United States Patent

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[54] METHOD OF MAKING AMMUNITION

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Related U.S. Application Data

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[52] **U.S. Cl.** .....**86/1,** 102/43 P

[51] **Int. Cl.**.....**C06b 21/02,** F42b 33/10

[58] **Field of Search** .....29/1.3, 1.31, 1.32; 206/42, 206/81; 86/1; 102/43 P, 38, 43

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[57] **ABSTRACT**

The method of making ammunition in which a steel metal skeleton is blanked or stamped to provide a central hub and radially extending fingers. The fingers are then formed to extend in a direction normal to the hub and in a peripherally spaced relationship with each other. The blanked and formed skeleton is laminated with a reinforced plastic material and the ends of the laminated fingers are necked. A primer is seated in the hub, a projectile is secured and sealed to the laminated fingers, and the laminated skeleton is loaded with propellants.

3 Claims, 5 Drawing Figures

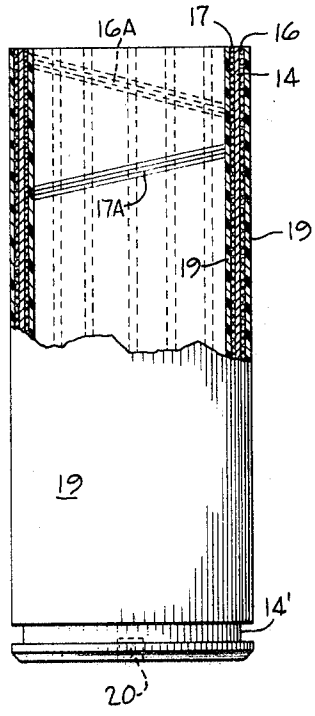
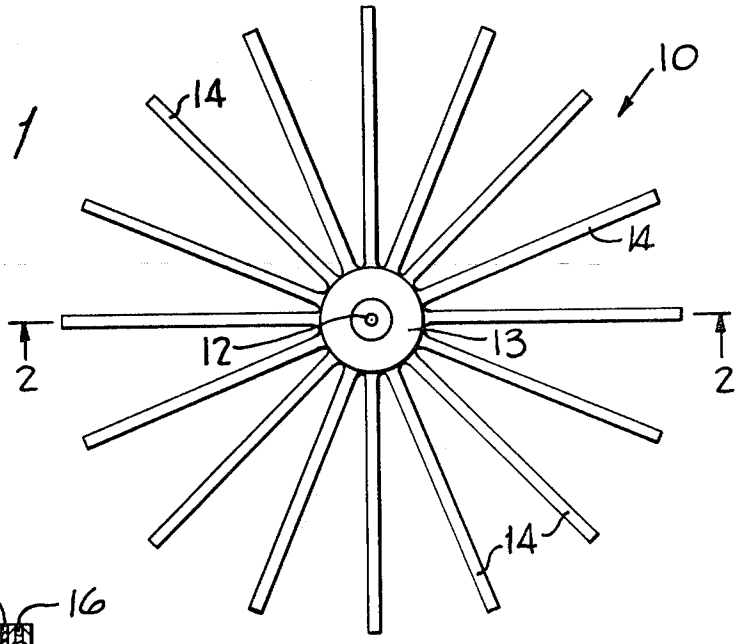
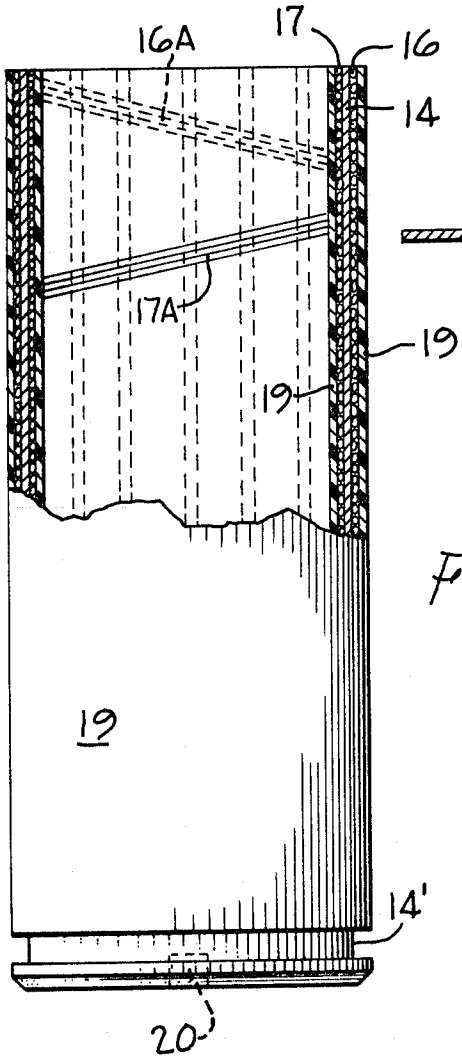


Fig. 1





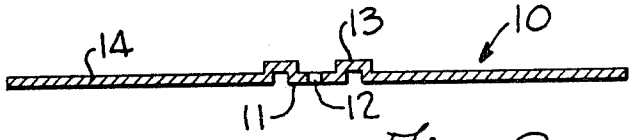


Fig. 2

Fig. 3

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Fig. 4

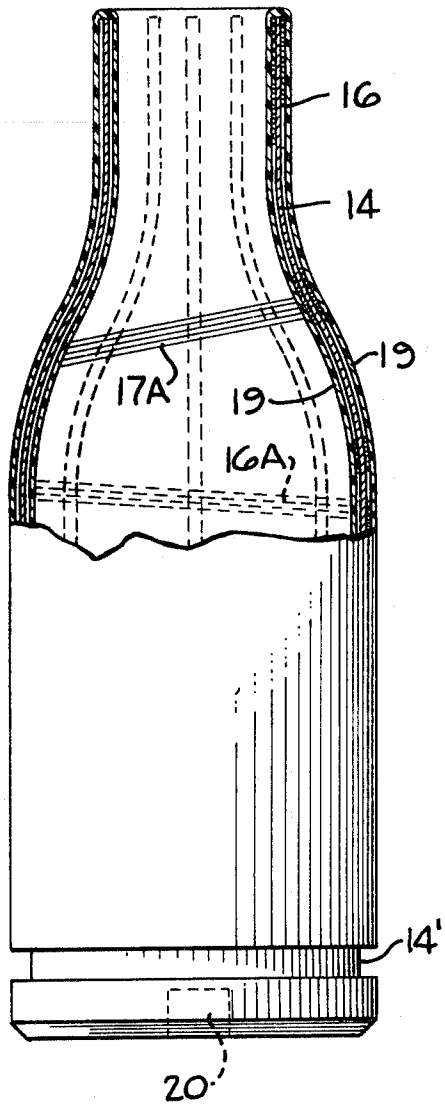
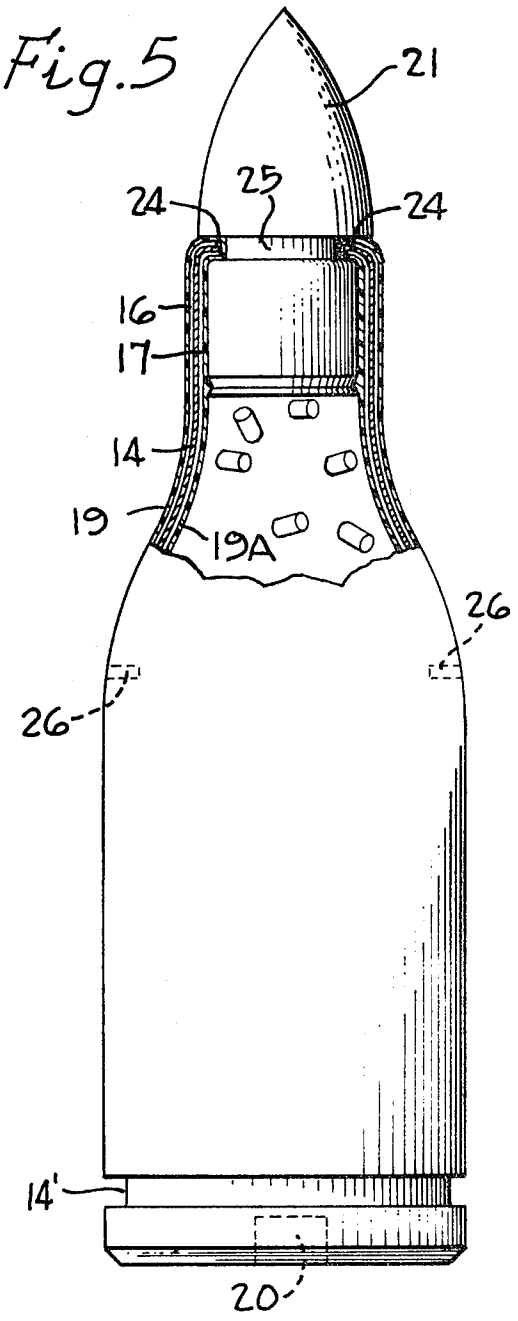


Fig. 5



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METHOD OF MAKING AMMUNITION

This application is a division of application Ser. No. 740,141 filed June 26, 1968, now U.S. Pat. No. 3,566,792, issued Mar. 2, 1971.

The invention described herein may be manufactured, used, and licensed by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to ammunition and, more particularly, to cartridge cases and the method of making same for small arms ammunition.

Envisioning the possible criticality of future supply availability of certain metals such as copper or alloys thereof, there is recognized an urgent requirement to find a substitute construction for small arms brass cartridge cases.

One of the objects of the invention is to provide a cartridge case in which there is eliminated the need for copper or alloys thereof in which the supply may be critical.

Another object of the invention is to produce such a cartridge case with a minimum number of operations.

Those and other objects, features and advantages will become more apparent from the following description and accompanying drawings in which:

FIG. 1 is a top plan view of a blanked or stamped metal skeleton from which the improved cartridge case is built up.

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1.

FIG. 3 is an elevational view, partially broken away, of a cartridge case embodying the principles of the invention.

FIG. 4 is an elevational sectional view of a cartridge case necked down for assemblying a round of ammunition.

FIG. 5 is a similar view of an assembled round with a modified cartridge case.

The steel metal skeleton, shown generally at **10** (FIGS. 1, 2) is blanked or stamped into the forms shown with a central annular hub **11** having a central aperture **12** for securely locating a suitable primer upon assembly of the ammunition round. The hub has a rearwardly offset annulus **13** from which a plurality of finger elements **14** extend in a radial direction, prior to their being formed to extend in a direction substantially normal to the hub and in a substantially peripherally spaced relationship to each other as viewed in FIG. 3, with the fingers **14** each having their rearward ends offset inwardly as shown at **14** in phantom. Preferably, the skeleton is formed of low carbon steel sheet material. In order to provide the appropriate skeleton contour, tooling requirements include flat blanking and forming punches and dies.

On either or both of the skeleton, a high tensile strength roving such as a glass monofilament **16** and/or **17** (FIGS. 3,4,5) or other high tensile, high yield steel or metallic wire are wound in spiral fashion **16A** and/or **17A** or other suitable pattern around the formed group of fingers **14**. Preferably, when both inner and outer windings **17A**, **16A** are used, they are spirally wound in relatively opposite directions such that areas of voids are kept to a minimum for obtaining a case of maximum strength. The wires are coated with a thermosetting resin material **19** which may be accomplished by either pre-coating the wires, dipping the wires in the thermosetting material, or by dipping the skeleton and its wound rovings in uncured resin, with the final polymerization taking place during a subsequent molding operation by which the voids or interstices are completely filled, and the blanked and formed skeleton is thus provided with a lamination of reinforced plastic material. The laminating material for the case skeleton may be any thermosetting material such as epoxy, phenal-formaldehyde, melamine or fluoroplastics, so long as it possesses good molding qualities, high impact strength, is resistive to heat and moisture, and has the capacity to withstand the effects of acids, solvents, alkalies and sunlight. In the FIG. 5 embodiment, the inner lamination **19A** is formed by use of an expanding mandrel to obtain outward radial molding pressure.

The cartridge case, after being necked down to predetermined dimensions for securement such as by crimping upon a grooved projectile or bullet **21**, is provided with a conventional primer **20** prior to propellant loading and bullet sealing operations.

Preferably, the cartridge case is propellant loaded after priming and heat sealing of the bullet to the inner periphery of the cartridge case as illustrated at **23** (FIG. 5). An appropriate annular seal **24** is provided as by crimping case contact portions at the case mouth or finger tip area to sealingly engage the bullet groove or cannulure **25**. To facilitate propellant loading, holes **26** are drilled through the case and subsequently suitably sealed. In this manner there is minimized the danger or hazard of accidental initiation during the heat sealing operation. Where cold sealing techniques are employed, propellant loading can be accomplished prior to bullet assembly. The sealing materials used in either manner must be compatible with the thermosetting resins and metal bullet jacket.

Various modifications, alterations or changes may be restored to without departing from the scope of the invention as defined in the appended claims.

I claim:

1. The method of producing a cartridge case for ammunition comprising the steps of

blanking a steel metal skeleton having a central hub portion and a plurality of elongated fingers of substantially equal length extending radially therefrom die forming said fingers to extend in a direction substantially normal to said hub portion and in a substantially peripherally spaced relationship with each other, and laminating said blanked and formed metallic skeleton with a reinforced plastic material.

2. The method of claim **1** wherein said laminating step includes winding a high strength monofilament around the group of formed fingers, said monofilament having a coating of thermosetting resin molded thereon.

3. The method of producing ammunition comprising the steps in accordance with claim **1** and further necking end portions of said laminated fingers,

seating a primer in the laminated skeleton hub portion,

securing and sealing a projectile to said laminated fingers, and

loading said laminated skeleton with propellant.

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