March 9, 1926. 1,575,716

W. J. PAVEK

SHOTGUN CARTRIDGE

Filed May 18, 1925

Fig. 1

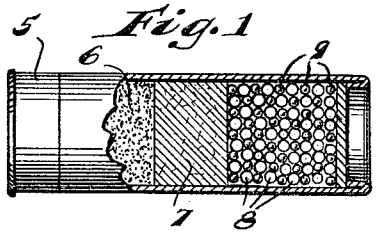


Fig. 2

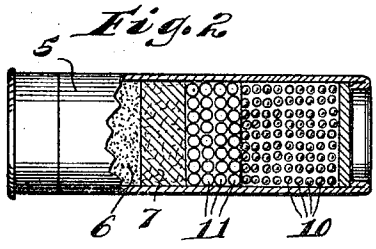
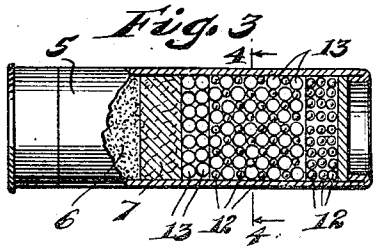


Fig. 3



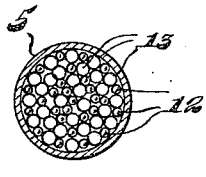


Fig. 4

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UNITED STATES PATENT OFFICE.

WILLIAM J. PAVEK, OF CHICAGO, ILLINOIS.

SHOTGUN CARTRIDGE.

Application filed May 18, 1925. Serial No. 30,906.

To all whom it may concern:

Be it known that I, WILLIAM J. PAVEK, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Shotgun Cartridges, of which the following is a specification.

My invention relates to shotgun cartridges involving a high pressure or powerful explosive charge and involving a projectile charge composed partly of soft shot and partly of hard shot, and the main object of my invention is the provision of an improved cartridge of this character which will be especially effective in producing a dense pattern at long range.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing, forming a part of this specification, and in which,

Fig. 1 represents a sectional view of a cartridge containing a mixed projectile charge;

Fig. 2 is a similar view of a cartridge containing a tandem projectile charge;

Fig. 3 is a similar view of a cartridge containing a compound projectile charge; and

Fig. 4 represents a cross section taken approximately on the line 4—4 of Fig. 3.

Those experienced in the use of shotguns well know how the pressure of powerful explosive charges flatten or tend to flatten the soft lead shot, how such missiles, when deformed, deviate from a straight path and scatter, and how an increase in effectiveness of the explosive charge will more effectively scatter the shot. It will also be appreciated that a choke bored gun is more effective in flattening and deforming the lead shot than a cylinder bored gun, since with the choke bored gun the mass of shot must pass through a restricted area with the general result that the soft lead shot during passage through the choke are changed from round missiles to missiles of flattened form. Instead of being utilized entirely to lengthen the shot column, a portion of the compressive force, produced by the choke, is always absorbed in the deformation or flattening of the shot. The higher the velocity the more pronounced is the scattering of the shot that have been deformed either by pressure or by the choke.

Steel shot do not flatten as a rule, even when subjected to high explosion pressures, but due to their hardness, they grind out and damage the choke portion of the gun barrel. In addition to this, steel shot upon colliding tend to spring apart and scatter even more than the soft lead shot. In its simplest and preferred form my invention comprises a cartridge having a projectile charge composed in part of hard shot, made of steel or hard material, and in part of soft shot made of lead; the hard and soft shot being disposed and related in such manner that the soft shot, serving as convoying buffers, will yield and flatten during trajection through the choke thereby permitting the projectile charge to pass through without such resistance as will cause the hard shot to cut and damage the barrel. In this connection the soft shot perform a second function and serve as a convoy, preventing the hard shot from rebounding on each other and scattering, thereby producing a dense pattern at long range.

Referring now to the preferred embodiments of my invention as illustrated in the accompanying drawing, the numeral 5 denotes a shell of usual construction and provided in the usual way with a high pressure explosive charge consisting of powder 6 and wads 7, and of a projectile charge composed of commingled steel shot 8 and soft lead shot 9. In the form illustrated in Fig. 2 I show a tandem projectile charge, in which a mass of soft lead shot 10 is arranged adjacent the discharging end of the shell while behind the soft lead shot is arranged a mass of steel shot 11. In this tandem construction, the steel shot are preferably made larger than the soft lead shot, the increase in diameter being, for example, as illustrated, approximately ten percent. In this construction also, the mass of steel shot, by preference, constitutes the smaller part of the total projectile charge. By placing the hard shot in back of the soft lead shot, the difficulty of flattening the soft lead shot through the pressure of the explosion is overcome; and if the charge of hard shot is not too large, the hard and soft missiles will become mixed through friction with the barrel and through the disturbance produced from the passing from the cartridge into the barrel, so that there will be a commingled mass by the

time the choke of the gun is reached. This arrangement, therefore, overcomes the usual difficulties encountered with the use alone of either hard shot or soft shot.

In Fig. 3, I illustrate a compound projectile charge, in which there is provided a relatively small mass of soft lead shot 12 adjacent to the discharging end of the shell; then behind this mass of soft shot a relatively large mass of hard shot 13 commingled with the soft shot 12, followed by a small mass of hard shot 13. By thus combining the mixed and the segregated methods of loading, I obtain excellent results when very heavy loads are employed.

By providing projectile charges in accordance with the construction above described, it is possible to use more powerful explosive charges and at the same time to obtain dense patterns at long distances. Moreover, owing to the fact that the soft lead shot act as buffers for the hard shot, the choke of the gun is not ground or cut out by the use of the hard shot.

It is to be understood that my improvements are not confined to any one type of load; nor to any particular material from which the missiles are to be made, although steel is mentioned herein as an example of the hard shot and although lead is referred to as an example of the soft shot. It is also to be understood that the hard shot may be larger in diameter. In such a case the soft shot tend to be contained partly in the voids between the hard shot instead of completely displacing them, and this, of course, reduces the total volume or space occupied by the commingled mass of shot. In the tandem construction, it increases the facility with which the soft shot find their way through the hard shot, producing a complete mixture, when the choke is reached, with a larger charge of hard shot than when both are of the same size.

It is probable that lead may generally be used for the soft shot and that the hard shot will be made of materials of lower specific gravity than that of the material in the soft shot. When this is the case the hard shot may be made larger in volume to have the same weight and therefore the same energy at the muzzle as the smaller soft shot. On the other hand the difference in size may be made such as to produce equal velocity, penetration or energy, or any desired ratio of ballistic characteristics to those of the soft shot at the range for which the cartridge is intended.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A shotgun cartridge characterized by having a projectile charge composed in part of soft shot and in part of hard shot, substantially as described.

2. A shotgun cartridge characterized by having a high pressure explosive charge and a projectile charge composed in part of soft shot and in part of hard shot, substantially as described.

3. A shotgun cartridge characterized by having a projectile charge composed partly of soft shot and partly of hard shot, positioned and related to allow flattening of the soft shot during the agitation instant to muzzle trajection to prevent cutting of the bore by the unyielding hard shot, substantially as described.

4. A shotgun cartridge characterized by having a projectile charge composed partly of soft shot and partly of hard shot, positioned and related to insure flattening of the soft shot under the reactions of the hard shot during agitation instant to muzzle trajection to secure a dense pattern of the hard shot, substantially as described.

5. A shotgun cartridge characterized by having a projectile charge composed of commingled hard and soft shot, substantially as described.

6. A shotgun cartridge characterized by having a projectile charge composed of a mass of soft shot adjacent to the discharging end of the shell, and a mass of hard shot behind the mass of soft shot, substantially as described.

7. A shotgun cartridge characterized by having a projectile charge composed of a mass of soft shot adjacent to the discharging end of the shell, a mass of commingled hard and soft shot behind the mass of soft shot, and a mass of hard shot behind the mass of commingled shot, substantially as described.

8. A shotgun cartridge characterized by having a projectile charge composed of a mass of commingled soft shot adjacent to the discharging end of the shell, a mass of hard shot behind the soft shot, the hard shot being larger than the soft shot, substantially as described.

9. A shotgun cartridge characterized by having a projectile charge composed of a mass of soft shot adjacent to the discharging end of the shell, and a mass of hard shot behind the soft shot, the mass of hard shot constituting the smaller part of the total mass of the projectile, substantially as described.

10. A shotgun cartridge characterized by having a projectile, composed of a mass of

soft shot adjacent to the discharging end of the shell, a mass of hard shot behind the soft shot, the hard shot being larger than the soft shot and constituting the smaller part of the total mass of the projectile, substantially as described.

11. A shotgun cartridge characterized by having a projectile charge composed in part of soft shot and in part of hard shot the soft and hard shot being of such sizes as to have approximately equal weight, substantially as described.

12. A shotgun cartridge characterized by having a projectile charge composed in part of soft shot and in part of hard shot, the soft and hard shot being of such sizes that there will be predetermined ratios among their various ballistic characteristics at a certain range from the muzzle of the gun, substantially as described.

In testimony whereof I have signed my name to this specification.

WILLIAM J. PAVEK.