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Seminiano

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[54] **DRY FIRE CARTRIDGE OR SHOT SHELL**

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[52] **U.S. Cl.** ..... **42/1 N,** 102/41

[51] **Int. Cl.** **F41c 27/00**

[58] **Field of Search** ..... 102/41; 42/1 LP, 1 N

[56] **References Cited**

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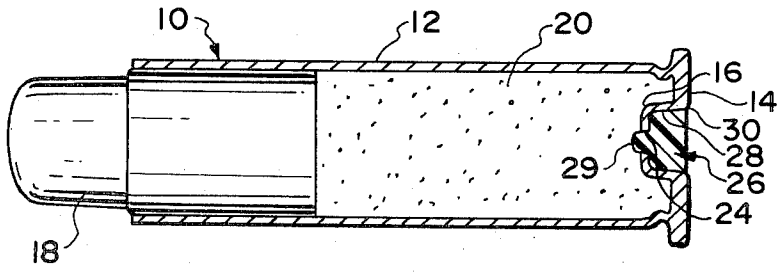
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Assistant Examiner—C. T. Jordan
Attorney, Agent, or Firm—Harbaugh and Thomas

[57] **ABSTRACT**

A dummy center-fire cartridge or shotgun shell having a flexible shock-absorbing plastic "primer" or non-explosive body or slug, is disclosed for use in dry-firing a firearm without harm to or breaking of the fing pin or other parts of the gun. The plastic body is formed or molded within the primer pocket of an empty cartridge case and is formed around and into any indentations or holes such as the flash hole so that it is rigidly affixed therein. The plastic body is composed of a non-shrinking thermo-setting resin such as polyurethane, characterized by toughness, high tensile strength; and tear, chemical and abrasian-resistance. The plastic body allows partial travel of the firing pin therein with little or no rebound tendency. The impression made in the plastic body is quickly healed because of the elastic memory of the plastic so that repeated hammer falls on the same cartridge or shell are not detrimental to the firing pin or the plastic body.

6 Claims, 7 Drawing Figures



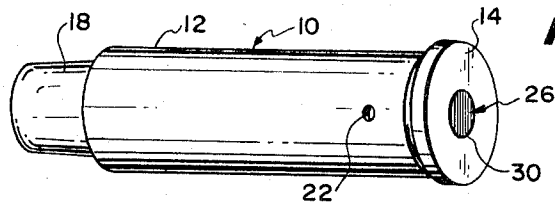


FIG. 1

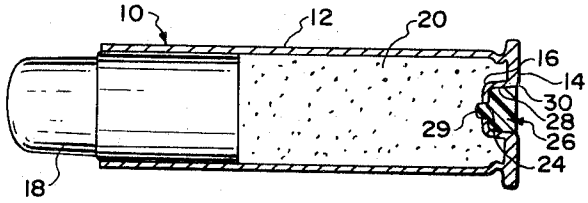


FIG. 2

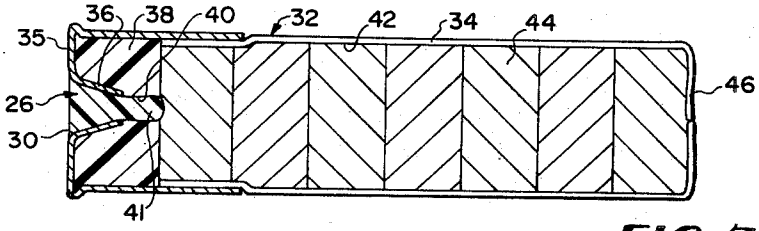


FIG. 3

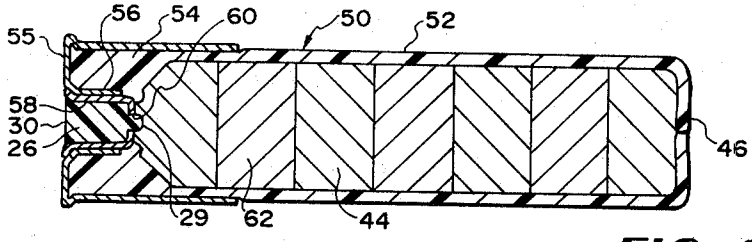


FIG. 4

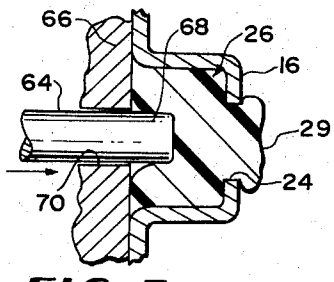


FIG. 5

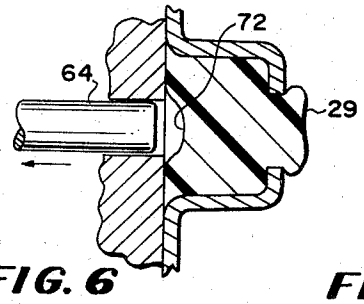


FIG. 6

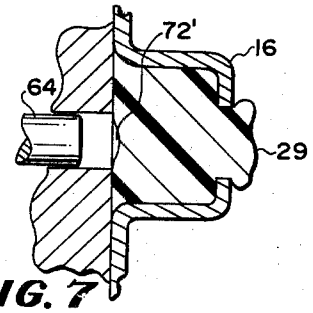


FIG. 7

DRY FIRE CARTRIDGE OR SHOT SHELL

BACKGROUND OF THE INVENTION

A number of dry-fire cartridges are available employing a spring loaded pad in place of the primer. Some of these devices are quite expensive because a relatively strong spring must be used to withstand the hammer blow and means must be provided to hold and guide the spring as it absorbs the inertia of the firing pin. These means must insure proper return of the pad after each dry-firing and consequently are subject to malfunction due to inclusions of dirt and failure to provide proper and instantaneous shock absorption and return of the pad when the firing pin is retracted. The shock absorbing parts must be specially machined from bar stock and particularily formed for each caliber or type of gun. Since the cases are also specially formed to accommodate the inner spring mechanism, the cost is increased and, in some instances, the end products will not chamber in all guns of the same caliber or gauge.

SUMMARY OF THE INVENTION

In accordance with this invention the foregoing disadvantages are avoided by completely sealing and filling the primer pocket of a used or empty brass cartridge, the primer pocket of a used shotgun shell or the primer cup of a spent primer within the primer pocket of a spent shell with a tough resilient plastic composition. By these means an inexpensive, readily formed shock absorber for the firing pin is formed which can be used repeatedly in a firearm for dry-firing practice without harm to the firing pin. Because spent or empty cases are used, no problems of chambering the dummy rounds are incurred. One particular advantage of the use of plastic for this purpose is that the shock of stopping the firing pin is distributed over the surface of the pin as it penetrates the plastic so that there is no wearing because of point contact with a pad. Also the forces are quickly absorbed within a short distance of travel of the pin. The further the pin travels into the plastic primer the more the resistive forces are multiplied.

The dummy cartridges or shells of this invention accommodate any shape of firing pin and the forces of the hammer blow are absorbed axially in a short travel distance or penetration into the plastic body. The depth of penetration may be less than the penetration of the pin into a real primer so that there is no battering of the breech block or cylinder. This assures that no damage will result from dry firing any type of guns. Another advantage with some guns is the absence of any perceptible sound since metal-to-metal contact is avoided and only the click of the sear and hammer spring are audible to the user. These and other advantages will become apparent or be set forth as the invention is described.

DESCRIPTION OF THE DRAWINGS

Illustrative examples of the invention are shown in the drawings in which:

FIG. 1 is a perspective view of a revolver or pistol center-fire cartridge having a plastic "primer" or body formed in accordance with this invention;

FIG. 2 is a cross-sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view of a shotgun shell with the primer pocket containing a plastic body formed therein;

FIG. 4 is a cross-sectional view of a shotgun shell with the primer cup therein and the plastic body of this invention formed within the primer cup; and

FIGS. 5, 6 and 7 are cross-sectional views of the dummy primer of this invention being struck by the firing pin of a gun and retracted therefrom to show the substantially instantaneous recovery of the plastic from this kind of indentation.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2, the cartridge 10 is shown having the brass case 12 with the flanged head 14 and the integral primer pocket 16. Although the case has been properly fitted with a bullet 18, the interior 20 is devoid of powder and the round is absolutely safe for dry firing. Any type of empty cartridge or shell case can be used and the rimmed case 12 is merely illustrative. In order that this round will not be confused with a live round of the same caliber, the hole 22 is drilled through the wall of the case 12 into the chamber 20. This is the earmark of a dummy round to the shooter. The cartridge can also be color-coded.

The primer pocket 16 has the flash hole 24 at the bottom or interior end which is for the purpose of allowing the primer flame or flash to reach the powder which ordinarily would occupy all or part of the space 20 so that the cartridge will fire. After the cartridge is fired the powder and bullet are gone and the primer is spent. Upon removal of the primer, the primer pocket 16 is normally readied for re-loading by cleaning and inserting a new primer followed by a measured charge of powder for the chamber 20 and the seating of a bullet 18 to the proper depth. Re-loading is a common practice among sportsmen who desire to prepare their cartridges exactly to the shooting characteristics of their guns or in order to reduce the cost of shooting.

In accordance with this invention a spent cartridge case or a new unloaded case is transformed into a safe dry-firing practice or dummy round by filling the primer pocket 16 with the plastic body or "primer" 26 in such a manner that the plastic flows into intimate contact with the cup filling all voids and is in intimate contact at the interface 28 with any roughness or scratches that may exist on the surface of the cup and also make certain that a portion of the plastic body flows into the flash hole 24 to form the excess blob 29 on the outside of the cup. Any excess plastic is removed, after setting, so that the outer surface 30 against which the firing pin strikes is flat and flush with the cartridge head 14. By so forming the plastic body 26 it does not dislodge during use nor interfere in any way with the operation of a firearm.

FIG. 3 shows a shotgun shell 32 having a cardboard jacket 34 and a brass head 35 crimped thereover. A primer pocket 36 is formed into the plastic base 38 by means of a number of tabs of the brass face bent into a conical recess. The base has the flash hole 40 which extends into the interior 42 of the case, and serves the same purpose as the flash hole 24 in the pistol cartridge. The tabs forming the primer pocket are spaced from each other so that the plastic body or "primer" 26 flows between and about their edges and also flows into the irregularities of the flash hole 40 as shown at 41 so

that there is no possibility of dislodgement of the false primer during use. The balance of the interior **42** of the shell is filled with any desired number of wads **44** and the end crimped as at **46** to complete the dummy shotgun round. The presence of the wads and crimping gives the round the proper density or firmness and length so that it can be chambered like a regular round into the breech of a gun and also be handled by the ejector after dry-firing.

FIG. **4** illustrates a modern plastic shotgun shell **50** with a unitary casing **52** and base **54** all made of plastic and encased by the brass head **55** with a different type of primer pocket **56,** still retaining the spent primer cup **58** from which the primer cap and anvil have been removed. The use of the primer cups retains the appearance of a regular round and provides a sharp edged flash hole **60** into which the plastic body **26** flows to lock therein by means of the excess blob **29.** Suitable shaped wads **62** and regular wads **44** are used to fill the case **52** and the end is re-crimped at **46.**

FIG. **5** shows a dummy primer or plastic body **26** of this invention within a primer pocket **16,** securely locked by the excess blob **29** protruding through the flash hole **24** as same is struck by a firing pin **64** guided by the breech block **66** of a gun. The firing pin **64** has a typical blunt end **68** which extends sufficiently through the bore **70** of the breech block **66** to strike and fire a primer under normal conditions. As shown the use of the plastic body **26** allows the pin **64** to penetrate about the extent of its normal travel while the force is absorbed. When the gun is re-cocked and the pin being retracted as shown in FIG. **6,** the indentation **72** in the plastic body **26** has already recovered by 90 percent and moments later substantially full recovery of the indentation has been accomplished as shown in FIG. **7.** Even after extended and repeated use only a vestige of the indentation will remain as shown by the smaller indentation line **72'** in FIG. **7,** and the plastic body **26** retains its ability to safely cushion the penetration of the firing pin at any time. This is also true of more pointed firing pins and blunt or tapered or wedge shaped pins found in some center fire guns.

A number of thermoplastic and thermosetting resinous compositions can be used to form the plastic body or "primer" **26** of this invention.

Preferably, the plastic has a Durometer Shore A hardness of about 85 to 120, a tensile strength of about 1,000 to 2,000 psi (ASTM D412-51T), elongation percent (ASTM D638-587) of 250 to 270, and a tear strength of at least about 900 to 1,500 lb/in. ASTM D1004-59T. Preferably, the shrinking during casting or molding will be about 0.0002 to 0.0004 in/in at about 75°F. and the plastic should be resistant to oils, greases and cleaning solvents normally used with guns. Dyes can be used in the compositions as an added coded index for the shooter to indicate a dummy round.

In accordance with one aspect of this invention, the proprietary product known under the trademark FLEXANE 95 in putty form has been found to produce excellent results. This product is a flexible rubber-like putty comprising urethane. The putty is mixed with equal portions of a hardener and forced into the primer pocket or primer cup at room temperature and allowed to set. The cast product adheres to most other plastics and also to metal if a metal primer is first applied. The urethanes also flow into pores and interstices of the primer pocket for good adhesion.

The preferred polyurethane has the following characteristics:

TABLE

Durometer Shore A Hardness		95
Tensile Ultimate	ASTM D412-51T	1500 psi (7 days)
Elongation	ASTM D 638-58T	265%
100% Modulus	ASTM D 412-51T	1000 psi (7 days)
Tear Strength	ASTM D 1004-59T	400 lb/in (7 days)
Abrasion weight loss		0.1784
Specific Gravity		1.06
Shrinkage linear		0.0003 in/in
Viscosity of mix at 75°F		31,000 centipoises

Experimentation with other plastics such as rubber, polyethylene and acrylics has indicated that they do not remain in the primer pocket well, are too brittle and have no elastic recovery in comparison with the polyurethanes. Brittle and hard plastics such as phenolics are totally unsuitable.

The polyurethane compositions can contain about **10%** to **25%** of rubber and some species of die rubber used in making copies of hollow molds can be used. Compatible mixtures of polyurethane and neoprene may be used. Other plastics having the foregoing characteristics can be used.

What is claimed is:

1. A dummy cartridge suitable for dry-firing practice comprising:

a cartridge case having a base end with a center fire primer pocket therein;

said primer pocket including a flash hole defined by said base end and a shock-absorbing plastic body molded within said primer pocket, characterized by its toughness and ability to recover after penetration by a firing pin;

an integral portion of said plastic body extending within said flash hole in interfacial locking relationship.

2. A dummy cartridge in accordance with claim **1** in which: said plastic body comprises polyurethane.

3. A dummy cartridge suitable for dry-firing practice comprising:

a cartridge casing having a center fire primer pocket;

said primer pocket including a flash hole;

said primer pocket being filled with a shock-absorbing plastic body extending through said flash hole and characterized by its toughness and ability to recover after penetration by a firing pin.

4. A dummy cartridge in accordance with claim **3** in which:

said plastic body is characterized by a Durometer Shore A hardness of about 85 to 120, a tensile strength of about 1,000 to 2,000 psi, an elongation of about 250 to 270 and a tear strength of at least about 900 to 1,500 lb/in.

5. A dummy cartridge in accordance with claim **3** in which said plastic body comprises polyurethane having the following characteristics:

Durometer Shore A Hardness		95
Tensile Ultimate	ASTM D412-51T	1500 psi (7 days)

-Continued

Elongation	ASTM D638-58T	265%
100% Modulus	ASTM D412-51T	1000 psi (7 days)
Tear Strength	ASTM D1004-59T	400 lb/in (7 days)
Abrasion weight loss		0.1784
Specific gravity		1.06
Shrinkage linear		0.0003 in/in
Viscosity of mix at 75°F		31,000 centipoises

6. A dummy cartridge in accordance with claim **3** in which:

said primer pocket includes a primer cup having said plastic body molded therein and with a portion extending into the flash hole of the primer cup.

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