ABSTRACT: A cartridge having a primer disposed at one end therein and assembled by loading with a predetermined amount of charge and packing the charge in place about the primer with a resilient wad secured within the cartridge in predetermined spaced relationship with a closure plug at the other end of the cartridge.
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PROPELLANT-LOADED CARTRIDGE

BACKGROUND OF THE INVENTION

This invention relates to the manufacture of ammunition and more particularly to propellant-loaded cartridges and a method for assembling and loading such cartridges.

The invention is particularly useful with military ordnance of the type where the ammunition or projectile is separate from the cartridge case. The purpose thereof is to provide a cartridge having a resilient wad therein for holding the propellant in place under such high deaccelerating forces as occur during normal handling operations and particularly in the chambering of the cartridge case to the ammunition in rapid fire guns.

When loading and assembling the cartridge cases, an amount of powder or propellant is placed therein that will provide a particular muzzle velocity for the projectile upon firing of the gun. Since the energy content of one lot of powder may vary substantially from that of another, the amount of powder to be placed within the cartridge case must also be changed with each new lot of powder, according to the energy content thereof. To provide or compensate for the variation in the amount of propellant to be used therein, the cartridge cases utilized are of such length to accommodate whatever quantity of propellant may be necessary to insure the required muzzle velocity. Accordingly, since in nearly all cases the cartridge case will not be completely filled, some device must be provided for holding the propellant in place in the cartridge case near the base thereof. If the retaining device fails for any reason to hold the propellant in place and the propellant is permitted to fall away from the primer, erratic and undesirable results may occur upon the firing thereof. The failure in certain instances of the retaining piece to hold the propellant in place has been one of the major problems encountered by the cartridges heretofore most widely used.

Wads of pyrolin or celluloid have been most frequently used in cartridges of the prior art for holding the propellant in place therein. These wads have a tendency to split and become loose during handling and ramming of the ammunition in the gun. Also, installation in a tapered cartridge case was difficult due to the variations of the lengths of the propellant required in the cartridge cases as described hereinabove. In addition, it is impossible to get a tight-fitting space piece between these wads and the chamber end-closure plug, and consequently an adhesive is required to retain the wads in place.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a cartridge having the propellant therein positively held in place at the base end thereof during handling and gun-loading operations.

Another object of this invention is to provide a method for partially filling a cartridge case with a propellant and for positively holding the propellant in place at the base end thereof.

Still another object of the invention is to provide a method for partially filling a cartridge case with a propellant and for positively holding the propellant in place at the base end of the cartridge.

Yet another object of the invention is the provision of a method of assembling and partially loading a cartridge with a propellant so that the propellant is positively held in place during handling and gun-loading operations.

The foregoing and other objects are attained by the use of a tight-fitting, resilient and pressed firmly against the propellant surface, thereby to hold the propellant in place at the base end of the cartridge, and further secured therein by spacer pieces disposed between the wad and a closure plug for the other end of the cartridge.

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BRIEF DESCRIPTION OF THE DRAWING

Still other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the detailed description, when considered in connection with the accompanying drawing wherein the single FIGURE is a central longitudinal cross section of a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

There is shown in the drawing a metallic cartridge case 10 having a circular base 11 integrally formed with a substantially tubular, but preferably slightly tapered sidewall 12. A conventional type of primer 13 is disposed within the cartridge case 10 and threadably secured to the base thereof at 14. The primer 13 is surrounded or enclosed by a powder charge or propellant 15.

The powder or propellant 15 is held in place near the base 11 and about the primer 13 by a disc-shaped resilient wad 16 composed of a foam plastic such as, for example, polyethylene. A tight fit of the resilient wad 16 any place along the tapered cartridge case may be assured by cutting it oversize on diameter so that the resilient properties of the wad may be used to tightly engage the inner face of sidewall 12.

At the end of the cartridge case 10 remote from the base 11 an end closure plug 17, preferably tapered on the inner end thereof, composed of a compressible gasket-like material such as, for example, polyurethane is secured in place by crimping of the end of the sidewall 12 thereover. Other materials could be used for constructing the closure plug 17, of course. Polyurethane is preferred, but cork or the like is also adaptable to the purpose.

Additional assurance that the resilient wad 16 remains in place as secured by wedging action against the sidewall 12 is provided by a plurality of elongated spacer pieces 18 formed of any suitable material such as, for example, cardboard. The spacers 18 may be constructed having any one of a variety of cross-sectional shapes, although a triangular form has been satisfactorily used and found to have the desired strength. In any event, a tight-fitting spacer piece 18 may be readily provided by cutting the piece slightly longer than required so that it will be slightly embedded in the resilient wad 16 when the closure plug 17 is secured in place by crimping of the sidewall 12.

The novel method of assembling and loading the cartridge as illustrated in the drawing will now be described. It will be readily understood from the foregoing description that in the fabrication of the cartridge case, the case is molded as a single piece with the base 11 and sidewall 12 integrally formed, but the end of sidewall 12 not being crimped or bent, as shown in the drawing. The primer 13 is first threadably secured to the base 11 within the case structure. In loading the cartridge, the propellant 15 is placed in the cartridge body 16 with the latter preferably held in an upright position with its open end uppermost. The height to which the cartridge is filled with propellant is predetermined by energy content of the lot from which the propellant is taken and the amount of such propellant required to obtain a given muzzle velocity upon firing of the projectile from the gun.

The resilient, polyethylene wad disc 16 is readily installed in the cartridge by turning the wad on edge, hand-squeezing it through the cartridge case mouth, pushing it to the surface of the propellant, turning the wad flat and pressing it against the propellant surface. Because the wad 16 is slightly larger in diameter than the internal diameter of the cartridge 10, the wedging of the wad within the wall of the cartridge will firmly secure it in place therein.

The cardboard spacers 18 are then inserted endwise into the mouth of the cartridge and pushed against the wad 16 with sufficient force to slightly penetrate the wad so that the spacers are free-standing therein in a vertical position. The polyurethane closure plug 17 is then positioned within the mouth of the cartridge and the mouth is cramped around it to
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3 firmly secure it in place. Support for the plug 17 during the crimping operation is provided by the spacers 18 which, during crimping of the case, will be even further embedded in the wad disc 16. Because polyethylene is not heat-resistant and is flammable, no fire mix is required to assure complete burning of the wad. Moreover, with the materials used in the cartridge of this invention, it has been found that complete consumption takes place and the gun which has been fired is left in a relatively clean condition.

Modifications and variations of the present invention are obviously possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims may be practiced otherwise than as specifically disclosed.

What is claimed is:

1. A cartridge comprising:
   a substantially tubular molded casing having a base closing one end thereof and an integral sidewall,
   a primer within said casing and secured to said base,
   a propellant partially filling said casing,
   a substantially disc-shaped, resilient wad wedgingly supported within said casing for confining said propellant to the base end thereof,
   a closure plug for the other end of said casing, and
   spacer means extending between said resilient wad and said closure plug said spacer means including a plurality of elongated, rigid members slightly embedded at one end thereof into the resilient wad.

2. A cartridge according to claim 1 wherein said resilient wad is composed of polyethylene.

3. A cartridge according to claim 2 wherein said closure plug is formed of polyurethane, and
   the other end of said sidewall is crimped over said closure plug to secure said plug in place within said casing.

4. A cartridge according to claim 3 wherein the lengths of said spacing members are greater than the distance separating said wad and said plug so that said plug pushes against said spacing members.