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J. J. BLUM

2,385,398

HAND GRENADE BODY

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Fig. 1.

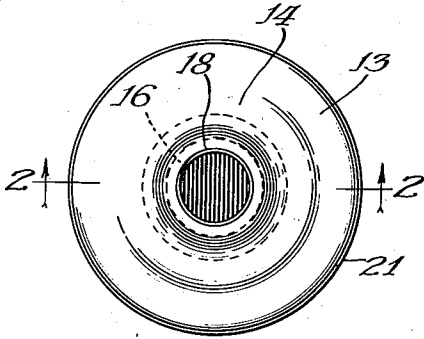


Fig. 4.

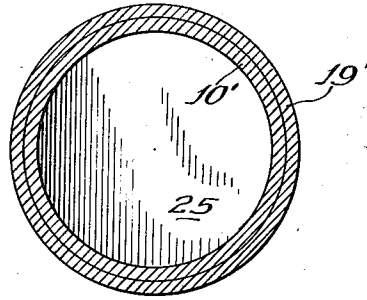


Fig. 2.

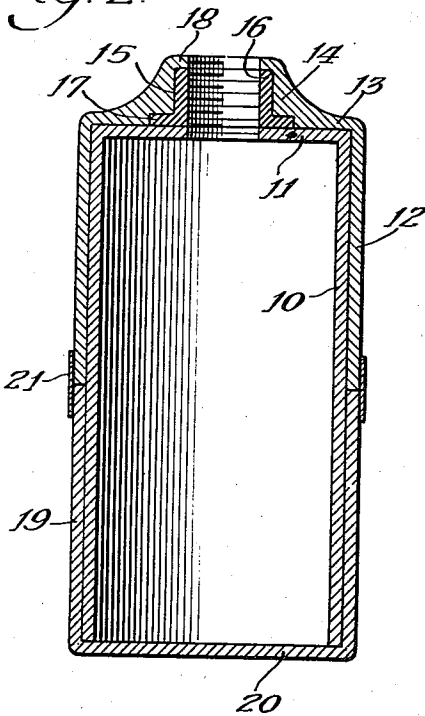
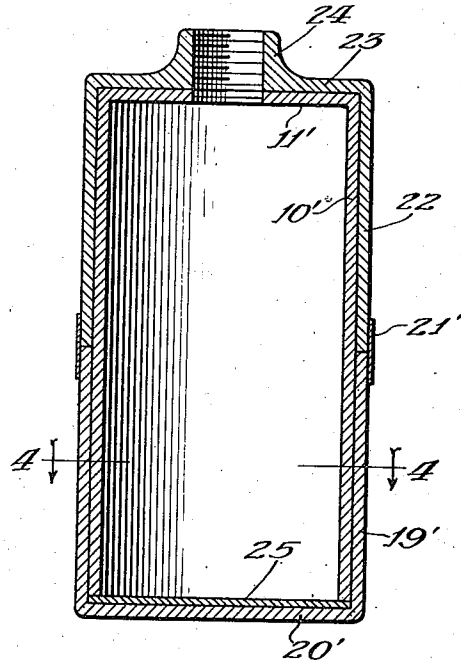


Fig. 3.



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HAND GRENADE BODY

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3 Claims. (Cl. 102—64)

This invention relates to improvements in offensive hand grenades and more particularly to a new and improved hand grenade body comprising an assembly of parts which are of waterproof non-metallic, seamless construction, and composed essentially of fibrous material and a thermo-plastic binder.

It is a particular object of my invention to provide a body for an offensive hand grenade which is adapted to contain as its filling a demolition charge for use at fairly close quarters. For such use, metal bodies of heretofore conventional construction which are subject to fragmentation on explosion are naturally very undesirable and dangerous to the user, hand grenades conventionally employing five second fuses which are ignited when the grenade is armed and thrown. It is therefore a particular object of my invention to provide a hand grenade of this type with a body wherein fragmentation dangerous to the user is avoided.

The undesirability of such dangerous fragmentation is avoided by the use of a hand grenade body formed in accordance with my invention which although devoid of metals is of dense and rigid construction, has good physical characteristics and good resistance to a high range of conditions of climate and storage.

In general my novel hand grenade body comprises an inner tubular body portion capped at one end by a member provided with an internally threaded annular boss for the introduction and engagement of the exploding device, and closed at its opposed end by a complementary cap. These body portions are composed of fibrous pulp and a thermo-plastic binder having good water-resistant qualities, the respective parts being each seamless and pre-molded into form, and being thereafter consolidated and compressed under heat to form dense rigid bodies wherein the binder and fibres are uniformly distributed in interlocking engagement.

Other objects related to the component materials, the details and modifications of construction and the arrangement of parts as will be apparent from a consideration of the following specification and diagrammatic drawing wherein;

Fig. 1 is a plan view of my novel offensive hand grenade body.

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1.

Fig. 3 is a section similar to Fig. 2 of a modified form of construction.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Referring to the drawing, and particularly Figs.

1 and 2, the reference numeral 10 indicates the inner tubular body, preferably comprising an integrally formed annular top 11, the whole being of seamless construction and preformed, as hereinafter more fully set forth, of fibrous material and a thermo-plastic binder. Extending over the top of the inner tube body 10 and in snug embracing engagement therewith is the seamless head cap 12 provided with integrally formed top 13, from which there projects outwardly and axially thereof a portion 14 hereinafter termed an "annular boss." This annular boss 14 is internally recessed as indicated at 15 for the reception and retention of the bushing 16. This bushing 16 is retained within the recess 15 and between the boss 14 and the top 11 of the inner body 10, the bushing being preferably provided with a base flange 17 so as to more firmly seat it and better retain it between the boss 14 and the top 11. The external lip 18 of the boss 14, the bushing 16 and the annular opening of the top 11 are all preferably of the same diameter and provided with a continuous internal thread for the reception and engagement of the conventional hand grenade exploding device, the latter not being illustrated.

The open end or bottom of the inner body 10 is closed by means of the seamless tubular base cap 19 provided with integrally formed bottom 20. It is preferred that the lips of the head cap 12 and the base closure cap 19 be substantially in meeting engagement as illustrated, and that the inner body 10 be coextensive with the joint depths of the two caps so as to provide a double wall structure and a body of reinforced construction. The meeting lips of the caps 12 and 19 may be additionally sealed by means of a strip of tape 21 to provide additional moisture sealing. If desired, the various adjacent portions may be additionally bonded together by means of suitable adhesive, for example, the top 11 of the inner body 10 may be adhesively joined to the top 13 of the head cap 12, and adhesive may also be applied at any other suitable points, for example, between the tubular portion of the inner body 10 and head cap 12, and between the tubular body 10 and the base cap 19.

As hereinbefore indicated and as hereinafter more fully set forth, each of the component tubular portions 10, 12 and 19 are of a fibrous nature composed of a rigid, dense, waterproof, homogeneous combination of a fibrous pulp and a thermo-plastic binder. The bushing 16 although likewise non-metallic is preferably formed of a material having relatively greater mechanical

strength than the remaining portions of my novel grenade body so that more perfect threads can be cut thereon for the purpose of more firmly engaging the corresponding threaded portion of the exploding device, if such is desirable. For such use the bushing 16 may be formed of a plastic material such as hard rubber or a hard, synthetic so-called rubber, a suitable thermo-plastic resin, or a thermo-setting resin such as urea or phenol formaldehyde and the like or even a hard wood.

The modified form of construction illustrated in Figs. 3 and 4 is similar to that of Figs. 1 and 2 in so far as it employs a like inner body 10' with integrally formed annular top 11' and base closure cap 19' provided with integrally formed bottom 20'. In this instance, however, although employing a similar tubular head cap 22 provided with integrally formed top 23, the integrally formed annular boss 24 may be used as shown without the employment of an internal recess and an additional bushing. In this form the annular boss 24 is, together with the top 11' provided with an internal thread for the reception and engagement of the exploding device. I may also provide additional reinforcement at the base by the positioning of a circular disc 25 within the base closure cap 19', this disc 25 being if desired bonded to the bottom 20' by means of suitable adhesive. The length of the inner tube body 10' is substantially coextensive with the resulting internal depths of the two caps, the meeting lips of the two caps being if desired additionally sealed by means of the tape 21'.

It will be understood that the form of construction illustrated in Fig. 2 may likewise be reinforced at the base thereof by the lodging of a disc within the bottom of the base closure cap 19 similar to the disc 25 shown in Fig. 3.

In forming the component parts of my novel container (with the exception of the bushing 16 when employed) I form the preliminary bodies thereof by the well known method of accretion felting, utilizing a mixture of fibrous pulp and a thermo-plastic binder which binder may be one or more of the various synthetic or natural thermo-plastic binders or resins and is preferably of various types of synthetic or natural bitumens or mixtures thereof, the fibrous material being preferably paper stock and for the present purpose waste paper stock is suitable. In general in accordance with one well known process, there is first formed a preliminary mass of slightly wet fibers and binder, and after an intimate admixture of the fiber and binder is formed in a suitable device such as a Werner-Pfleider mixer, water is added and the mass transferred to a beater to reduce it to the form of a workable pulp, after which further water is added to form an aqueous pulp of about 2% solids consistency. In forming my fibrous-bituminous composition, I may employ a pre-mix, of 30 to 50% and preferably 40% of waste paper stock of dry weight, together with 50 to 70 and preferably 60% of bituminous material.

The resulting dilute stock is then deposited by a conventional accretion method on foraminous forms by either vacuum or suction to build up the parts to a desired thickness and of their approximate shapes, after which they are removed from the forming members and placed in ovens and thoroughly dried. After such drying, they are subjected to repressing treatment to bring them to definite shape and dimension. This is accomplished by subjecting the parts to pres-

sure in dies heated from about 250 to 350° F., and preferably about 325° F., and at a pressure of from about 500 to about 1,000 pounds per square inch, depending upon the component materials and the resultant desired finish.

A preferred composition composed of approximately 40% waste paper stock by dry weight and approximately 60% of bitumen, accretion felted, oven dried and then pressed and consolidated in dies at a temperature of about 325° F. and a pressure of from about 500 to about 1,000 pounds per square inch, will withstand a strain of about 3 pounds per point per square inch, or a pressure of approximately 375 pounds per square inch for a part of 1/8 inch thickness.

The resultant finished products are thoroughly waterproof and will not warp or deteriorate after long exposure to the elements. They will also retain their shape at temperatures ranging up to about 175° F., and are not appreciably affected as to size either by heat or cold at temperatures ranging from about freezing to about 125° F.

Due to the fact that this material is thermo-plastic and waterproofed with an inert substance, it will not become brittle except at sub-zero temperature, and exhaustive tests have shown that it will not absorb moisture above approximately .5% regardless of atmospheric humidity, and like water immersion test indicates that there is no greater water absorption.

A grenade thus constructed is waterproof and is not affected by changes in temperature or humidity and if exposed to the elements will last indefinitely and will not deteriorate. It can be wholly immersed in water and if properly sealed the contents will not be affected in any manner whatsoever and it will at all times be suitable for the purpose intended.

Although in the foregoing I have shown and described a hand grenade body suitable for use as an offensive hand grenade adapted to contain a demolition charge for use at fairly close quarters, the body being free of metal parts which would be subject to fragmentation on explosion and thus undesirable as being dangerous to the user, it will be understood that my novel body may be used for other hand grenade fillings to which it is susceptible, such as for example certain chemical fillings. I therefore do not wish to be limited to the details and functions hereinbefore set forth except as limited by the following claims.

I claim as my invention:

1. A waterproof hand grenade body of the class described comprising a seamless tubular inner body, a seamless tubular head cap having an integrally formed internally recessed annular boss adapted to receive and engage an exploding device, a seamless tubular base closure cap, and a threaded bushing positioned within the recessed portion of said boss, the said tubular portions being each pre-formed and composed of a rigid dense homogeneous combination of fibrous pulp and a thermo-plastic binder, and said bushing being formed of a non-metallic material of relatively greater mechanical strength.

2. A hand grenade body of the class described comprising a tubular inner body having an integrally formed annular head, a tubular head cap in snug embracing engagement thereover, said head cap having an integrally formed annular top and an axially and outwardly projecting internally recessed annular boss, a tubular base cap having an integrally formed bottom in snug embracing engagement over the opposed open end of

said inner body, and a threaded bushing within the recess of said boss for engagement with an exploding device for the grenade, the said tubular body and cap portions being each seamless and pre-formed of a rigid dense waterproof homogeneous combination of a thermo-plastic binder and fibrous pulp, and said bushing being formed of a non-metallic material of relatively greater mechanical strength.

3. A hand grenade body of the class described comprising a tubular inner body having an integrally formed annular head, a tubular head cap in snug embracing engagement thereover, said head cap having an integrally formed annular top and an axially and outwardly projecting in-

ternally recessed annular boss, a tubular base cap having an integrally formed bottom in snug embracing engagement over the opposed open end of said inner body, and a flanged threaded bushing retained between the recessed portion of said boss and the top of said inner body for engagement with an exploding device for the grenade, the said tubular body and cap portions being each seamless and pre-formed of a rigid, dense, waterproof, homogeneous combination of a thermo-plastic binder and fibrous pulp, and said bushing being formed of a non-metallic material of relatively greater mechanical strength.

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