cartridge casing and loaded with a flame producing ignition powder in amount and characteristics to insure

substantially central ignition of the heavily deterred double base smokeless powder and a weak detonating primer not substantially stronger than a #1½ Remington rifle primer, located centrally within the base of the said ignition primer whereby ignition of the said ignition powder is accomplished.

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