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SKEET LOAD

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Fig. 1.

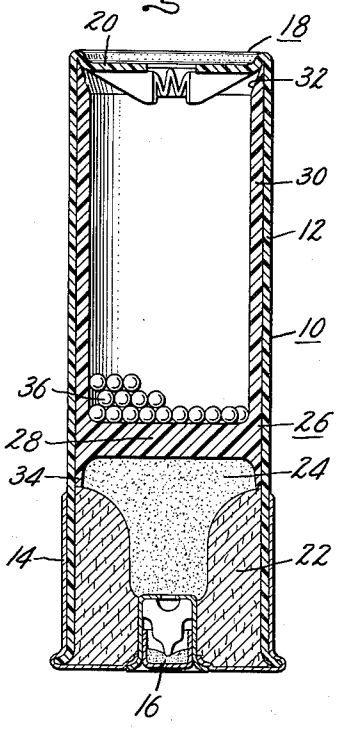
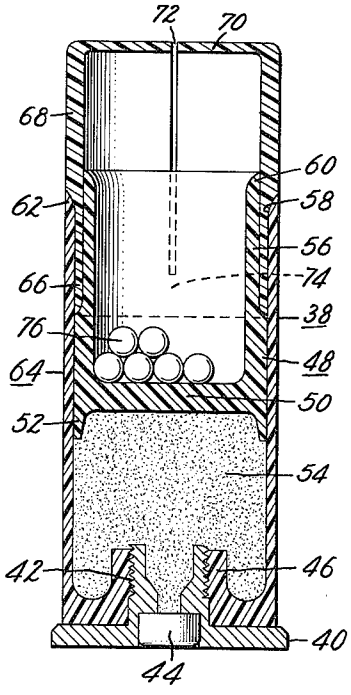


Fig. 2.



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SKEET LOAD

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This invention relates in general to shotgun cartridges. More specifically, it refers to a new and improved shotshell load utilizing steel shot which is especially useful as a skeet target load.

It is significant that although the disadvantages and shortcomings of using lead shot pellets have been appreciated by the ammunition industry for some time, steel shot pellets are not commercially available up to the present time. The major reason for this, of course, is that steel shot, being much harder and much more abrasive than lead shot, is a constant and serious source of gun barrel wear and scratching. Up to the present time, the use of steel shot has been too destructive of gun barrels for other than experimental use.

Heretofore, work in the field on the substitution of steel shot for lead has resulted in shotshell loads which, due to the relatively light weight and relatively high hardness of steel shot as compared to lead, have been admittedly inferior. It is believed that this invention is the first application which utilizes the physical characteristics of steel shot to make a specific shotshell load which in its intended use is clearly superior to the equivalent lead shot load.

Present skeet loads contain 1⅛ ounces of #9 lead shot (658 pellets). Patterns fired from a skeet barrel at 25 yards (skeet range) run about 65–70% (428 to 460 pellets) in a 30" diameter circle. With the present invention it is possible to use one ounce of steel shot (744 pellets) and achieve an 80% pattern at 25 pards (592 pellets) in a 30" diameter circle. This improved skeet load, therefore, would have the following advantages over present loads:

(1) No barrel leading or scoring; (2) less recoil due to ⅛ ounce less shot weight and decrease of weight of wad column since filler wad can be eliminated; (3) far greater pattern density—over 125 more pellets in a 30" diameter circle at normal skeet range (25 yards); (4) a safer load—tests at 40 yards have shown that steel shot pellets of this size possess less energy than #9 lead shot. Therefore, the danger range should be less for steel shot; (5) a more economical shell due to the differential in price between 1 ounce of steel shot at about $.06 per pound and 1⅛ ounces of lead shot at about $.12 per pound; (6) a non-lead shot is non-toxic to fowl, who sometimes become poisoned by eating lead shot pellets.

The above listed advantages of steel shot loads over the present lead shot loads are real and highly desirable. It must be stated however, that due to the range limitations of steel shot, the advantage of greater pattern density disappears as the effective range increases over 25 yards. The other advantages remain however.

It is an object of this invention to provide an improved shotshell in which steel shot pellets are efficiently and effectively utilized.

It is a further object of this invention to provide an improved skeet load designed to give improved patttern density at a range of about 25 yards.

It is a further object of this invention to provide a more economical and safer shotshell load than the present lead shot shotshells.

Other objects and advantages will be apparent from

the following description and accompanying drawing in which:

FIGURE 1 shows an elevation view of a shotshell utilizing the present invention.

FIGURE 2 is an elevation view showing a modified version of the invention.

Referring to the drawing, FIGURE 1 shows a shotgun cartridge **10** in which the shotshell body **12** is preferably made of plastic **9** although paper, or any other suitable material can be used. At the lower end of the body **12** is a head **14** in which a conventional priming assembly **16** is positioned. The open-ended forward or mouth end **18** of the body is closed off by a closure **20** which is integral with the body **12** and crimped so as to provide the closure means. Obviously other types of closures may be provided.

Located in the lower end of the body adjacent to the head **14** is a conventional base wad **22** in which priming assembly **16** is positioned so that the primer is in direct communication with a propellant explosive means **24**, preferably powder. Immediately adjacent the propellant means is a shot liner **26**, preferably made of plastic.

The shot liner **26** is made in the form of an integrally molded plastic cup which has a transverse wall portion **28** and a cylindrical portion **30** which extends forwardly from the transverse wall. The front end of the cylindrical portion **30** is inwardly inclined at **32** for a purpose to be described later. Cylindrical skirt means **34** extend rearwardly from transverse wall **28** and functions as a gas seal to prevent explosive gas from escaping between the cylindrical portion **30** and the body **10**. A plurality of steel shot pellets **36** are positioned within the shot liner **26** and rest on the transverse wall **28**.

When lead shot is used, it is necessary to insert one or more filler wads between the shot and the propellant means in order to protect the lower layers of soft lead shot from being mechanically deformed by the shock caused by the firing of the shell. In addition, the heat and explosive gas generated by the ignition of the propellant tend to melt the lower layers of lead shot and cause barrel leading. Obviously, both the mechanical deformation and the barrel leading are objectionable and efforts are constantly being made to decrease or eliminate both of these objectionable results.

In the present invention, the steel shot, being substantially harder and having a substantially higher melting point than the lead shot, are not affected by the shock and heat of the propellant explosion in the same manner as the lead shot. It has been found that the transverse wall portion **28** of the shot liner is sufficient to keep the steel shot and propellant separated in order to prevent the direct force of the explosion from deforming the shot pellets.

After various penetration tests, it was found that the wall thickness of a shot liner made of high density linear polyethylene plastic material must be at least .050" in order to prevent the steel shot from scratching the gun barrel. The general classification of polyethylenes based on density has become standard in the industry. Low-density resins are in the range of 0.910 to 0.925 g./cu. cm.; medium-density resins from 0.926 to 0.940 g./cu. cm.; and high-density resins from 0.941 to 0.965 g./cu. cm. If a low density nonlinear polyethylene plastic material were to be considered, the wall thickness requirement would increase to about .060" in order to obtain safe performance. Conversely, a material harder than linear polyethylene could function with thinner wall thicknesses, but such material must not exhibit brittleness such as found in polystyrene liners. Obviously, other forms of flexible polyolefinic plastic materials are available and acceptable in addition to polyethylene.

Polyolefins are the normally solid products of high molecular weight resulting from the polymerization of olefins, usually either ethylene or propylene (singly or in admixture) under suitably selected pressure and temperature conditions, with or without the use of catalysts.

In order to prevent any tendency of a shot pellet to "ride" on the lip of a liner, the mouth of the liner is chamfered, as shown at 32. Due to shot compression during firing, there is no tendency for shot to penetrate the liner in the first ¼" of the mouth end. The reduction in wall thickness at this point, due to a chamfer, therefore would not be harmful.

A modification utilizing another form of the invention is shown in FIGURE 2. In this modification, the shotshell body 38 has a head 40 at one end which can be either connected in a conventional manner, molded integral with the body or releasably connected as shown by threaded means 42. Priming assembly 44 is positioned in the head 40 and flange portion 46 of body 38.

As can be seen in FIGURE 2, a shot container 48 having a transverse wall portion 50 and a gas sealing skirt means 52 at the lower end thereof is placed within said body adjacent to propellant powder 54. Container 48 also includes a heavy tubular wall portion 56 extending upwardly from transverse wall 50, the heavy wall portion 56 having an elongated peripheral recess 58 at its forward end 60 thus forming an open area between the forward end 60 of the shot container 48 and the forward end 62 of the shotshell body 64. Into this open area is inserted the lower tubular wall portion 66 of a closure-container 68. The closure-container 68 is in the form of an inverted cup whose lower, necked-down end portion 66 telescopes into the open area formed by the shot container and the shotshell body and which is held there either by a friction fit or by any other well known means such as a detent, a circular bead, etc.

Closure-container 68 also includes a forward transverse closure member 70 and a slit 72 which extends longitudinally through the closure-container. An unslit portion 74 acts as a hinge means which will be explained below. A plurality of steel shot pellets 76 are enclosed within the shot container and container-closure so that firing, the shot container and closure-container move together as a unit until the unit leaves the gun barrel (not shown), after which the container-closure opens up like a clam at its slit and hinges on the unslit hinge portion 74, thus releasing the shot pellets. This aspect of the shotshell, however, is not part of the present invention and is mentioned here only to provide the necessary background information.

In order for the unit comprised of the shot container and the container-closure to effectively prevent the steel shot pellets from scratching the gun barrel, the same conditions of plastic thickness must be present. Thus, at least about .050" of high density linear polyethylene plastic material or .060" of non-linear polyethylene must be provided if the steel shot is not to push through the plastic and scour or scratch the gun barrel. However, it must be appreciated that this thickness of plastic can be the combined thickness of the upper portion 60 of the shot container 48 and the lower portion 66 of the closure-container 68.

It is believed that the above describes the first effective and practical shotshell using steel shot. As explained above, the utility of such a combination for a skeet load is apparent.

It is to be understood that the figures are not drawn to scale and that relative dimensions of the various elements, if they are deemed patentably important, will be found in the specification and not to be derived by scaling the drawings.

What is claimed is:

1. A shotgun cartridge comprising a shotshell body with a head at one end and an open mouth at the opposite end, propellant explosive means positioned in said body, priming means in the head cooperating with and in communication with said propellant explosive means, a closure means slidably mounted at the mouth end of the body and adapted to be explosively projected therefrom, said closure means comprising an inverted cup of polyethylene plastic material, said cup having a transverse closure member and a rearwardly-extending tubular wall portion, slit means in said transverse closure member connecting with slit means said closure tubular wall portion, an integrally molded shot container made of polyethylene plastic material positioned within said body and cooperating with said inverted closure cup to form a chamber therebetween, said shot container comprising an elongated tubular wall portion and an integral transverse wall positioned immediately adjacent to said propellant explosive means, gas sealing means extending rearwardly from said transverse wall, a plurality of steel shot pellets confined within said chamber, said chamber being defined by said shot container transverse wall at the rear, said transverse closure member at the front and by a minimum of about 0.060" thickness of plastic at the sides so that a minimum of 0.060" plastic is positioned between the steel shot and the shotshell body thus effectively preventing the steel shot from coming in contact with the shotshell body and the gun barrel while the shot is being explosively projected therethrough.

2. A shotgun cartridge as recited in claim 1 wherein said closure tubular wall portion includes an end portion which overlaps and abuts a cooperating end portion of said shot liner tubular wall portion, said cooperating end portions of said closure tubular wall portion and said shot liner tubular wall portion separating said steel shot from said shotshell body by a minimum of about 0.060" thickness of plastic.

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