# United States Patent

**Quinlan et al.**

[15] **3,645,206**

[45] **Feb. 29, 1972**


## [54] AMMUNITION CARTRIDGE


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[73] Assignee: **The United States of America as represented by the Secretary of the Army**



[22] Filed: **Feb. 19, 1970**

[21] Appl. No.: **12,659**

[52] **U.S. Cl.** ..... **102/40**, 102/DIG. 1

[51] **Int. Cl.** ..... **F42b 5/18**

[58] **Field of Search** ..... 102/38, 40, 43, DIG. 1



[56] **References Cited**

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*Primary Examiner*—Robert F. Stahl

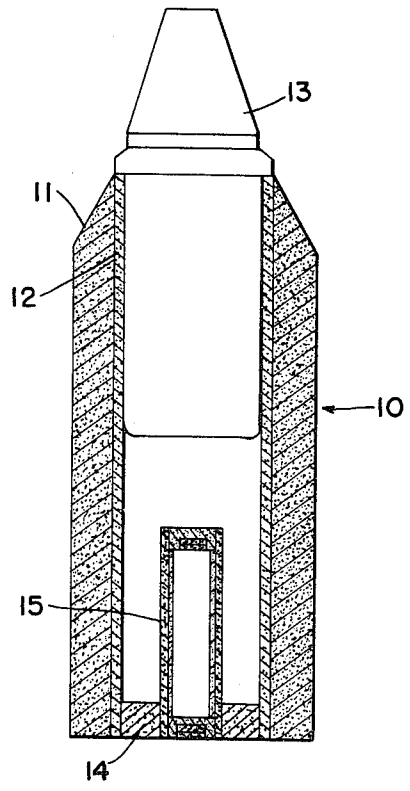
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[57] **ABSTRACT**

A caseless ammunition cartridge having a completely combustible ignition system for providing improved propellant surface area breakup and ignition in larger caliber ammunition. The ignition system includes a base end plug secured in the rearward end of a propellant support tube which is surrounded by a cylindrical molded charge and has a projectile secured in its forward end. A molded propellant cylinder has one end seated in the base end plug and a propellant tube bonded to its inner surface. A primer assembly has with the propellant cylinder one end, a primer cup containing a primer pellet and a combustible primer seal. A booster assembly has within the other end of the propellant cylinder a booster cup containing an explosive charge and a booster seal.


**4 Claims, 2 Drawing Figures**



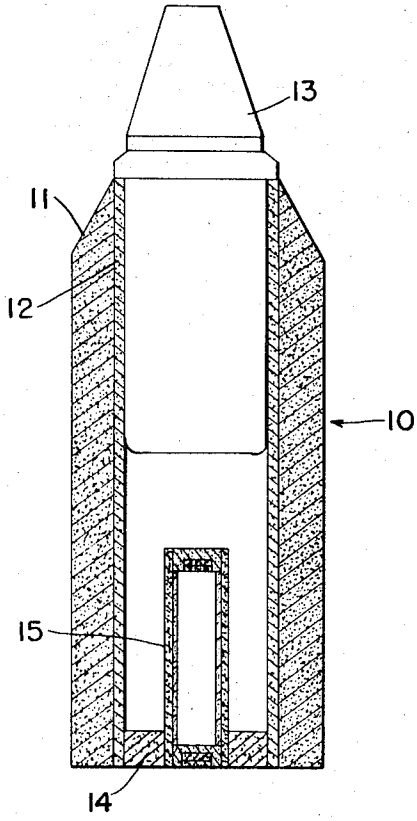



FIG. 1.

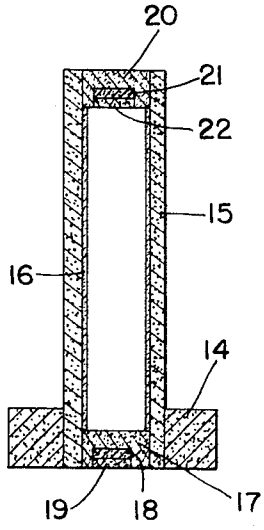



FIG. 2.

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# AMMUNITION CARTRIDGE

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

The invention is related to ammunition cartridges, and more particularly to relatively large caliber caseless ammunition cartridges.

It is an object of the invention to provide large caliber caseless ammunition cartridge having improved propellant surface area breakup and ignition.

Another object of the invention is to provide such a cartridge having a minimum of weight and volume.

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

FIG. 1 is a longitudinal sectional view of an ammunition round embodying the principles of the invention.

FIG. 2 is an enlarged sectional view of the ignition system in the ammunition round of FIG. 1.

The caseless ammunition cartridge, shown generally at **10** (FIG. 1), includes a substantially cylindrical molded charge **11** surrounding a propellant support tube **12**. A projectile **13** is secured in the forward end of the support tube **12**. The molded charge **11**, preferably a single base propellant, is made of explosive powder that is mixed with a binder and pressed in a mold to conform with predetermined gun chamber specifications that may be applicable for larger caliber (20 to 30 mm.) caseless ammunition. The support tube **12** is a **4** to **5** ply tube of 0.004 in. sheet nitrocellulose propellant that, when placed inside the molded cylinder **11**, provides strength and support to the cartridge, as well as additional charge weight and faster burning characteristics for the cartridge.

Secured in the rearward end of the support tube **12** is a base end plug **14** (FIGS. 1 and 2) of a completely combustible ignition system. A molded single base composition propellant cylinder **15** has its rearward end seated in the base end plug **14**



and a propellant tube **16** bonded to a substantial portion of its inner surface. The plug **14** is of a single base propellant composition and propellant tube **16** preferably is a spirally, convoluted wrapped or extruded double base propellant composition. A primer (percussion) assembly includes a primer cup **17**, of single base propellant composition, which is seated within the propellant cylinder rearward end and in abutment with one end of the propellant tube **16**. Primer cup **17** contains a primer pellet **18** which is secured in the cup **17** by a combustible primer seal **19**. A booster assembly includes a booster cup **20**, a fast burning single base propellant, which is seated in the propellant cylinder forward end and in abutment with the other end of propellant tube **16**. Booster cup **20** contains an explosive charge **21** that is secured in the cup **20** by a booster seal **22** which is made from a suitable fast burning propellant.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

We claim:

**1**. In a caseless ammunition cartridge having a substantially cylindrical molded charge surrounding a propellant support tube and a projectile secured in a forward end of said support tube,

a completely combustible ignition system secured in a rearward end of said support tube,

**2**. The structure of claim **1** wherein said booster assembly includes a booster cup containing an explosive charge and a booster seal.

**3**. The structure of claim **2** in which said booster cup is a fast-burning single base propellant.

**4**. The structure of claim **1** wherein each of said propellant cylinder, base end plug and primer cup are single base propellants and said propellant tube is a double base propellant.

* * * * *

# UNITED STATES PATENT OFFICE
# CERTIFICATE OF CORRECTION

Patent No. 3,645,206 Dated February 29, 1972

Inventor(s) Joseph B. Quinlan and Paul E. Williams

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1 should read as follows:

1. In a caseless ammunition cartridge having a substantially cylindrical molded charge surrounding a propellant support tube and a projectile secured in a forward end of said support tube,

a completely combustible ignition system secured in a rearward end of said support tube, said ignition system including a base end plug secured in said support tube rearward end, a molded propellant cylinder having one end seated in said base end plug, a propellant tube bonded to an inner surface portion of said propellant cylinder, a primer cup within said propellant cylinder one end and containing a primer pellet and combustible primer seal, and a booster assembly within the other end of said propellant cylinder.

Signed and sealed this 16th day of April 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

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a completely combustible ignition system secured in a rearward end of said support tube, said ignition system including a base end plug secured in said support tube rearward end, a molded propellant cylinder having one end seated in said base end plug, a propellant tube bonded to an inner surface portion of said propellant cylinder, a primer cup within said propellant cylinder one end and containing a primer pellet and combustible primer seal, and a booster assembly within the other end of said propellant cylinder.

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