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J. B. SPOTSWOOD ET AL

CONTAINER FOR EXPLOSIVES

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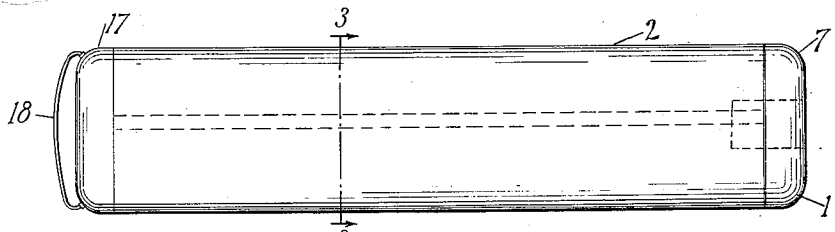


Fig. 1

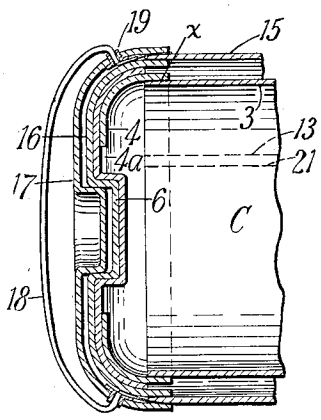


Fig 2

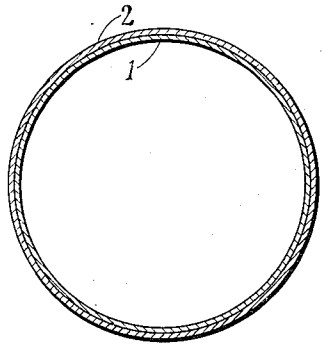


Fig. 3

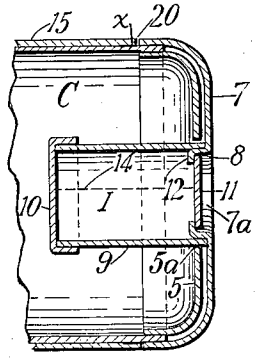


Fig. 4

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UNITED STATES PATENT OFFICE.

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CONTAINER FOR EXPLOSIVES.

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This invention relates to containers for explosives and has more particular relation to containers for use where fixed ammunition is not used, the container holding both a main charge and an igniter charge. It is highly desirable that a container of this type be somewhat flexible while sufficiently rigid to properly retain its shape, and so forth, strong, waterproof, and capable of keeping the main charge and the igniter charge properly separated, but also it is desirable that it be light and composed of a material not only not detrimental or indifferent to the explosion, but capable of increasing the effectiveness of the explosion. We have devised a container which, while having the various desirable characteristics of lightness, non-detrimental material, and so on, is strong and possesses the requisite rigidity and flexibility. The object of the invention is to provide a container having the mentioned, and other, desirable features. To this end, and also to improve generally upon containers of the character indicated, the invention consists in the various matters hereinafter described and claimed.

Without restricting the invention thereto it is described with more particular reference to the embodiment thereof illustrated in the accompanying drawings. In these drawings:

Figure 1 is an elevation of a container;

Figure 2 is a diametrical section of the left (in Figure 1) end of the container;

Figure 3 is a cross sectional view substantially on the line 3—3 of Figure 1, and

Figure 4 is a diametrical section of the right (in Figure 1) end of the container.

In Figure 2, due to the exaggeration of the thickness of the stock from which the container is made, the difference between the diameters of the inner and outer elements is greatly exaggerated, the outer diameter of the inner container and the inner diameter of the outer container being, actually, nearly the same. In the drawings but minor showing of the cement is attempted, to avoid confusion and unnecessary complication.

Briefly stated, the invention comprises a container having a form and construction adapting it to be made of a light, waterproof material itself consumed upon explosion of the charge, e. g. pyroxylin plastic, and also comprises a container of such material and having said construction.

Referring now to the drawings, the illustrated container comprises an inner element designated generally as 1, and an outer protective and reinforcing element designated generally as 2. The inner element presents a chamber C for the main charge, e. g. smokeless cellulose nitrate powder, and a chamber I for the igniter charge, e. g. black powder. Both elements are composed throughout of pyroxylin plastic, the double —but separate—wall construction provided by the two elements providing for the use of this material in sheet form while providing requisite rigidity, combined with a desirable amount of flexibility, and strength against rough handling and so on. A certain degree of rigidity is of course called for in order that the form of the container may be preserved, while some flexibility is also desirable; the double-wall construction gives these characteristics while providing for the use of such material as thin sheets of pyroxylin plastic. The thickness of the sheets will of course vary somewhat with the size of the container, but by way of example, for a 5 inch 51 calibre container sheet plastic .015 inch thick is generally satisfactory. It has been found by experiment that two thin sheets of the material, for example two sheets of .015 inch each are more flexible and also more readily consumed on firing, than a single thick sheet having the aggregate thickness, .030 inch, of the two thin sheets. A further advantage of the two-element construction is that in case of damage it is not likely that both elements would be ruptured at the same point, and the container will remain waterproof despite the damage.

Referring to the illustrated construction in detail, the inner element 1 comprises the cylindrical shell 3, the inner open head 4 with the opening 4^a, the inner open head 5 with the opening 5^a, the closing cap 6 for the opening 4^a, and the external open head 7. The latter supports the cylindrical igniter chamber I upon the flange 8 of the opening 7^a. The chamber is made up of the shell 9 with closing end 10 and has the closure 11 resting on the inwardly projecting supporting flange 12 in the flange 8. The shells 3 and 9 are conveniently made by bringing

the side edges of a sheet of plastic into overlapping relation and cementing the seam as 13 and 14. The various heads and the like may be merely sheet stock formed as desired. The heads 4, 5 and 7 are cemented (*x*) to the shell 3 (the heads 4 and 7 lying externally of the shell and the head 5 internally), the cap 6 cemented to the head 4, the end 10 cemented to the shell 9, the shell 9 cemented to the flange 8, and the closure 11 cemented to the flange 12.

The outer element 2 comprises the cylindrical shell 15, closely receiving the element 1, with the interior and exterior closing heads 16 and 17 cemented to the shell. A becket 18 is received at its ends between the two heads and between the head 17 and the shell 15 and cemented in place. Desirably an eyelet 19 is provided for each end of the becket and lying between the two heads and cemented thereto, for strengthening the aperture for the becket in the sheet. As indicated at 20, the element 2 is without a head at the end adjacent the ignition end of the inner element 1, and the end 20 is cemented to the inner element, leaving the ignition end exposed. Desirably this end, that is the head 7 and the closure 11, is given a distinctively visual characteristic, as a distinctive color, distinguishing it from the other end of the container. The shell 15 may be made as are the shells 3 and 9, and have the seam 21.

The plastic used for the container may of course be of any desired color and finish. Desirably substantially colorless transparent material may be used for the inner element but with the head 7 and closure 11 red, the shell 3 being given a smooth finish to facilitate its sliding into the outer element. Colorless material may be used for the outer element, with a smooth inner surface, but if desired a linen or frosted finish may be given the exterior. As will be understood, the possibilities of finish and appearance are wide; the invention is not restricted to any particular features of this sort. The plastic and the cement may be of any suitable character and formula. Merely by way of example I mention (parts by weight) for the plastic, pyroxylin (N content 10.85 to 11.15%) 77, camphor 20, volatile solvents (as acetone) 3, any suitable stabilizer being used as will be understood by those skilled in the art; for the cement, butyl acetate 30, butyl alcohol 38, ethyl acetate 32, this serving as a softener upon application of which the plastic will adhere. If a pyroxylin-containing cement is desired it may be butyl acetate 27, butyl alcohol 24, ethyl acetate 29, pyroxylin 10. It will be noted that the plastic has about 60% of the ballistic value of smokeless powder. In other words, if the plastic weighs, for example, five pounds, three pounds can be deducted from the smokeless powder charge and the same velocities obtained. This is a great advantage over such containers as silk bags which have no ballistic value.

The assembling and loading of the container may be carried out as follows:—The heads 4 and 5, and the head 7 carrying the chamber I are cemented to the shell 3, the charge of smokeless powder is filled into the chamber C through the opening 4^a, and the cap 6 cemented in place, enclosing the charge in a thoroughly waterproof manner. The outer element 2 (shell 15 with heads 16 and 17 cemented thereto) is slid over the inner element, fully and closely containing it, except the head 7, and giving additional strength and protection and doubly insuring the waterproofing, and the edge 20 is cemented to the inner element, giving the two elements a unitary character. At the desired time the igniter charge is filled into the chamber I and the closure 11 cemented in place.

We claim—

1. A container for explosive charges made of waterproof quick burning material and comprising an inner explosive-containing unit having an igniter-charge chamber, structurally distinct from the interior space of the inner explosive-containing unit, at one end, and an outer unit of substantially the size of the inner unit and closely receiving the same, said outer unit having an open end and said inner unit being received in the outer with the igniter-charge-chamber end exposed by said open end.

2. A container for explosive charge made of waterproof quick burning material and comprising an inner explosive containing unit and an outer unit of substantially the size of the inner unit and closely receiving the same, said container comprising an igniter-charge chamber, structurally distinct from the interior space of the inner explosive-containing unit, at one end thereof, and such end having a visual characteristic distinct from those of the opposite end of the container, identifying said one end as the igniter end.

3. A container for explosive charges made of waterproof quick burning material and comprising an inner explosive-containing unit having an igniter-charge chamber, structurally distinct from the interior space of the inner explosive-containing unit, at one end, and an outer unit of substantially the size of the inner unit and closely receiving the same said outer unit having an open end and said inner unit being received in the outer with the igniter-charge-chamber end exposed by said open end, said exposed end having a visual characteristic distinct from those of the opposite end of the container, identifying the exposed end as the igniter end.

4. A container for explosive charges made of waterproof quick burning material and comprising an inner explosive-containing unit having an igniter-charge chamber at one end, and an outer unit of substantially the size of the inner unit and closely receiving the same, said outer unit having an open end and said inner unit being received in the outer with the igniter-charge-chamber end exposed by said open end, said exposed end having a color distinct from the opposite end of the container, identifying the exposed end as the igniter-end.

5. A container for explosive charges made of waterproof quick burning material and comprising an inner chamber-presenting unit having one end closed and the other provided with an igniter-charge chamber, structurally distinct from the interior space of the inner explosive-containing unit, opening upon such end, and an outer envelopng unit of substantially the size of the inner unit to closely receive the same and having one end closed and the other open, the inner unit received in the outer with the closed ends of the two adjacent and the igniter-charge-chamber end of the inner unit exposed by the open end of the outer.

6. A container for explosive charge made of waterproof quick burning material and comprising an inner unit in the character of a cylinder headed at each end, each head having an opening, a closing cap for the one head, an igniter-charge chamber carried at the other head and opening upon the opening therein, a closure for such opening, and an outer unit of substantially the size of the inner unit to closely receive the same and in the character of a cylinder headed at the one end and open at the other, said inner unit received in the outer with its capped head adjacent the closed head of the outer and its igniter-chamber head exposed by the open end of the outer.

7. A container for explosive charges made of waterproof quick burning material and comprising an inner unit comprising a shell having at the one end an open head and a cap head for closing the same and having at the other end a pair of open heads the one exterior of the other, an igniter-charge-chamber carried by the exterior head and communicating with the opening thereof, and means for closing such opening; said container also comprising an outer unit of substantially the size of the inner unit to closely receive the same, and comprising a shell having at one end a pair of closing heads the one exterior of the other and having the other end open, the inner unit received in the outer with the one said end of the inner adjacent the closed end of the outer and the igniter-charge-chamber end of the inner exposed by the open end of the outer.

In testimony whereof we affix our signatures.

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