Jan. 27, 1970 V. L. KNIGHT 3,491,690

WATER BOOSTED SHOTSHELL

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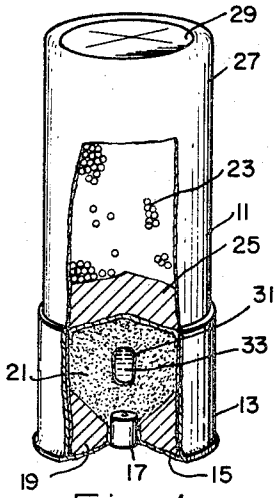


Fig. 1.

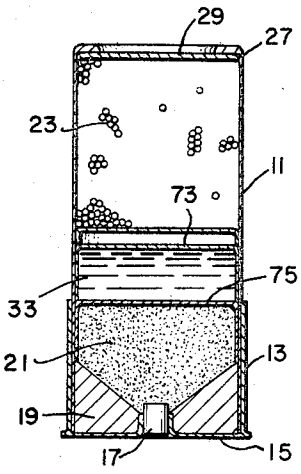
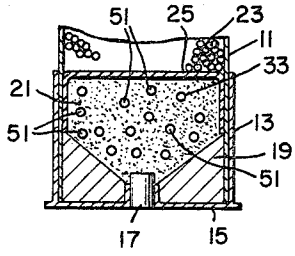


Fig. 4.

Fig. 2.



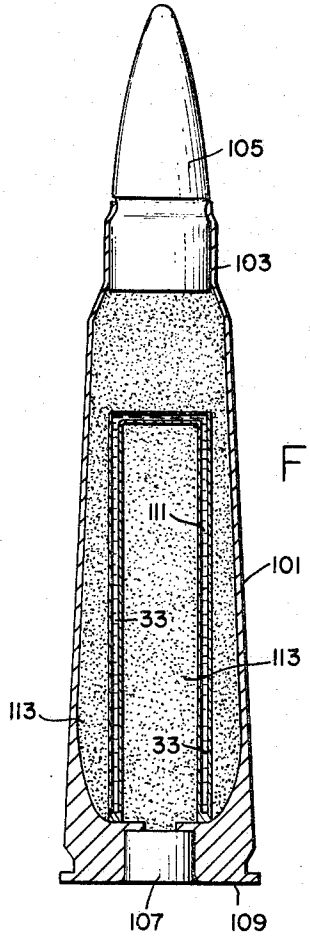


Fig. 7.

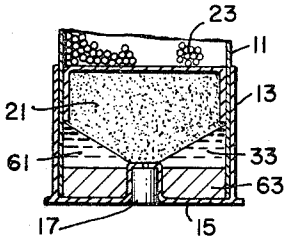


Fig. 3.

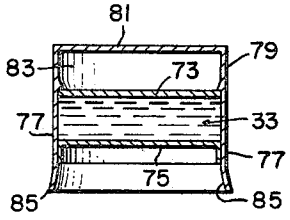


Fig. 5.

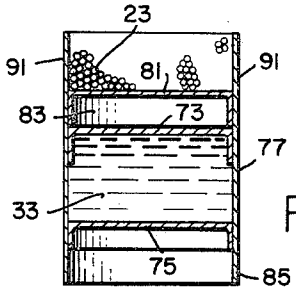


Fig. 6.

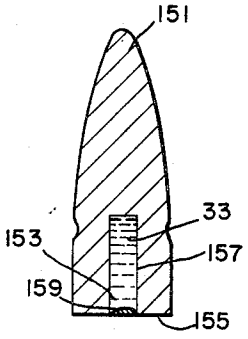


Fig. 8.

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WATER BOOSTED SHOTSHELL

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ABSTRACT OF THE DISCLOSURE

A waterproof container filled with a liquid is disposed in a position within the shotshell where at least a portion of the container is exposed to the heat generated by the ignition of the propellant so that at least a portion of the container so exposed will disintegrate to liberate the liquid which will then be substantially vaporized by the heat generated.

It has long been the byword of the ammunition and arms art that it is imperative to keep the powder dry. This tradition has remained in full force and effect from the days of the muzzle loading arms to the present time. Much literature and quite a number of patents that have issued have dealt with the solution to the problem of keeping water and moisture out of ammunition, especially shotshells which do not have a completely enclosed metal housing. To this end, the development of the shotshell case made of molded plastic has been hailed by shooters everywhere.

The reason for this extreme caution is obvious. It has always been the thought that even a small amount of moisture would adversely affect the performance of the charge or powder in the bullet or shell. This contention is correct in its general sense, but not in all circumstances. It has been found that moisture even though present in the area of the powder will not adversely affect the burning and gas generation of the powder if the moisture has not the time to "wet" the powder. It has further been found that water in the vicinity of the powder charge has some very substantial advantages such as providing extra thrust, cooling the barrel of the gun in which this ammunition is used and a further advantage of helping to keep the inside of the barrel clean by removing residue.

It is therefore an object of the invention to provide an improved type of ammunition that overcomes a heretofore extreme prejudice in the art by using water in the vicinity of the powder charge.

It is another object of this invention to provide a type of ammunition that provides a boost in thrust while helping to keep the barrel of the gun utilizing such ammunition cool even under rapid fire conditions.

It is still another object of the invention to provide a new type of ammunition that helps to maintain the barrel of a gun clean from harmful foreign substances such as residue.

These and other objects of the invention are provided according to one embodiment of the invention comprising a tubular body casing having a closed head end and an open mouth end. A propellant such as gun powder and a projectile such as a bullet or shot is conventionally disposed in the casing which also includes a conventional primer to ignite the propellant. The invention also includes a liquid-filled waterproof container disposed in the casing, at least a portion of which is exposed to the heat generated by the ignition of the propellant. At least a portion of the container so exposed is fabricated from a material having a low flash point so as to liberate the liquid which will substantially be vaporized by the heat.

The invention and specific embodiments thereof will be described hereinafter by way of example and with reference to the accompanying drawings wherein like reference numerals refer to like elements or parts, and in which:

FIG. 1 is an embodiment of the invention in the form of a shotshell;

FIG. 2 illustrates the head portion of a shotshell in accordance with another embodiment of the invention;

FIG. 3 illustrates the lower portion of a shotshell in accordance with still another embodiment of the invention;

FIG. 4 is still a further embodiment of the invention in the form of a shotshell;

FIG. 5 illustrates a variation of the embodiment of FIG. 4;

FIG. 6 illustrates another variation of the embodiment of FIG. 4;

FIG. 7 is an embodiment of the invention in the form of a rifle, hand gun, or machine gun cartridge; and

FIG. 8 illustrates a projectile portion of a cartridge or an artillery round in accordance with the invention.

With reference to the drawings and particularly FIG. 1, there is shown an elongated tubular shotshell body or casing **11** of plastic, paper, metal or other suitable material. The casing **11** includes a head portion **13** of metal attached to the lower end of the tubular casing **11** by conventional means. The head portion **13** has a closed end **15** in which is centrally disposed a conventional primer means **17**. Within the casing **11** is a conventional base wad **19** placed in the head portion **13** and separating the closed end **15** from a quantity of conventional propellant powder **21**.

Separating the propellant powder **21** from a shot charge **23** is a central disk-like wad **25**. The central wad **25**, as in the case of the base wad **19**, may be fabricated from plastic or paper. The central wad **25** may also take on other shapes and sizes to perform certain additional functions such as preventing the shot from contacting the barrel of the gun and thus provide better shot patterns.

At the end **27** of the tubular casing **11** opposite the closed end **15** a plastic, paper or cardboard disk **29** is conventionally retained to confine the shot charge **23** in the casing **11**.

Disposed within the propellant powder **21** is a container **31**, here shown in the shape of a typical medicine dispensing capsule. The shape of the container **31** is not critical but it must be disposed in a position to be exposed to the heat generated by the ignition of the propellant powder **21** when the primer means **17** is detonated. Further, at least a portion of the container must be fabricated or constructed of a material such as a plastic that will in some manner disintegrate or otherwise liberate the contents of the container when the heat generated by the ignited propellant powder reaches it. The container **31** contains a liquid **33** such as water, for example, that upon being subjected to the aforementioned heat will substantially vaporize.

Another form in which the liquid **33** may be carried within a cartridge or shell is shown in FIG. 2. Here, the liquid **33** is contained in a plurality of small ball-like plastic spheres **51** more or less uniformly distributed throughout the propellant powder **21**. This configuration provides a very smooth and uniform vaporization of the liquid **33**.

The liquid container may also take the shape of and replace at least a portion of the base wad. Such a scheme is illustrated in FIG. 3 where container **61** is in the form of straight sided doughnut lying on an annular wad **63** to allow the primer **17** to ignite the propellant powder **21** through the container **61**. The container **61** thus acts

as a cushions to relieve some of the shock when the powder **21** is ignited.

FIG. 4 illustrates still another embodiment of the invention incorporated in a shotshell. Here, the liquid **33** is confined in a liquid retaining enclosure **71** having a high flash top **73** and a low flash bottom **75**. The top **73** and bottom **75** are held in place by a side member **77** of high flash material. The difference between the low flash and high flash material may only be the thickness of each—the higher flash portions being thicker. The side member **77** also may include an upper portion **79** holding a relatively heavy wad-type disk **81** to thus create an air gap **83** between the disk **81** and the top **73** as can be seen in more detail in FIG. 5. The air gap **83** aids in providing a compressible cushion to dampen internal violence within the shell. The air gap **83** as drawn is not to scale but only represented for the purpose of identification. The side member **77** may also include a lower skirt portion **85** to help prevent the escape of gases along the side of the enclosure **71**.

A variation of the enclosure **71** shown in FIG. 5 is displayed in FIG. 6 where the side member **77** includes an extended upper portion **91** to act as a cup to hold the shot charge **23** in a shot group for better shot dispersion control.

It should be clear that the invention is not limited to shotshells but can be incorporated in any ammunition wherein an internal propellant charge is ignited to propel a projectile charge. This category includes rifles, hand guns and artillery and mortar rounds, for example. A rifle cartridge incorporating the invention is shown in FIG. 7. This figure shows a conventional rifle cartridge metal case **101** holding at its open end **103** a bullet **105** and a primer **107** at its closed end **109**. Within the case **101** is found a cylindrical liquid container **111** disposed symmetrically with respect to the longitudinal axis of the case **101** and filled with the liquid **33**. A conventional propellant charge **113** is disposed both within and without the container **111**. When the primer **107** is detonated, the charge **113** is ignited first within the container **111**. The explosion of this portion of the charge **113** disintegrates the container **111** and disperses the liquid **33** throughout the remaining propellant but, before the liquid **33** has time to wet the remaining propellant, it also is ignited in the presence of the liquid. The liquid in this situation is in a position to absorb more heat which causes liquid **33** to evaporate and cause a smooth but large build-up of gas pressure to give greater thrust characteristics. Although a center fire cartridge is shown in the drawing, it should be understood that rimfire or any other type detonation means such as electrical means may be utilized within the scope of the invention.

The liquid container need not always take the form of a capsule but may be incorporated in the bullet or projectile of various types of ammunition, for example. FIG. 8 illustrates such a scheme. This figure shows a bullet

151 of lead, for example, having a longitudinal opening **153** in the bottom end **155** thereof to thus create a container **157**. The opening **153** is closed by a low flash material membrane **159** that prevents the escape of the liquid **33** contained in the container **157**. However, the escape of the liquid and subsequent vaporization thereof will be affected when heated by the ignition of a propellant charge (not shown) adjacent to the membrane **159**. The weight of the bullet **151** may be kept the same as before the boring of the container **157** by extending the lower portion thereof. The operation of this embodiment is basically similar to the other embodiments described.

In all embodiments of the invention, the liquid **33** may be a liquid such as water or may be a liquid having similar heat absorbing and gas creation characteristics. Further, the liquid may be a combination of different materials such as, but not limited to, water and a water soluble lubricant.

From the foregoing, it should be clear that a very useful and advantageous ammunition is provided that aids in the cooling, cleaning and lubrication of the instrument discharging such ammunition and also provides smooth and significant boost to the projectile propelling gases produced by the ignition of the propellant charge.

What is claimed is:

1. A shotshell, comprising:

a tubular body casing having a closed head end and an open mouth end;

shot projectiles disposed in said casing adjacent said mouth end;

propellant means disposed in said casing between said shot projectiles and said head end for propelling said shot projectiles outward of said mouth end when said propellant means is ignited;

a primer means disposed in said head end for igniting said propellant means; and

a plurality of small ball-like plastic spheres distributed uniformly throughout said propellant means, said spheres containing water.

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