United States Patent

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[54] **SHOTGUN SHELL**
10 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **102/42,** 102/43, 102/95
[51] **Int. Cl.** **F42b 7/06,** F42b 7/08
[50] **Field of Search** ..... 102/42, 42 C, 43, 43 C, 43 P, 95

[56] **References Cited**

UNITED STATES PATENTS

2,144,232	4/1924	Spengler	102/42

FOREIGN PATENTS

999,372	10/1951	France	102/43 C
631,021	10/1949	Great Britain	102/43 C
735,061	8/1955	Great Britain	102/43 P

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ABSTRACT: A shotgun shell having a plastic wad secured in an annular groove formed around the inner periphery of the shell case adjacent its open mouth to receive and retain the plastic wad. The wad is a concave-convex, or dome-shaped disc having an outer periphery of a size to closely fit within the open mouth of the shell case to radially align the peripheral edge of the wad with the groove. The wad is initially positioned into the open mouth of the shell case with the convex surface toward the open end of the case, then the wad is oil-canned, or snapped over center to expand the peripheral edge portion of the wad into the groove to seal and retain the wad in the shell case.

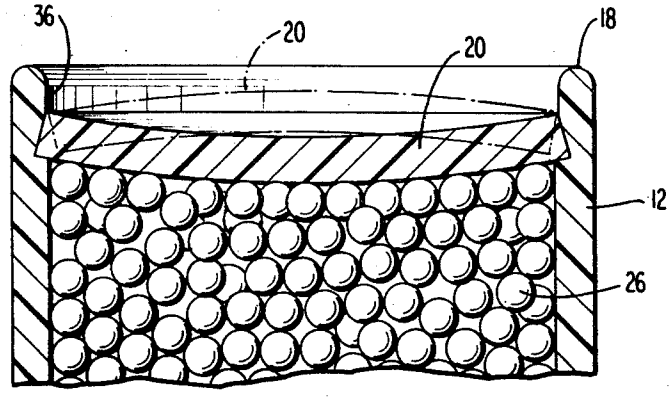


FIG.1

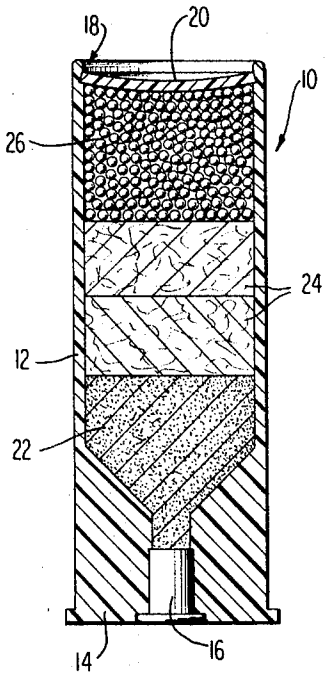


FIG.2

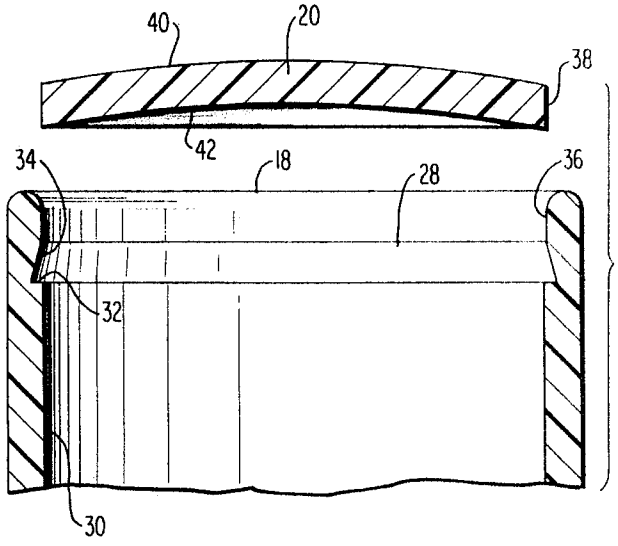
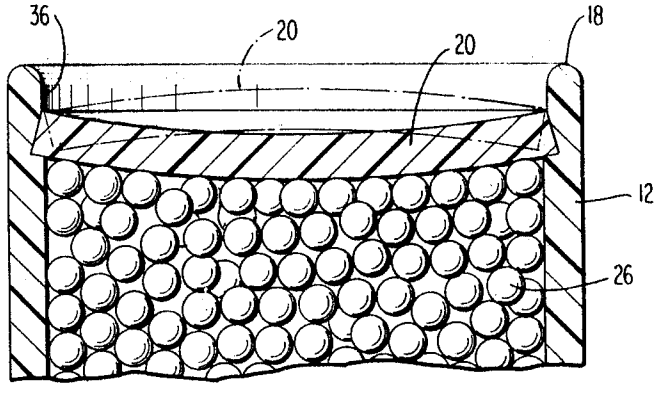


FIG.3



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SHOTGUN SHELL

This invention relates to shotgun shells, and more particularly to an improved shotgun shell case and wad assembly which permits the shell case to be reloaded and fired without substantial damage to the shell case by the wad being propelled therefrom.

Conventional shotgun shells have cases in the form of a cylindrical tube formed of a relatively dense cardboard or plastic material, with the mouth of the case being sealed by a cardboard disc or wad to retain the powder and shot in the case, or by crimping the plastic, with or without heat, in a "star," in which method a wad is not used. Conventionally, the wad is retained in the open mouth of the shell case by crimping the end of the cardboard to form an inwardly directed bead overlying the peripheral edge of the cardboard wad; or, in the case of the plastic shells, the shot are directly retained by the "star" crimp. When the shell is fired, the wad is expelled from the end of the case, thereby forcibly straightening the crimped end of the case, or, in the case of the plastic shells, the "star" crimp is straightened to near-original cylindrical form.

The conventional shotgun shells described above may be reloaded and reused for so long as the end of the shell case retains sufficient rigidity and integrity to permit recrimping. However, mutilation of the crimped end of the case occurs very quickly, so that it is normally only possible to reload and reuse a case a relatively few times before it must be discarded. It is, of course, desirable to extend the reloading life of the shotgun shell case, because this is the most expensive component, and need not be discarded after firing.

It is therefore an object of this invention to provide an improved shotgun shell case and wad assembly.

Another object is to provide an improved shotgun shell case which may be repeatedly reloaded and reused without material damage to the mouth of the shell case.

Another object is to provide an improved shell case and wad assembly in which the wad is firmly retained in the shell case until the shell is fired, then expelled without substantial damage to the end of the shell case.

In the attainment of the foregoing and further objects, an important feature of the invention resides in providing a plastic wad secured in an undercut annular groove formed around the inner periphery of the shell case adjacent the open mouth of the case. The wad is a concavo-convex, or dome-shaped disc normally having an outer peripheral edge of a size to closely fit within the open mouth of the shell case. The wad is secured in the shell case by initially positioning the wad into the open mouth with the convex surface directed outwardly toward the open end, then oil canning, or snapping the wad over center to thereby expand a portion of its peripheral edge into the groove to firmly retain the wad in the shell case. Firing of the shell snaps the wad back over center so that the wad is expelled without damage to the case.

Other objects and advantages of the invention will become apparent from the following detailed description, taken with the drawings, in which:

FIG. 1 is a sectional view of a shotgun shell case according to the present invention;

FIG. 2 is a fragmentary exploded sectional view of the mouth portion of the shell case and wad; and

FIG. 3 is an enlarged fragmentary sectional view of the shotgun shell shown in FIG. 1.

Referring now to the drawings in detail, a shotgun shell according to the present invention is indicated generally by the reference numeral 10 and includes a hollow cylindrical body portion 12 having a head portion 14 in which a conventional primer assembly 16 is positioned, and an open mouth end 18 closed by a plastic disc wad 20. The shell includes the conventional powder charge 22, filler wads 24, and a charge of shot 26.

As most clearly seen from the enlarged fragmentary views of FIGS. 2 and 3, an annular, generally V-shaped groove 28 is formed in inner cylindrical surface 30 of shell case 12. The generally V-shaped groove 28 provides a substantially radial shoulder 32 facing the open mouth 18 with an inwardly inclined substantially frustoconical surface 34 extending from shoulder 32 toward the open mouth end 18. Groove 28 is spaced inwardly from the open end 18, with the diameter of the cylindrical surface portion 36 of the shell case between the conical surface 34 and the open end 18 being slightly larger than the diameter of the cylindrical surface 30.

The disc wad 20 is preferably formed from a resilient plastic material in a normal condition indicated in FIG. 2. In this normal condition, the wad is a concavo-convex circular disc of substantially uniform thickness and having a cylindrical outer peripheral edge surface 38. The diameter of the peripheral surface 38 is preferably substantially equal to the diameter of surface 36, but slightly greater than the diameter of cylindrical surface 30 whereby the shoulder 32 will provide a positive stop to accurately position the wad within the shell case.

To assemble the plastic wad 20 in the shell case 12, the wad, in its normal condition, is telescoped into the shell case with its normally convex surface 40 facing the open mouth 18. The wad 20 is advanced in casing 12 to the phantom line position illustrated in FIG. 3 in which the inner, normally concave surface 42 engages and rests upon the shoulder 32. An axial force is then applied to the disc-shaped wad to oil-can or snap the concavo-convex disc over center so that the normally convex outwardly facing surface 40 becomes a concave surface. This applies a slight compressive force to the charge in the shell casing 12 and expands and deforms the normally cylindrical peripheral surface 38 into a substantially frustoconical surface conforming to and engaging the frustoconical surface 36 to tightly seal the open end of the shell case. Preferably when the disc 20 is oil-canned to this overcenter condition, the surface 38 is of a slightly larger diameter than the surface 34, whereby the surface 34 applies a radial compressive force to the disc to assist in retaining the disc in its overcenter condition. Alternatively, the wad may be initially formed in the configuration illustrated in FIG. 3 in which the peripheral edge surface is generally frustoconical in shape and of a diameter to engage the surface 34 to seal the shell case. In this case, the wad would be installed by snapping it over center to the configuration shown in FIG. 2 before telescoping the wad into the shell case. The wad could then be snapped back over center to its normal condition to seal the shell case.

From FIG. 3 of the drawings, it is believed apparent that, when the shell is fired, the buildup of pressure within the shell casing will quickly snap the plastic disc wad back over center to its normal condition so that, as the wad is expelled from the shell case, the open mouth portion of the case is not damaged. Thus, the shell case may be reloaded and reused repeatedly, so long as the head end 14 and body of the shell casing 12 remain in a safe and operable condition.

While the shell casing may be formed of any suitable material, it is preferably formed from a synthetic resin material which is nonflammable and heat resistant, and capable of withstanding limited elastic expansion upon explosion of the charge without permanent deformation of the casing. The limited elastic expansion is desirable to provide a gas seal between the shell casing and the inner bore of the gun barrel; however, it is necessary that the expansion not be permanent so that the expanded shell can be extracted from the gun, and so that the dimension of the annular groove will not be so altered as to prohibit reloading. Numerous plastic materials are presently commercially available which have the desired characteristics.

While I have disclosed and described a preferred embodiment of my invention, I wish it understood that I do not intend to be restricted solely thereto, but that I do intend to include all embodiments thereof which come within the spirit and scope of my invention.

I claim:

1. A shotgun shell comprising a hollow cylindrical shell case having a head end and an open mouth end, an annular groove formed in and extending around the inner peripheral surface of said shell case adjacent said open mouth, and a normally concavo-convex disc wad mounted in said annular groove and closing said open mouth end, said disc wad being formed from a resilient synthetic resin material and having a smooth outer peripheral edge surface normally having a maximum diameter less than the maximum diameter of said annular groove, said disc being capable of being snapped over center from its normal condition to a sealing condition to reverse its concavo-convex configuration and to increase its maximum peripheral edge surface diameter, whereby said wad may be secured in said open mouth by positioning said outer peripheral surface adjacent said groove when said wad is in said normal condition then snapping said wad overcenter to project said outer peripheral surface into said annular groove to seal said open mouth.

2. The shotgun shell defined in claim 1 wherein the internal diameter of said shell case between said groove and said open end is greater than the diameter between said groove and said head end.

3. The shotgun shell defined in claim 2 wherein one wall of said groove defines a substantially radial shoulder facing said open mouth end.

4. The shotgun shell defined in claim 3 wherein the normal diameter of said wad is greater than the inner diameter of said shoulder whereby said shoulder provides a positive stop to limit the distance said wad may be inserted into said shell case.

5. The shotgun shell defined in claim 1 wherein said groove is of generally V-shaped configuration, and wherein one wall of said groove defines a substantially radially extending annular shoulder facing said open mouth end.

6. The shotgun shell defined in claim 5 wherein the diameter of said shell case between said annular shoulder and said open mouth end is greater than the inner diameter of said radial shoulder.

7. The shotgun shell defined in claim 6 wherein said annular groove is spaced from said open mouth end.

8. The shotgun shell defined in claim 6 wherein said wad comprises a substantially right circular cylindrical peripheral surface in said normal condition, and wherein said peripheral surface is substantially frustoconical when in said sealing condition.

9. The shotgun shell defined in claim 1 wherein said shell case applies a radially compressive force to said wad when said wad is installed in said groove.

10. The shotgun shell defined in claim 1 wherein said shell case is formed from a synthetic resin material.