WADS FOR CHARGING SHOT OF SHOT GUN

Inventors: Junichi Nomura; Takemitsu Andoo, both of Ohita, Japan

Assignee: Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

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References Cited
UNITED STATES PATENTS
3,262,392  7/1966 Becker ............................................ 102/95
3,289,586  12/1966 Horn et al. .................................... 102/42 C
3,270,669  9/1966 Atkins et al. .................................... 102/42 C

FOREIGN PATENTS OR APPLICATIONS
1,465,217  11/1966 France ............................................ 102/42 C

ABSTRACT

The present invention relates to improvements in shot-cups and cup-wads used for shot gun cartridges, and, more particularly, it relates to a combination of plastic wads for shot gun cartridges comprising a shot-cup for retaining shot pellets provided with a unitarily molded lower cylindrical skirt portion having a smaller outer diameter than that of the upper cup portion and a cup-wad having identical and symmetric top and bottom concaved portions the top concave portion receiving the curved lower edge of the skirt portion.

8 Claims, 4 Drawing Figures
1 WADS FOR CHARGING SHOT OF SHOT GUN

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to plastic wads used in cartridges for shotguns.

2. Description of the Prior Art

In shotgun cartridges using wads known heretofore, since conventional wads comprising separate unitary bodies of a shot-cup and a shot-cup-supporting cup-wad having asymmetric top and bottom shapes are assembled together, the respective wads are non-uniformly deformed at the time of shooting with attendant disadvantages in that the damper effect and the reproducibility of patterns are inevitably disturbed.

Moreover, in wads of the prior art, there is a necessity of paying a great deal of attention as to the inserting direction of these wads when loading the cartridge, since, once inserted in a wrong direction, it is hardly possible to find out the mistake after the loading. Thus, there were occasions where the cartridges as they were mistakenly loaded were delivered to the users, causing inconveniences at the time of shooting.

There have been known heretofore wads in which a plastic cup portion, a cushion portion and a cup-wad portion are integrally formed in one piece, for example, as disclosed in the U.S. Pat. Nos. 3,217,648 and 3,262,392.

While such unitary body wads of this type are manufactured by injection molding the manufacturing requires complicated collapsible molds. In addition, since the space volumes of these wads are to be varied depending upon the variations in the amounts of propellant and shot pellets charged, a wide variety of molds are necessitated. Moreover, because of the structure of the unitary wads in which the upper shot-cup portion, the center cushion portion and the gas check portion are necessarily formed integrally in one piece, the unitary wads known heretofore have drawbacks attributable to their weights and sizes in that they fly a considerable distance, often to disturb sight of a shooter in catching and confirming the targets when hunting or at clay pigeon shooting.

SUMMARY OF THE INVENTION

An object of the present invention resides in providing wads having a simple structure which warrants an easy manufacturing.

Another object of the present invention resides in providing wads which reduce the possibility of misloading of cartridge.

Still another object of the present invention is to provide wads capable of being deformed uniformly and affording a satisfactory pattern of shot pellets due to their unique structures.

These objects of the present invention mentioned above have now been accomplished by the combination use of a shot-cup for retaining shot pellets provided with a unitarily molded cylindrical skirt portion having a smaller outer diameter than that of the cup portion and a cup-wad having identical and symmetric top and bottom concaves when loading the cartridge.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be explained in conjunction with the accompanying drawings in which;

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FIG. 1 shows a longitudinal sectional view of an H-shaped shot-cup which constitutes a part of the present invention;

FIG. 2 illustrates a sectional view of an I-shaped cup-wad which constitutes another part of the present invention;

FIG. 3 shows a longitudinal sectional view of a cartridge of shotgun employing the wads of the present invention and;

FIG. 4 illustrates a longitudinal sectional view of the cartridge being deformed at the time of shooting.

The wads of the present invention comprise a shot-cup in the form of the H-shaped structure as shown in FIG. 1 and a cup-wad in the form of the I-shaped structure as shown in FIG. 2.

Referring to FIG. 1, the skirt portion designated by the numerals 3—3 has an outer diameter which is slightly smaller than that of the cup portion designated by the numerals 3—1, i.e., the difference in the diameter therebetween rests within the range of from 1.0 to 3.0mm. In other words, the clearance between the outer wall of the cup portion 3—1 and that of the skirt portion 3—3, when charged, rests within the range of from 0.5 to 1.5mm. on one side, respectively.

The skirt portion 3—3 has a thickness ranging from 0.7 to 1.2mm. and the lower end edge portion thereof is formed with a gradual curve so that the outer wall near the lower end of the skirt portion is inclined inwardly towards its axes so as to fit the curvature of a concave portion designated by the numerals 4—1 in the cup-wad 4 shown in FIG. 2.

As is seen from FIG. 2, the cup-wad 4 has smooth top and bottom concaved portions designated by numerals 4—1 and 4—2, respectively, which are identical and symmetrical with each other and having a cross-section describing substantially an arc of a circle. Thus, the cup-wad has an approximately I-shaped cross-sectional configuration. The cup-wad as illustrated in FIG. 2 has an advantage in that, unlike wads known heretofore, it can be inserted and seated onto propellants regardless of the inserting direction since the top and bottom concaved portions are identical and symmetrical in shape. In addition, since the curvature of the concave 4—1 of the cup-wad fits that of the lower end edge portion of the skirt portion 3—3 of the shot-cup, it is stably held when loaded.

While almost any synthetic resins which can be molded by injection molding may be conveniently used as plastic materials in embodying the present invention, those having a sufficiently high strength capable of enduring distortions caused by excessive pressure and heat evolved at the time of ignition and combustion of propellant, for example, so-called polyethylene with low or medium pressure polymerization process having a Melt Index ranging 0.1—7.0, and polyethylene with high pressure polymerization process having a Melt Index ranging somewhere around 0.5—10.0 are most preferably used.

FIG. 3 illustrates a charged cartridge of shotgun in which these wads are inserted. In FIG. 3, numeral 1 designates a cartridge case, numeral 2 designates shot pellets, numeral 3 designates an H-shaped shot-cup, with numerals 3—1 designating a cup portion, numerals 3—2 designating a bottom portion and, numerals 3—3 designates a cylindrical skirt portion of the shot-cup, numeral 4 designates an I-shaped cup-wad, numerals 4—1 and 4—2 designate concaved portions of the cup-
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wad, respectively, numeral 5 designates propellant, numeral 6 designates a base-wad, numeral 7 designates a primer and symbol a designates a cushion portion formed by the cup-bottom portion 3—2, the cylindrical skirt portion 3—3 and the cup-wad 4.

FIG. 4 illustrates a deformed condition in firing of the cartridge shown in FIG. 3. In this drawing, the same reference numeral designates the same portion as in FIG. 3 and symbol b designates the cushion portion being deformed. Upon firing, the wall of the skirt portion 3—3 defining the cushion portion a shown in FIG. 3 is uniformly compressed inwardly along the curvature of the upper concave port 4—1 of the cup-wad 4 like a bellows as shown in FIG. 4 designated by symbol b. Owing to the structures of these wads as described above, air compressed inside the deformed cushion portion b, which leaks out nowhere, exhibits an effective and uniform cushioning effect, making the gun recoil to the shooter even smaller. Moreover, the air contained inside the deformed cushion portion b serves not only to lower a drastic increase in the inner pressure at the vigorous combustion of gun powder but also to prevent the occurrence of excessive pressure in the course of combustion of propellant. In addition, a slight deformation of the bottom portion 3—2 of the shot-cup 3 in a concave form due to inertia at the time of firing as shown in FIG. 4 favorably affects the distribution of the shot pellets to give an excellent pattern.

In accordance with the wads of the present invention, unlike unitary body wads known heretofore, no complicated collapsible molds are required in the manufacturing. Thus, a high productivity can be obtained in the mass production requiring less adjustment and maintenance of the molding machine. This represents an advantage of the present invention from a commercial standpoint.

Furthermore, conventional unitarily formed wads known heretofore fly a considerable distance because of their rather heavy weights and since they are relatively large in size, conventional unitarily formed wads tend to be mistaken by shooters as targets. In contrast, these wads of the present invention are seldom mistaken as targets since they have adequate sizes and weights. Upon comparing these wads of the present invention with those known heretofore comprising a shot-cup and an asymmetrically-shaped cup-wad for supporting the shot-cup which are unitarily formed respectively, it will be readily appreciated that since the shot-cup of the present invention is provided with an integrally formed skirt portion, a sure and stable loading can be accomplished through simple procedures with less factors for variance. In addition, because of the unique structure of the cup-wad of the present invention as described above, breakages often observed in conventional plastic cup-wads known heretofore caused from insufficient impact strength at low temperatures can be successfully prevented. Moreover, the cup-wad of the present invention having identical and symmetric top and bottom concave portions has an advantage in that it can be easily inserted into a cartridge case irrespective of the inserting direction, unlike cup-wads of the prior art known heretofore.

We claim:
1. The combination of plastic wads for a shotgun cartridge comprising:
   a. an annular cup-wad having identical and symmetrically arranged upper and lower concave surfaces; and
   b. a shot-cup having:
      i. an upper cylindrical portion with the same outer diameter as said cup-wad; and
      ii. a lower annular skirt portion with a smaller outer diameter than said upper portion and whose lower outer edge is curved to cooperatively engage the upper concave surface of said cup-wad whereby upon firing of the cartridge the skirt portion collapses outwardly increasing the area of engagement between said lower outer edge and said upper concave surface.
2. A cartridge for shotgun comprising plastic wads of claim 1.
3. The combination as in claim 1 wherein said shot-cup is of unitarily molded plastic.
4. The combination as in claim 3 wherein the plastic is polyethylene with low or medium pressure polymerization process having a Melt Index in the range from 0.1 to 7.0 .
5. The combination of claim 3 wherein said plastic is polyethylene with high pressure polymerization process having a Melt Index in the range from 0.5 to 10.0.
6. The combination as in claim 1 wherein said concave surfaces are the arcs of circles.
7. The combination as in claim 1 wherein said skirt portion defines a cylindrical interior cushion portion.
8. The combination as in claim 1 wherein said upper cylindrical portion retains the shot pellets.