Feb. 27, 1968 G. L. HERTER 3,370,534

SHOTSHELL WITH INTEGRAL BASE WAD

Filed March 24, 1966

FIG. 1

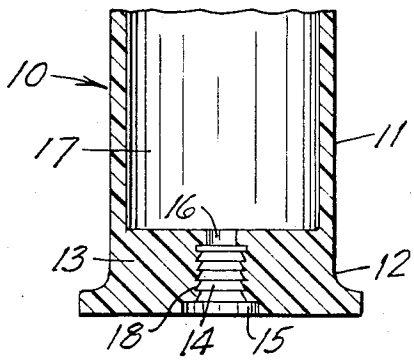


FIG. 2

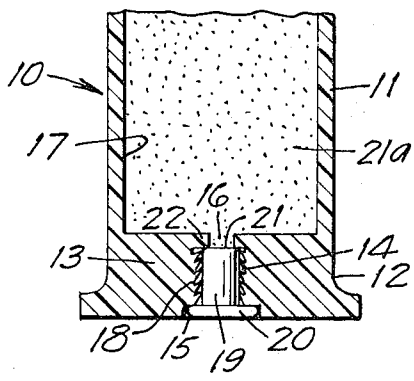


FIG. 3

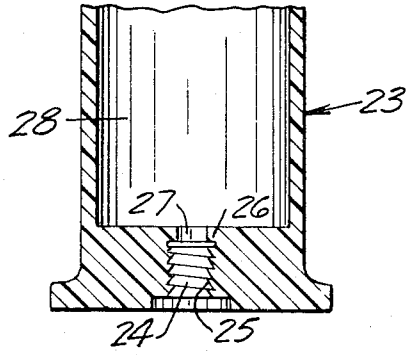


FIG. 4

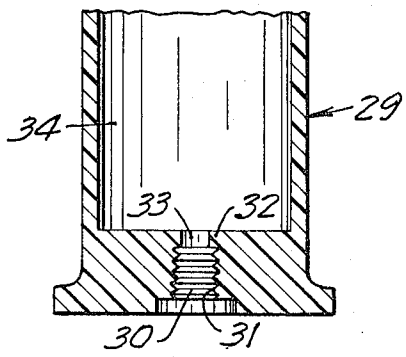


FIG. 5

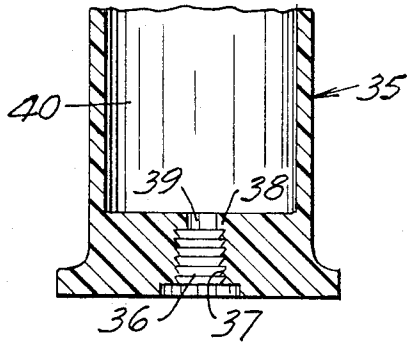
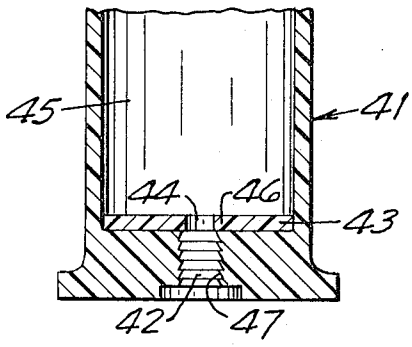


FIG. 6



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SHOTSHELL WITH INTEGRAL BASE WAD

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ABSTRACT OF THE DISCLOSURE

A shotshell casing with integral base wad having a primer cavity with inwardly protecting peripheral saw-tooth shaped ribs and an annular shoulder adjacent the flash port formed integrally of the base wad or on a separate disc.

In the construction of shotshells, a base wad is used inside the head of the shotshell to position the propellant charge or powder in front of the flashing end of the primer cap. Another function of the base wad is to hold the primer cap in the shotshell and to hold the primer cap in such a way that the gases generated at detonation do not leak between the primer cap and the base wad. The base wad should also retain the primer cap in such a way that, after detonation, the base wad and shotshell casing may be reloaded for subsequent use. To achieve this desirable feature, and still maintain proper sealing between the base wad and the primer cap, the base wad must provide for absorption of the forces generated at detonation without becoming cracked or distorted. These forces are particularly great at the surfaces of the base wad which are adjacent the primer cap.

With these comments in mind it is to the elimination of these and other disadvantages to which the present invention is directed along with the inclusion therein of other novel and desirable features.

An object of my invention is to provide a new and improved base wad integral with a shotshell of simple and inexpensive construction and operation.

Another object of my invention is the provision of a base wad, integral with the shotshell, which base wad seals gases generated upon detonation from escaping through the head of the shotshell at the surface of contact between the primer cap and the base wad.

Another object of my invention is the provision of an integral base wad and shotshell which, upon detonation of the propellant charge, maintains a seal and absorbs the pressure generated at detonation without distorting the head of the shotshell or the integral base wad, and without cracking or otherwise deforming the base wad.

These and other objects and advantages of my 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 partial vertical sectional view taken along an axial plane of the shotshell.

FIG. 2 is a partial vertical sectional view taken along an axial plane of the shotshell at the precise time of detonation.

FIG. 3 is a partial vertical sectional view taken along an axial plane of the shotshell showing an alternate form of the integral base wad construction.

FIG. 4 is a partial vertical sectional view taken along an axial plane of the shotshell showing an alternate form of the integral base wad construction.

FIG. 5 is a partial vertical sectional view taken along an axial plane of the shotshell showing an alternate form of the integral base wad construction.

FIG. 6 is a partial vertical sectional view taken along an axial plane of the shotshell, showing the integral base wad with a primer cap sealing disc disposed thereon.

Referring to FIG. 1, a portion of the shotshell is shown and is indicated, in general, by numeral **10**. The shotshell is generally tubular and is formed from compressible, yieldable, resilient plastic material such as polyethylene, and is typically of molded or drawn construction. The casing portion is indicated by numeral **11** and; the head portion by numeral **12**. The base wad portion **13** is integral with the shotshell and is located at the head portion thereof. The base wad **13** includes a cavity **14** adapted to receive a primer cap. Recess **15** receives the flange of the primer cap, properly seating the primer cap within the cavity **14**. Base wad **13** includes an aperture **16** which interconnects the flashing end of the primer cap with the propellant charge cavity **17**. Aperture **16** is of a diameter substantially less than the diameter of the primer cap. The primer cap receiving cavity **14** includes upwardly projecting axial circumferential sealing and cushioning teeth or convolutions **18** spaced concentrically a predetermined distance apart and adapted to engage the primer cap providing a sealing relation thereto as well as absorbing the forces generated at detonation. Teeth **18** have a generally saw-tooth cross-sectional configuration.

The shotshell **10**, in FIG. 2, is shown at the precise time of detonation. The forces generated at detonation are absorbed at the base wad. The plastic flow or deformation is indicated in FIG. 2, particularly at teeth **18** which engage the primer cap, indicated by numeral **19**. The detonation pressures compress the base wad **13** causing a pressure seal between teeth **18** and primer cap **19**. The plastic flow to the teeth and the formation formed thereby is shown in FIG. 2. This controlled distortion accounts for the sealing and pressure absorbing characteristics of my shotshell as generally described below. Variations in the plastic formulation may be used to achieve optimum sealing and pressure absorbing characteristics to arrive at variations in the performance of the shotshell to give desired characteristics. Primer cap **19** is shown disposed in cavity **14** with teeth **18** engaging the surfaces thereof. Primer cap flange **20** is disposed in recess **15**, properly seating the primer cap within the base wad **13**. The flashing end of the primer cap is indicated at **21** with aperture **16** providing communication between the flashing end and the propellant charge **21***a*. It should be noted that the circumferential shoulder **22**, defined by aperture **16**, engages the upper surface of the primer cap at the flashing end **21** thereof. At detonation the gas pressures force the shoulder **22** into tight sealing relation with primer cap **19**. This provides a seal which is greatly increased in efficiency at the time of detonation thereby aiding in preventing gases generated at detonation from escaping through the cavity **14** of the base wad **13**. Additional sealing is effected by the pressure absorbing teeth **18** since they more tightly engage the primer cap **19** at detonation. Additional sealing is also affected by the action of the primer cap flange **20** within recess **15**.

Referring to FIG. 3, an alternate embodiment of my invention is shown. Shotshell casing **23** is shown having a primer cap receiving cavity **24** with primer cap engaging teeth **25** projecting upwardly. Teeth **25** are formed by a helical thread cutting process, such that teeth **25**

are continuous. Shotshell 23 is constructed of a yieldable, compressible, resilient plastic material such as polyethylene. Shotshell 23 is of integral construction as is shotshell 10 described above. A shoulder 26 is adapted to engage the flashing end of the primer cap providing a sealing relation thereto. Aperture 27 is defined by the shoulder 26 and the aperture communicates the propellant charge cavity 28 and the flashing end of the primer cap.

Referring to FIG. 4 another embodiment of my invention is shown. A shotshell is indicated in general by numeral 29. This shotshell is of the integral base wad construction described above. Cavity 30 is adapted to receive a primer cap with teeth 31 in sealing and pressure absorbing relation thereto. Teeth 31 are concentrically and axially spaced with the projection substantially outwardly. Teeth 31 are typically molded within the cavity 30 but may, of course, be cut from the cavity. Shoulder 32 is adapted to seal at the flashing end of the primer and defines aperture 33 which communicates the flashing end of the primer cap with the propellant charge cavity 34.

FIG. 5 shows another embodiment of my shotshell with the shotshell indicated, in general, by numeral 35. This is an integral unit including a base wad, the unit constructed from plastic material similar to the above units. A primer cap receiving cavity 36 is formed with primer cap engaging teeth 37 projecting downwardly. These teeth 37 engage the primer cap providing a seal thereto, as well as providing pressure absorbing elements at the time of detonation. Shoulders 38 engage the flashing end of the primer cap and define aperture 39 which communicates the propellant charge cavity 40 with the flashing end of the primer cap.

FIG. 6 shows another form of my invention. The shotshell 41 is formed from plastic material similar to the material used in forming the above described shotshells. The base wad is integral with the shotshell and includes cavity 42 adapted to receive the primer cap. A sealing disc 43 having an aperture 44 which communicates the flashing end of the primer cap with the propellant charge 45, is disposed over the opening or cavity 42 and beneath the powder or propellant charge cavity 45. The aperture 44 is substantially smaller than the cavity 42 which receives the primer cap. This affords a shoulder portion 46 which engages the primer cap at detonation, providing a sealing relation thereto. Teeth 47 are included to further seal and absorb the pressure forces between the base wad of the shotshell 41 and the primer cap. Primer cap sealing disc 43 may be constructed from a compressible, yieldable, resilient plastic such as polyethylene. The sealing disc may also be made from other plastics and the hardness of the plastic formulation may be varied to achieve optimum operating characteristics.

Operation

The operation of my shotshell with the integral base wad is best described by referring to FIG. 2. At the precise time of detonation, base wad 13 is subjected to great pressures exerted by the gases generated by the explosion of the propellant 21*a*. The pressures generated deform the plastic shotshell 10, causing the plastic to flow and momentarily deform the wad. Under the influence of the pressures, the annnlar shoulder 22 is forced generally downwardly into engaging relation with the flashing end of the primer cap 19, providing a sealing relation therewith. At detonation, the base wad is generally compressed, causing the plastic to flow to the area of the teeth 18 which may deform and compress against the primer cap 19 absorbing the pressure generated by the explosion. The teeth are momentarily deformed to absorb the pressures and in this deformed position provide an added sealing effect with respect to the primer cap 19. The primer cap is maintained in position by the action of the breech bolt thereon at the time of firing. An additional seal is effected between the flange 20 of the primer cap 19 and the wad shoulder above recess 15 which receives flange 20. The deformation of the base wad 13 results in a considerably more snug fit between the flange 20 and the recess 15, thereby creating additional sealing between the base wad 13 and the primer cap 19. After detonation has taken place, the shotshell 10 returns to its normal configuration. Since the shock of the explosion has been absorbed by the base wad 13, the plastic is neither cracked nor deformed and, consequently, the shotshell 10 may be reused. This is particularly important to the reloader who finds it efficient and economical to utilize a shotshell which may be reloaded for subsequent use. The shotshell may be reused without any loss of its sealing and shock absorbing characteristics. For reuse the primer cap 19 is simply removed from the primer cap receiving cavity 14, and a new primer cap inserted. The primer cap snugly engages the teeth 18 and abuts, at the flashing end of the primer cap, the annular shoulder 22.

The alternate forms of my invention utilizes substantially the same operation as described above.

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 is claimed is:

1. A plastic shotshell having a generally tubular configuration, said shotshell comprising,
   - a generally tubular plastic casing portion adapted to contain a propellant charge,
   - a head portion integral with said casing portion,
   - a plastic base wad integral with said head portion and disposed at one end thereof, said base wad having a flat inner surface facing inwardly of the casing portion and also having an axial cavity adapted to receive a primer cap, the axial cavity communicating with said casing portion whereby the primer cap flashing end contacts the propellant charge, and
   - sealing and pressure absorbing elements integral with said base wad and disposed peripherally of and within the primer cap receiving cavity, said sealing and pressure absorbing elements projecting into the cavity and having a sawtooth cross-sectional configuration and adapted to engage the primer cap in sealing and pressure absorbing relation thereto, said sealing elements deforming under the influence of insertion of the primer cap and additionally deforming under influence of the detonation of the propellant charge and flow of plastic in the wad and casing portion to effect pressure absorption and sealing.

2. The shotshell of claim 1 and wherein the tooth projecting generally upwardly in the direction of the propellant charge.

3. The shotshell of claim 1 wherein said sealing and pressure absorbing elements are disposed helically on the periphery of the primer cap receiving cavity.

4. The shotshell of claim 1 wherein said sawtooth shaped sealing and pressure absorbing elements project generally downwardly of the primer cap receiving cavity.

5. The shotshell of claim 1 including,
   - a transverse primer cap sealing disc having an axial aperture therein, said sealing disc being disposed in said tubular casing portion adjacent said head portion whereby the flashing end of the primer cap contacts the propellant charge and said sealing disc in sealing relation to the primer cap, the axial aperture superimposed on the primer cap receiving cavity and having a diameter of substantially less than the diameter of the primer cap receiving cavity whereby an annular shoulder is defined adapted to engage the primer cap in sealing and pressure absorbing relation thereto.

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