

March 1, 1960

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2,926,607

HERMETICALLY SEALED EXPLOSIVE CARTRIDGE

Filed May 28, 1957

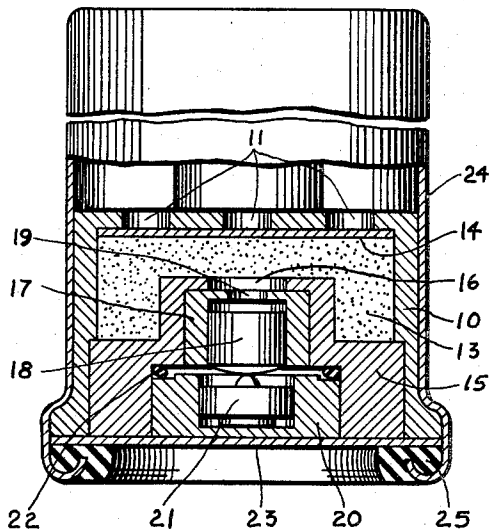


FIG. 1.

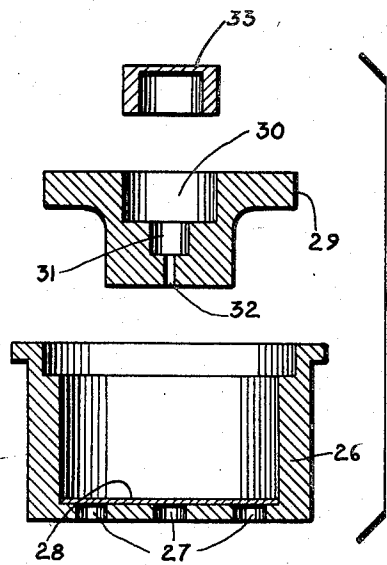


FIG. 2.

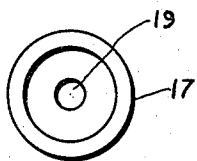


FIG. 3.

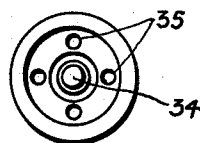


FIG. 4.

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HERMETICALLY SEALED EXPLOSIVE CARTRIDGE

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Application May 28, 1957, Serial No. 662,300

2 Claims. (Cl. 102—39)

(Granted under Title 35, U.S. Code (1952), sec. 266)

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

This invention relates to an improvement on the type of explosive cartridge disclosed by U.S. Patent 2,667,837, which was granted C. Walton Musser and Norman K. Turnbull on February 2, 1954.

In the use of the cartridge described in the aforesaid patent, it has sometimes happened that the combustible disk interposed between the ignition chamber and the propellant absorbed nitroglycerin from the propellant during storage. This absorption of nitroglycerin caused the disk to shrink from under its retaining ring so that the ignition powder was not properly retained and misfiring of the cartridge resulted.

When the combustible disk was replaced by a magnesium disk, that disk became dislodged from the cartridge's head too soon, so that the ignition powder was allowed to escape from the cartridge head before it had become well ignited. This condition resulted in misfiring of the cartridge. Also the disk sometimes acted as a barrier between the ignition powder and the propellant so that the propellant would not be properly ignited. This also resulted in misfiring.

Another disadvantage of this prior art cartridge was that the primer container was sometimes crushed into the fire holes so that the ignition powder was not effectively ignited.

In accordance with our invention, improper retention of the ignition powder is avoided by the provision of a cup-shaped member having a perforated bottom which is interposed between the ignition powder and the propellant, this apertured bottom being covered by a moisture-proof barrier. Such moisture-proof barrier may be a disk of polyethylene, a disk of paper having one or more layers of nitrocellulose, a plastic or other suitable material.

Excessive crushing of the primer casing is avoided by so mounting the firing pin that it is resiliently supported and is restricted to a limited range of travel.

As will appear, applicants' improved cartridge is in the general form of a plurality of cup-shaped members which fit into one another to form a cylindrically-shaped cartridge head. An important feature of this cylindrically-shaped cartridge head is the provision of an arrangement such that cups adapted to different types of primers may be interchanged with one another.

Our invention will be better understood from the following description considered in connection with the accompanying drawings and its scope is indicated by the appended claims.

Referring to the drawings:

Fig. 1 is a sectional view illustrating a preferred form of the invention,

Fig. 2 is a similar view of a modified form of the invention,

Fig. 3 illustrates a cup suitable for use with one type of primer, and

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Fig. 4 illustrates a cup adapted to the use of a different type of primer.

The cartridge head of Fig. 1 includes a cup-shaped member 10, the closed end of which is perforated as indicated at 11. It has been found that a suitable area of opening between the ignition and propellant chambers is 0.2484 square inch. This area is preferably in the form of nine perforations each three-sixteenths of an inch in diameter. These perforations are sealed by the moisture-proof barrier previously mentioned as indicated at 14. As previously indicated, the operation of the cartridge disclosed by the above-identified Musser and Turnbull patent is not altogether satisfactory for the reason that the cellulose nitrate disk 24 is sometimes forced against the propellant in a manner to prevent its proper ignition. The present invention avoids this difficulty by the provision of the openings 11 between the ignition and propellant chambers.

The other end of the ignition chamber 13 is closed by a second cup-shaped member 15 which has an outer shoulder adapted to rest on an inner shoulder of the first cup-shaped member 10, has an inner shoulder and is provided at its closed end with an aperture 16.

Nested within the cup-shaped member 15 is a third cup-shaped member 17 which houses the primer 18, and is provided at its closed end with an aperture 19. It will be noted that the aperture of the member 17 registers with and is somewhat smaller than the aperture 16 of the member 15. This difference in the size of the apertures 16 and 19 is required in order that the primer cup 17 (shown as having a single fire hole) may be interchanged with a primer cup having a plurality of holes as indicated by Fig. 4.

Also nested within the cup-shaped member 15 is an additional cup-shaped member 20 which encases the firing pin 21. It will be noted that the member 20 is arranged to rest against a resilient ring 22 of rubber or the like, this ring being interposed between the edge of the member 20 and the inner shoulder of the member 15. With this arrangement, travel of the firing pin is restricted to a limited range and crushing of the primer casing into the fire hole is avoided. The member 20 has an imperforate bottom and is fitted singly into the member 15. This prevents the deleterious leakage encountered in the use of the Musser and Turnbull cartridge wherein the only protection against leakage is the metallic cover plate 20.

Resting against the flush ends of the cup-shaped members 10, 15 and 20 is a cover plate 23 which closes the open end of the cartridge case 24. This end of the casing 24 is sealed by means of a resilient ring 25 which is held in a stressed condition against the cover plate by rolling or otherwise forming the ends of the case 24 so as to press against the resilient ring 25.

The modification of Fig. 2 includes a cup-shaped ignition container 26, which is provided with apertures 27, these apertures being sealed by the moisture-proof barrier 28 previously described.

Arranged to rest against the inner shoulder of the member 26 is a cup-shaped member 29 which is provided with a primer chamber 31 and a fire hole 32.

Adapted to rest against an inner shoulder of the member 29 is a cup-shaped member 33 which cooperates with member 29 to form a firing pin chamber 30. The cartridge head of Fig. 2 is otherwise generally as indicated by Fig. 1.

Fig. 3 illustrates a primer container of the type which has a single fire hole and is similar to the primer container 17 of Fig. 1. This container is for use with a well known type of primer including an anvil.

Fig. 4 illustrates a container which is exchangeable with that of Fig. 3 and is adapted for use with a type of primer which has no anvil and requires a Berdan anvil for its

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operation. It will be noted that the Berdan anvil 34 of Fig. 4 is surrounded by four fire holes 35 located on a circle which is within the confines of the aperture 16 of Fig. 1. In the use of the Berdan anvil, the primer is forced against it by the firing pin 21, the anvil 34 functioning in a manner similar to the anvil otherwise enclosed in the primer itself.

From the foregoing, it is evident that our improved cartridge head solves the problem of leakage between the ignition and propellant chambers, prevents crushing of the primer casing into the fire holes and provides an arrangement of parts whereby one type of primer may be exchanged for another.

We claim:

1. In an explosive cartridge, the combination of a case enclosing a propellant and having a central opening thereinto and an inner shoulder facing said opening, a first cup-shaped member having at one end an outer shoulder resting against the inner shoulder of said case and at its other end a plurality of openings adjacent said propellant, said first cup-shaped member having an inner shoulder intermediate its ends, a moisture-proof barrier within said first cup-shaped member and covering said openings, a second cup-shaped member having an outer shoulder resting against the inner shoulder of said first cup-shaped member

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and having an inner shoulder intermediate its ends, said second cup-shaped member forming with said first cup-shaped member an ignition chamber and having an opening in its bottom, a seal ring resting against the inner shoulder of said second cup-shaped member, and an additional cup-shaped member having its rim resting against said seal ring and its bottom imperforate to form with said second cup-shaped member a primer and firing pin housing which is completely sealed at its outer end.

2. An explosive cartridge according to claim 1 wherein said opening in the bottom of said second cup-shaped member is large enough to clear the openings of a Berdan anvil primer container whereby said cartridge is enabled to function with either a primer having its own anvil or a primer requiring a Berdan anvil for its operation.

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