United States Patent

Moehlman et al.

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[54] SHOT PROTECTOR

[72] Inventors: **Vernon C. Moehlman; Robert J. Klein,** both of Florissant, Mo.

[73] Assignee: **Olin Mathieson Chemical Corporation**

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[52] **U.S. Cl.** ..... **102/42 C,** 102/95

[51] **Int. Cl.** **F42b 7/08**

[58] **Field of Search** ..... 102/42 C, 95

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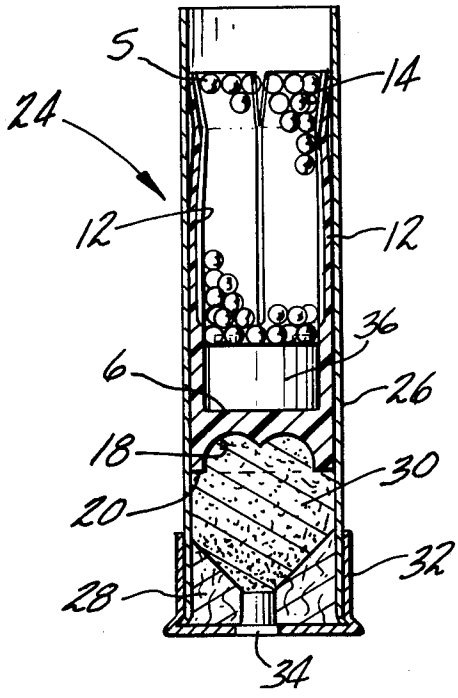
Primary Examiner—Robert F. Stahl

Attorney—H. Samuel Kieser, Donald R. Motsko and William W. Jones

[57] **ABSTRACT**

A one piece plastic shot protector for use with a shot shell, the shot protector having a lower or rearward gas obturating portion, and an upper or forward shot-receiving pocket. The shot pocket has a side wall including a plurality of adjacent petals of predetermined thickness, each of the petals being joined to the pedal next adjacent thereto by a thin web of plastic, and the terminal forward portion of each petal being outwardly flared. Wad retaining means may be included in the shot pocket.

8 Claims, 5 Drawing Figures



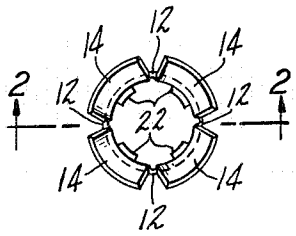


FIG - 1

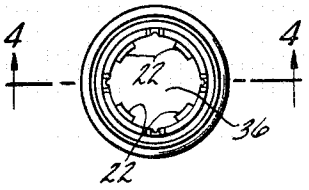


FIG - 3

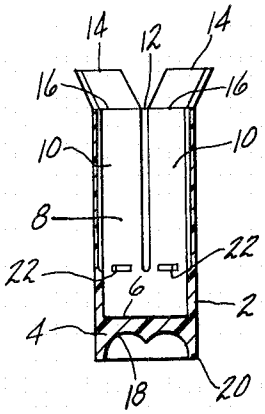


FIG - 2

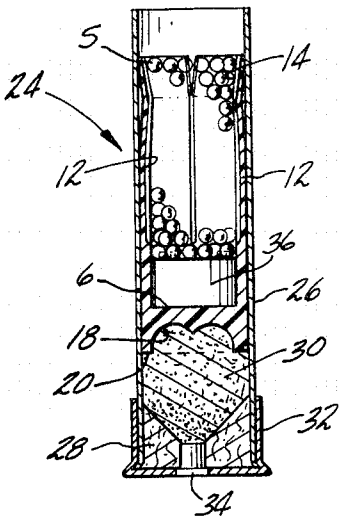


FIG - 4

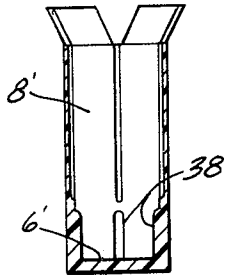


FIG - 5

INVENTORS
VERNON C. MOEHLMAN
ROBERT J. KLEIN

BY William W Jones

ATTORNEY

SHOT PROTECTOR

This invention relates to a one-piece plastic shot protector for insertion into a shot shell tube, the protector providing a gas obturator and a shot pocket in which the shot are disposed.

In general, a one-piece plastic shot protector for use with a shotshell, and having a gas obturating portion and a shot pocket portion is old in the art. Shop protectors of this character may include a lower or rearward hallowed end portion with an outwardly deflectable skirt, which rearward end portion overlies the propellant charge in the shot shell. When the shell is fired, the skirt flares outwardly against the barrel bore to seal combustion gases as the shot protector and shot charge are propelled through the barrel. Shot protectors of this character also may include an upper or forward end portion which defines a shop pocket having a cylindrical side wall. The shot charge is disposed in the shot pocket and travels through the barrel bore with the protector when the shell is fired. The side wall of shot protector thus protects the shot charge from contact with the barrel bore so that the shot pellets will experience minimum abrasion and compaction from the barrel bore as the shot charge passes through the barrel. A transverse web is included in the shot protector to separate the gas obturator from the shot pocket. Furthermore, the side wall of the shop pocket may include a number of longitudinal slits forming outwardly deflectable petals in the side wall. The petals flare outwardly when the shot protector leaves the gun muzzle, the flaring being triggered by air resistance, and the shot charge then moves forward away from the protector while the latter falls to the ground.

In assembling a shot shell using this variety of shot protector, the protector is inserted into the shot shell tube and slid thereinto until the obturator overlies the propellant charge. The shot pocket is then filled with shot by pouring the latter into the mouth of the shell tube. The tube mouth is then closed by crimping or in any other conventional manner. A problem has been found to exist with respect to the loading of this type of shotshell. This problem concerns maintaining the petals flush against the inside surface of the shot shell tube so that the shot pellets will not become lodged between the outer surface of the petals and the inner surface of the tube when the shot is poured into the shot pocket. Pellets which lodge between the petals and the tube cause the petals to bend inwardly with the result that subsequent pellets introduced into the tube will lodge between the petals and the tube and will not enter the shot pocket. These pellets will be abraded by the barrel bore after firing and will result in a poor shot pattern. Furthermore, these pellets will score the barrel bore reducing the life expectancy of the barrel.

Prior to the initial loading of the shot protector into the shell tube, the protectors may be stored for long periods of time and may undergo substantial handling. Since the petals are rather fragile, they often are bent or creased prior to loading. Often one or more of the petals will be bent inwardly into the shot pocket so that when the protector is inserted into the tube, the bent petals will not lie flat against the inside surface of the tube. Since the petals on the shot protectors of the prior art are unconnected and operate independently of each other, the other petals on the protector are not able to bring the bent petal into proper position against the tube when the protector is inserted into the tube. Thus shot loaded into the shot pocket will lodge between the petals and the shell tube in an undesirable fashion.

The shot protector of this invention is formed with the upper or forward terminal portions of the petals flared outwardly at an angle to the axis of the shot protector. Adjacent petals on the shot protector are connected by a thin plastic membrane which is operative to lend the strength of each petal to the adjacent petals. Thus any one petal will resist being bent inwardly since it is connected to the adjacent petals by the membranes. This resistance to deformation is greater than if the petals were completely disassociated from adjacent petals. The flared end portions of the petals are stressingly

pressed against the inner wall of the shotshell tube and thus closely adjacent thereto so that no shot pellets can become lodged between the protector and the shell tube. Furthermore, if one of the flared portions of a petal becomes creased or deformed inwardly, the connecting membranes serve to urge the deformed petal outwardly toward its original position when the protector is inserted into the shell tube. The membranes are sufficiently weak, however to tear when the protector and shot charge are fired from the muzzle of the shotgun and exposed to air resistance. The flared portions of the petals tend to act as a scoop to increase air resistance acting on the petals and thereby quickly tear the membranes to permit the petal to flare outwardly in the air to release the shot charge.

A second problem occurring with the prior art shot protectors concerns the positive positioning of filler wads within the shot pocket. The same shot protector can be used with a variety of shot loads if the extra space within the shot pocket is filled with a filler wad which is seated against the bottom wall of the shot pocket beneath the shot charge. The filler wad is placed in the shot pocket before the shot charge is inserted, so that the filler wad, and its position relative to the bottom of the shot pocket determines the volume of shot that can be poured into the shot pocket. The filler wads are sized to a predetermined volume to cooperate with a shot pocket of predetermined volume to define the size of the shot charge. If the filler wad does not seat against the bottom of the shot pocket, or does not remain seated against the shot pocket bottom during handling before the shot is poured into the pocket, the amount of shot that can be poured into the shot pocket will be less than the prescribed shot charge for the shell. The shot pocket of this invention may be equipped with radially inwardly extending projections which engage the filler wad in a positive manner to retain the latter in abutment with the bottom wall of the shot pocket.

It is, therefore, an object of this invention to provide a plastic shot protector adapted to be positioned in a shotshell so as to prevent shot pellets from wedging between the protector and the shotshell wall.

It is a further object of this invention to provide a shot protector of the character described wherein a plurality of petals are disposed to define the side wall of the shot pocket, the end portions only of the petals being outwardly flared for stressing contact with the wall of the shotshell.

It is yet another object of this invention to provide a shot protector of the character described wherein adjacent ones of the petals are partly joined together by a thin web of plastic material so that adjacent petals are opera-tively connected together.

It is an additional object of this invention to provide a shot protector of the character described wherein the shot pocket includes projections operative to positively grip a filler wad to hold the latter in abutting contact with the bottom wall of the shot pocket.

These and other objects and advantages of this invention will become readily apparent from the following detailed description when read in conjunction with the accompanying drawings, in which:

FIG. 1 is a top view of a preferred embodiment of the shot protector of this invention;

FIG. 2 is a side sectional view of the shot protector taken along line 2—2 of FIG. 1;

FIG. 3 is a top view of the shot protector of FIG. 1 shown in position within a shotshell;

FIG. 4 is a side sectional view of the shotshell and shot protector taken along line 4—4 of FIG. 3 and showing the shot pocket filled with shot pellets; and

FIG. 5 is a side sectional view of another shot protector formed in accordance with this invention but without an obturator and having an alternative wad-retaining structure.

Referring now to FIGS. 1 and 2, a preferred embodiment of the shot protector of this invention is shown. The shot protector is preferably formed from a one-piece molded resilient plastic tube of generally cylindrical configuration. The tube

includes a side wall 2 which is cylindrical and which is integral with a transverse web 4 having a surface 6 defining the bottom wall of the shot pocket 8. The side wall 2 is sub-divided into a plurality of petals 10. Each petal 10 is connected to the next adjacent petal by means of a thin-walled plastic membrane 12 which preferably extends through substantially the entire longitudinal dimension of the opposed edges of adjacent petals 10. The membrane 12 is actually a substantially thinned and weakened extension of the adjacent petals 10 and serves to intimately interconnect adjacent petals of the shot protector. Forces exerted on any one petal 10 are thus imparted to the adjacent petals by means of the connecting membrane 12. The strength and resistance to deformation of each petal 10, particularly to inward bending or creasing, are in part increased by means of the adjacent petals and connecting membranes. The forward or upper tip portions of the petals 10 are flared outwardly as at 14 to lie at an acute angle to the axis of the protector. The juncture 16 between the flared tip 14 and the main portion 10 of each petal is a substantially rigid connection which will tend to resist inward deflection of the flared tips 14. Thus when the flared portion 14 of any one petal is moved or deflected inwardly, the entire petal is put into a stressed state of outwardly directed tension by means of the rigid juncture 16 and by means of the connection between the root of the petal and the side wall 2 of the protector. The petals are thus biased outwardly when the protector is inserted into the shotshell tube. The membranes 12 serve to transmit the outwardly directed bias of each petal to each of the adjacent petals when the protector is inserted into the shotshell tube thereby tending to correct any inward deformation which may have been inflicted on any of the petals. The lower or rearward portion of the shot protector is hollowed out, as at 18 beneath the transverse web 4. The side wall of the hollow 18 is relatively thin and flexible to form an annular skirt 20 which flares outwardly when the shell is fired to obturate the barrel against gas leakage as the protector and shot charge are propelled through the gun barrel. A plurality of inwardly extending projections 22 are formed on the inner surface of the side wall 2 and spaced apart a predetermined distance from the bottom wall 6 of the shot pocket 8. The projections 22 act to retain a filler wad in place, as will be explained in greater detail hereinafter.

Referring now to FIGS. 3 and 4, the shot protector of FIGS. 1 and 2 is shown positioned within a shotshell 24 having a cylindrical tube 26 in which is positioned a base wad 28 of conventional structure, and a propellant charge 30 above the base wad 28. The shot protector hollow 18 and obturating skirt 20 overlie the propellant charge 30. The shell also includes a metallic head 32 centrally apertured to receive a primer cup 34 of conventional nature. A filler wad 36 is positioned in the shot pocket, the wad 36 being held against the bottom wall 6 of the shot pocket by the projections 22 which overlie the top surface of the filler wad 36. The projections are sufficiently flexible so as to be deflected aside when the filler wad is pressed into the shot pocket, but sufficiently rigid to retain the filler wad 36 in place against the shot pocket bottom wall 6 if the protector is jostled or turned upside down during handling. The projections 22 also prevent the filler wad 36 from becoming tilted within the shot pocket after initial positioning therein. When the shot protector is positioned in the tube 26, the flared petal portions 14 are forced toward the axis of the shell, and the inherent resiliency of the flared portions 14 in turn forces them outward into snug engagement with the inner wall of the tube 26. This snug fit prevents shot pellets from becoming wedged between the petals and the tube 26 when the shell is loaded. As previously noted, the thin membranes 12 act to transmit the outwardly directed biasing force of each petal 10 and flared portion 14 to each of the adjacent petals and their associated flared portions, so that the entire mouth of the shot pocket fits snugly against the shell tube 26 inspite of inward deformations which may be present in individual ones of the petals. After the shot protector is positioned in the shell tube 26, a charge of shot pellets S is poured into the shot pocket. The upper end of the shell may then be closed in any conventional manner, as, for example, by means of a crimp closure, a frangible or non-frangible top wad, or the like.

Referring to FIG. 5, an alternative means for retaining the filler wad in position is shown. The lower portion of the side wall of the shot pocket is formed with a plurality of radially inwardly projecting, longitudinally extending ribs 38 which frictionally engage the side wall of the filler wad to grip the latter and hold it against the bottom wall 6' of the shot pocket 8'.

It is readily apparent that the shot protector of this invention can easily be molded as a unitary plastic body for economy, and will be more durable during handling and loading operatings, while insuring a snug fit between the mouth of the shot pocket and shell tube so as to prevent shot pellets from becoming wedged between the shotshell tube and the wall of the shot pocket. It is, furthermore, apparent that the total shot load poured into the shot pocket can be more accurately controlled when the use of a filler wad is dictated, by means of the radial projections in the shot pocket which engage and hold the filler wad in place.

While several preferred embodiments of the invention have been explicity set forth, it is contemplated that obvious modifications therefrom could be employed without departing from the spirit of the invention.

What is claimed is:

1. A shot protector formed from a one-piece plastic body for use with a shotshell, said shot protector comprising:
   a. substantially cylindrical wall means sub-divided into a plurality of longitudinally extending flexible petals of predetermined thickness defining at least part of the side wall of a shot pocket, said petals having separate tip portions defining a mouth on said shot pocket, said tip portions being outwardly flared with respect to the remainder of said petals and said tip portions forming means to stressingly force said petals outwardly when said tip portions are deflected inwardly from their outwardly flared positions;
   b. a transverse web having a surface defining a closed transverse bottom wall of said shot pocket; and
   c. connecting means joining adjacent ones of said petals to provide a rupturable connection between said petals.

2. The shot protector of claim 1, wherein said connecting means is a membrane having a wall thickness substantially thinner than the wall thickness of said petals.

3. A shot protector formed from a one-piece plastic body and for use with a shotshell, said shot protector comprising:
   a. cylindrical wall means sub-divided into a plurality of longitudinally extending flexible petals of predetermined thickness defining at least part of the side wall of a shot-receiving pocket;
   b. a transverse web having a surface defining a closed transverse bottom wall of said shot-receiving pocket;
   c. membrane means joining adjacent side edges of adjacent ones of said petals, said membrane means having a wall thickness which is substantially thinner than the wall thickness of said petals, and said membrane means being operative to provide a rupturable connection between adjacent ones of said petals; and
   d. outwardly flared separated tip means connected to said petals along a substantially rigid hinge line, said tip means being operative to bias said petals outwardly when said tip means are deflected inwardly from their flared positions.

4. The shot protector of claim 3, further comprising a flexible annular skirt extending from said transverse web and substantially coaxial with said cylindrical wall, said skirt combining with said transverse web to define gas obturating means.

5. The shot protector of claim 3, further comprising at least one radially inwardly projecting protrusion on said cylindrical wall operative to retain a filler wad in position adjacent to said bottom wall of said shot-receiving pocket.

6. The shot protector of claim 5, wherein said protrusion is spaced apart from said bottom wall of said shot-receiving

pocket a distance approximately equal to the thickness of a filler wad.

7. The shot protector of claim 5, wherein said protrusion is a rib extending longitudinally from said bottom wall of said shot-receiving pocket toward said flared tip means.

8. A shotshell comprising:

a. tubular side wall means;

b. a propellant charge positioned within said tubular side wall means; and

c. a unitary plastic shot protector positioned within said tubular side wall means and overlying said propellant charge to form a gas obturating seal thereabove, said shot protector including shot pocket means having a side wall comprising a plurality of flexible petals of predetermined wall thickness, outwardly flared tip means connected to said petals along a substantially rigid hinge line, said tip means defining the mouth of said shot pocket means and said tip means being disposed in stressed engagement with said tubular side wall means and operative to position said petals in a stressed condition to bias said petals against said tubular side wall means, and membrane means interconnecting adjacent ones of said petals to form a rupturable connection between said petals, said membrane means having a wall thickness which is substantially less than said petal wall thickness, and said membrane means being operative to transmit stress from one petal to each of the petals adjacent thereto.

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