Oct. 18, 1966 G. L. HERTER 3,279,375

SHOTGUN SHELL WAD

Filed April 27, 1964

FIG. 2

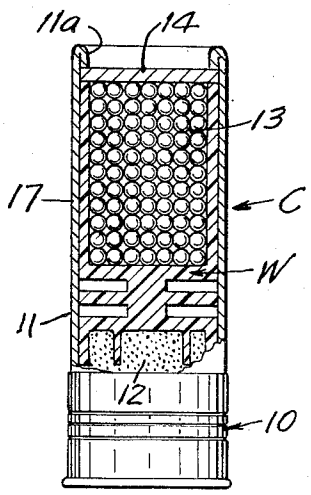



FIG. 1

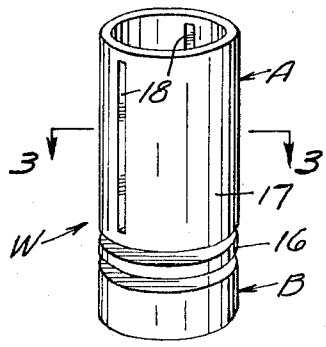



FIG. 3

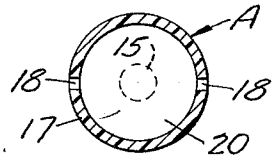



FIG. 4

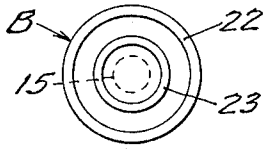



FIG. 5

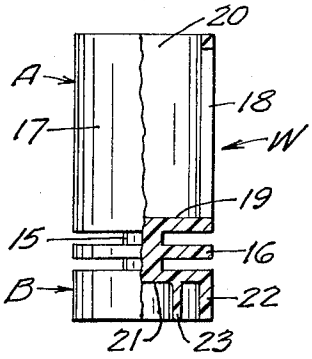
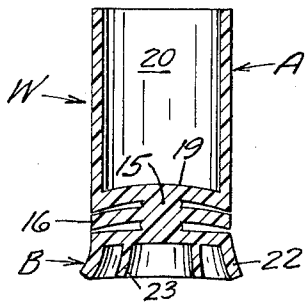



FIG. 6




INVENTOR
GEORGE L. HERTER
BY
Williamson & Palmatier
ATTORNEYS

United States Patent Office

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# SHOTGUN SHELL WAD

George L. Herter, Waseca, Minn., assignor to Herter's Inc., Waseca, Minn., a corporation of Minnesota

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6 Claims. (Cl. 102—95)

This invention relates to firearm cartridges and particularly to an improved shotgun shell wad to be disposed between the explosive charge and the shot pellets thereof.

An object of this invention is to provide an improved wad of the type described which is adapted to cushion and absorb the initial explosive impact or shock and thereby dampen the transmission of the explosive force to the projectile or shot.

Another object is to provide a wad of the type described which decreases and minimizes engagement of the shot with the barrel, thereby reducing wear on the gun barrel and decreasing or eliminating the deformation of the shot through such engagement, the reduction in deformation of the shot thereby improving the symmetry of the shot patterns, since deformed shot pellets tend to stray from the intended line of flight.

Still another object is to provide a wad of the type described having a cup, pocket or chamber for receiving and enclosing the shot, said shot cup having perforated wall structure so designed that it can be readily discharged from the barrel of the gun and which enables the wad to be fed easily through and handled by automatic machines without complication or jamming thereof.

Still another object is to provide a wad of the type described which is so designed as to keep the wad from cocking and maintain a true line of flight therefor as it travels through the barrel.

Still another object is to provide a wad of the type described having a shot cup and obturating means integrally connected therewith to provide an optimum gas seal with the gun barrel.

Still another object is to provide a wad of the type described which includes a shot cup and an obturating portion which are integrally connected and yet capable of relative axial movement therebetween to absorb the initial shock of the ignited explosive.

These and other objects and advantages of this invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views, and in which:

FIG. 1 is a perspective view of a wad constituting one preferred embodiment of this invention;

FIG. 2 is a side view of a shotgun cartridge embodying the wad of FIG. 1, with the upper portion of said cartridge shown in longitudinal diametrical section;

FIG. 3 is a cross-sectional view of the wad taken on the line 3—3 of FIG. 1;

FIG. 4 is a bottom plan view of the wad of FIG. 1;

FIG. 5 is a side view of the wad of FIG. 1 shown partly in elevation and partly in section as it appears prior to firing the cartridge; and

FIG. 6 is a diametrical longitudinal section of the wad of FIG. 1 as it appears immediately after firing of the cartridge and ignition of the explosive propellant charge thereof.

Referring to the drawings for a more detailed description of this invention, a complete shotgun cartridge C is illustrated in FIG. 2, said cartridge having a suitable metal base **10**, and the usual tubular generally cylindrical body or case **11** fabricated of paper, metal, plastic or the like. A primer assembly of any suitable type (not shown) is mounted in the base and a propellant explosive charge of



powder **12** is disposed thereabove in the conventional manner.

The wad W of this invention is telescopically mounted in the casing **11** in close fitting relationship and sliding engagement therewith and disposed on top of and seated on the powder **12**. The conventional lead pellets or shots **13** are enclosed within the wad W. The wad W and shot **13** are confined within the cartridge by a sealing wad **14**, which sealing wad is held in place by the inturned outer end **11***a* of the tubular casing of the cartridge.

Considering the wad W of this invention in more detail, said wad is preferably of integral molded construction and formed of compressible, deformable, flexible plastic material such as polyethylene. The wad W consists of an upper shot cup A and a lower sealing or obturating powder engaging base B, the upper shot cup and lower sealing base being interconnected by an axially extending shank or rod portion **15** extending therebetween, said rod having a circular flange or collar **16** formed thereon and extending perpendicularly therefrom, said collar being disposed approximately midway between and in spaced relationship from both the upper cup A and lower base **B**.

The upper shot cup A is open at its upper end and includes a generally cylindrical tubular wall **17** having a pair of diametrically opposed slotted openings **18** formed therein and a base portion **19**. It is important to note that the slots extend substantially the full length of the cylindrical wall portion but terminate just short of the outer end thereof so that they are not in communication with the marginal edge of the cup wall **17**. Thus, the slots or openings **18** are completely enclosed by the wall **17** and the upper or outer end of the shot cup A is of continuous integral annular formation and therefore will not tend to materially distort or flare out. This is particularly important in guns having choke mechanisms with an open space between the end of the barrel and the start of the choke tube. If the slots extended all the way to and communicated with the outer end of the shot cup, this outer end would distort and lodge or mushroom around the choke tube. However, because the openings **18** are completely enclosed, this cannot occur in the wad of this invention.

The wall **17** and base **19** define a recess or chamber **20** for receiving, housing and enclosing the aforementioned shot pellets **13**, which pellets may rest directly on the base **19**, without using any of the conventional filler or separator wads between the base **19** and the pellets. The conventional separator wads are usually considered necessary or at least desirable in cartridges using prior art overpowder obturating wads. However, the novel design of the wad of this invention obviates the need for such separator wads, although it will be understood that such can be used with the wad of this invention, and such use comes within the scope of this disclosure.

The slots **18** are provided to permit any air or lubricant present in chamber **20** at the time of firing to escape or be expelled from said chamber. Although the openings in the shot cup wall are preferably slotted as shown, it will be understood that openings having geometrical configurations, shapes, direction or number other than illustrated can be successfully utilized within the scope of this invention. Thus, the slots could be spirally arranged, or a plurality of small perforations could be vertically or spirally arranged to replace slots **18**.

The lower gas sealing base B actually comprises a cup within a cup or a pair of downwardly facing concentric cups having a common base **21**. The outer or larger cup has a depending resilient generally cylindrical skirt, wall or flange **22** which is spaced from the generally cylindrical wall **23** of the inner or smaller cup to form an annular groove between the walls **22–23**. Since the wad

is formed of somewhat flexible plastic material, the wall **22** of the outer cup expands or flares outwardly upon the initial explosion of the charge under the influence of the explosive gases and moves into tight sealing engagement with the barrel of the gun to prevent said gases from escaping forwardly.

The inner wall **23** serves to reinforce and strengthen the gas sealing cup and prevent rupture thereof when the powder is ignited. The hollowing out of the central portion of the underside of the obturating portion of the wad is unique, and provides better results than obturating wads of the prior art. In the past, the recess defined by inner wall **23** has been enclosed. The novel hollow design of this invention provides the necessary strength while at the same time providing more powder receiving space, thus providing for more effective use of all the space within the cartridge. This design also provides for more instantaneous uniform axial application of pressure to the wad by the explosive gases across the cross-sectional expanse of the wad.

The design of the upper and lower cups, the interconnection thereof by the narrow connecting rod **15**, and the compressible flexible nature of the material of construction provides a resilient compressible design which provides for relative axial movement between the upper and the lower cups A–B so as to cushion or absorb the initial explosive impact at the moment of discharge of the powder. When the powder is ignited, the gases formed thereby fill the cup B and press against the base **21** thereof. Because of the compressible resilient nature of the material from which the wad W is formed, the rod **15** tends to be compressed longitudinally or axially, and the base **19** of the shot cup tends to be pushed or bowed inwardly into the chamber **20** by the rod **15**, thus permitting and causing the cup B to move axially towards cup A and resiliently yield under the influence of the explosive gases to cushion the initial force thereof and minimize danger of damage to the wad W. This cushioning action of the wad is illustrated in FIG. 6, which shows the wad W immediately after firing and with FIG. 5 (which shows the wad before firing) illustrates the difference in positioning of the component parts of the wad W immediately before and after firing. It can be readily seen in FIG. 6 how, after firing, the sealing cup B moves towards the shot cup A, the rod **15** is axially compressed, and how the base **19** of the shot cup is bowed inwardly. The intermediate collar **16** is provided to prevent or minimize the cocking of the wad W as it travels through the barrel and maintains a truer line of travel therefor.

Thus, in use, when the powder is ignited, the skirt **22** of the lower cup B of the wad W is pushed outwardly into sealing engagement with the gun barrel and provides a gas seal therewith. The lower cup B moves axially toward and relative to the upper cup A without disintegrating under presssure to absorb and cushion the initial explosive shock. The entire wad W then moves as a unit through the barrel, carrying the pellets **13** therewith. The upper shot cup A prevents or minimizes contact of the shot with the gun barrel, thereby reducing the wear on the gun barrel and preventing or reducing shot deformation and thereby providing an improved and more symmetrical shot pattern.

The wad W is discharged from the gun and travels some distance until the air resistance slows the wad down to the point where the shot pellets are completely discharged therefrom and the wad falls to the ground.

Wads of this type are of such durable construction that they can be reused where desired and can be readily eliminated from all gun barrels including those having choke mechanisms thereon.

Although the wad of this invention is particularly applicable to shotgun cartridges, it can also be used in other types of cartridges for both small and large guns, including small arms ammunition and heavy-duty field type shells.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What I claim is:

**1.** A firearm cartridge wad comprising a tubular projectile cup having an open outer end and a closed inner end and adapted to house the projectile means of said cartridge, the wall of said cup having a pair of diametrically opposed slots formed therein and extending longitudinally thereof, the outer marginal edge of said cup being of integral annular formation, a sealing cup co-axial with said projectile cup and axially spaced therefrom and adapted to overlie and be exposed to the explosive charge of said cartridge, said sealing cup having an open outer end and a closed inner end, said sealing cup comprising a pair of concentric tubular walls connected to the inner end thereof and opening outwardly, said tubular walls being radially spaced from each other, the outer of said walls being adapted to move outwardly and sealingly engage the barrel of a gun under the influence of the gas from the ignited explosive charge of said cartridge, a flexible disk co-axial with, disposed between and spaced from said cups, said cups and said disk being of substantially the same outer diameter, a rod interconnecting said cups and disk and disposed co-axially thereof, said rod being of substantially smaller diameter than said cups and disk, said sealing cup and rod being capable of axial movement towards said projectile cup under the influence of the ignited explosive charge.

**2.** A firearm cartridge wad comprising a tubular projectile cup having an open outer end and a closed inner end and adapted to house the projectile means of said cartridge, the wall of said cup having a pair of diametrically opposed slots formed therein and extending longitudinally thereof, the marginal edge of the outer end of said cup being of integral annular formation, a sealing cup co-axial with said shot cup and axially spaced therefrom and adapted to overlie and be exposed to the explosive charge of said cartridge, said sealing cup having an open outer end and a closed inner end, said sealing cup comprising a pair of concentric tubular walls connected to the inner ends thereof and opening outwardly, said tubular walls being radially spaced from each other, the outer of said walls being adapted to move outwardly and sealingly engage the barrel of a gun under the influence of gas from the ignited explosive charge of said cartridge, and means interconnecting said cups whereby said sealing cup is capable of axial movement towards said projectile cup under the influence of the ignited explosive charge.

**3.** A firearm cartridge wad comprising a tubular projectile cup having an open outer end and a closed inner end and adapted to house the projectile means of said cartridge, a sealing cup co-axial with said projectile cup and axially spaced therefrom and adapted to overlie and be exposed to the explosive charge of said cartridge, said sealing cup having an open outer end and a closed inner end, said sealing cup comprising a pair of concentric tubular walls connected to the inner end thereof and opening outwardly, said tubular walls being radially spaced from each other, the outer of said walls being adapted to move outwardly and sealingly engage the barrel of a gun under the influence of the gas from the ignited explosive charge of said cartridge, a disk co-axial with, disposed between and spaced from said cups, said cups and said disk being of the same diameter, a rod interconnecting said cups and disk and disposed co-axially thereof, said rod being of substantially smaller diameter than said cups and disk, said sealing cup and rod being capable of axial movement towards said shot cup under the influence of the ignited explosive charge of said cartridge.

**4.** A firearm cartridge wad comprising a tubular projectile cup having an open outer end and a closed inner end and adapted to house the projectile means of said cartridge, sealing means disposed opposite the inner end

of said projectile cup and spaced therefrom, said sealing means being adapted to sealingly engage the barrel of a gun under the influence of the gas from the ignited explosive charge of said cartridge, a disk co-axial with, disposed between and spaced from said projectile cup and said sealing means, said cup and said disk being of substantially the same outer diameter, and a rod interconnecting said cup, sealing means and disk and disposed co-axially thereof, said rod being of substantially smaller diameter than said cup and disk, said sealing means and rod being capable of axial movement towards said projectile cup under the influence of the ignited explosive charge of said cartridge.

5. A firearm cartridge wad comprising a tubular projectile cup having an open outer end and a closed inner end and adapted to house the projectile means of said cartridge, the wall of said cup having a pair of diametrically opposed slots formed therein and extending longitudinally thereof, the marginal edge of the outer end of said cup being of integral annular formation, and sealing means attached to the inner end of said shot cup, said sealing means being adapted to sealingly engage the barrel of a gun under the influence of the gas from the ignited explosive charge of said cartridge, said sealing means axially spaced from the inner end of said projectile cup and including means interconnecting said projectile cup end and sealing means, said sealing means being axially movable towards said projectile cup under the influence of the ignited explosive charge of said cartridge, and including a disc disposed between and axially spaced from said sealing means and projectile cup and connected to said interconnecting means, said disc having a circular outer periphery of the same diameter as said projectile cup.

6. A firearm cartridge wad comprising a tubular projectile cup having an open outer end and a closed inner end and adapted to house the projectile means of said



cartridge, a powder engaging base co-axial with said projectile cup and axially spaced therefrom and adapted to overlie and be exposed to the explosive charge of said cartridge, and a rod interconnecting said projectile cup and said powder engaging base and disposed co-axially thereof, said rod being of substantially smaller diameter than said projectile cup and said powder engaging base, said base and said rod being capable of axial movement towards said projectile cup under the influence of the ignited explosive charge and including a disc disposed between and axially spaced from said powder engaging base and said projectile cup and connected to said interconnecting rod, said disc having a circular outer periphery of substantially the same diameter as said projectile cup.


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BENJAMIN A. BORCHELT, *Primary Examiner.*

R. F. STAHL, *Assistant Examiner.*