

K. K. V. CASEY.
CONTAINER FOR EXPLOSIVES.
APPLICATION FILED JULY 22, 1918.

1,329,503.

Patented Feb. 3, 1920.

FIG. 1

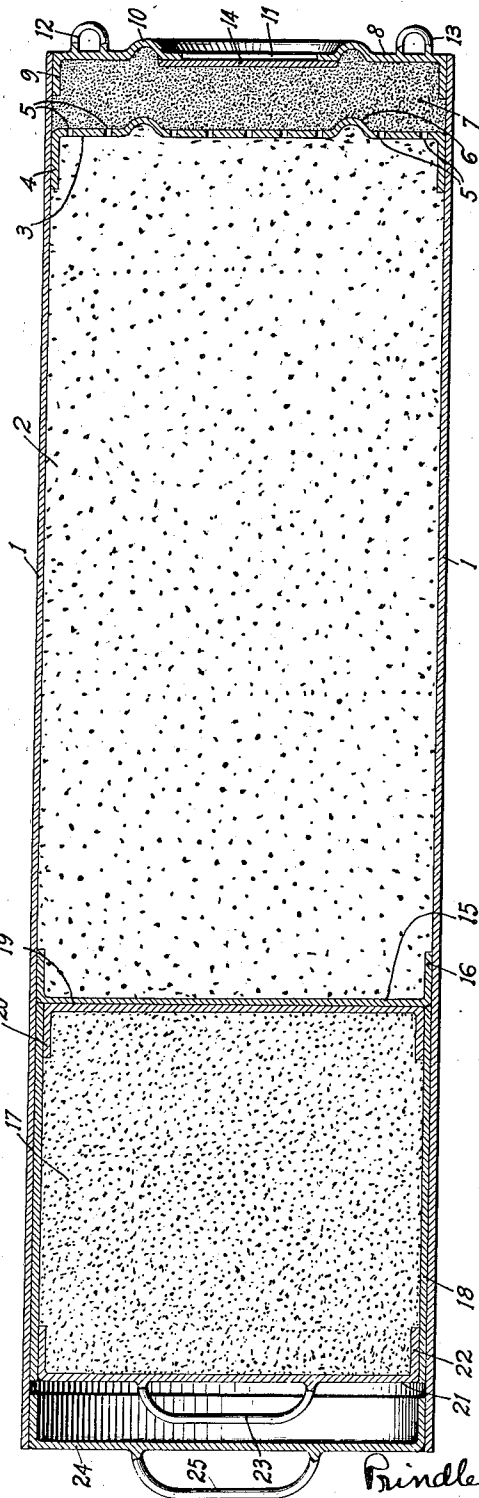
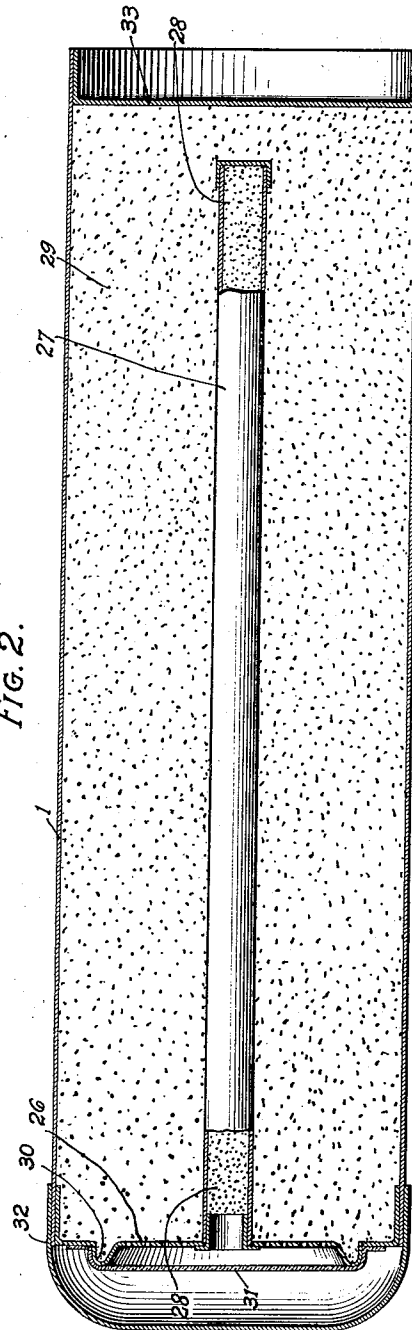


FIG. 2.



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CONTAINER FOR EXPLOSIVES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, KELLOGG KENNON VENABLE CASEY, of Wilmington, in the county of New Castle, and in the State of Delaware, have invented a certain new and useful Improvement in Containers for Explosives, and do hereby declare that the following is a full, clear, and exact description thereof.

10 The object of my invention has been to provide a container for explosives for use in firearms in general and large guns in particular and which shall have, among others, the advantages of being light in weight and yet sufficiently strong to resist the strains of handling and shipment, and which shall not only not be detrimental or indifferent to the explosion nor occasion flarebacks, but shall, on the other hand, positively increase the effectiveness of the explosion, and to such ends my invention consists of the container for explosives hereinafter specified.

In the drawings,

25 Figure 1 is a diagrammatic longitudinal section of a container made in accordance with my invention, and

Fig. 2 is a similar representation of another embodiment of my invention.

30 Previous to my invention, containers for explosives had been made of various substances, each of which possessed some advantages, but also involved disadvantages, and none of which was entirely satisfactory. For instance, containers have been made of metal, but such containers are heavy, reducing the number of rounds of ammunition which a soldier, for instance, could carry in the form of small arm cartridges, and increasing the weight to be transported for 40 larger ammunition. The metal cartridge also reduces the amount of explosive which can be contained in the chamber of a gun because of the space which the metal walls of the container occupy. Such a container 45 contributes no material to add to the gases of the explosion, and it cannot readily remain both waterproof and yet capable of access, so as to vary the amount of explosive therein to conform to the range which is desired, as is desirable in howitzer practice. 50

Explosive containers have also been made of fabrics, such as silk. Silk is, however, expensive and oftentimes difficult to obtain,

and it has the particular disadvantage of often leaving an unburned residue in the 55 barrel of the gun, which, when the breech is opened, admitting air, produces what is known as a "flare-back," or puff of flame backward through the breech, endangering the gun crew. Silk containers are not strong enough to stand all the rough treatment, some of which they unavoidably receive in transportation and in the haste of the loading of guns, and the silk fabric does not protect the explosive from the moisture of the 65 air. In howitzer practice, it is usual for a charge of explosive to consist of a number of silk bags, each containing a unit of explosive, all of which bags are fastened together in such a manner that the range can 70 be varied by taking away one or more of the unit bags from the main charge. When a unit bag is thus removed from the main charge, it is laid aside and exposed to the moisture of the atmosphere and to the moisture of the ground (upon which it is likely to be laid), and, consequently, the explosive 75 contained therein is likely to be injured. Moreover, the removal of a unit bag of explosive from the larger container varies the 80 length of the container.

Silk containers, also, are not rigid and have no definite shape and, therefore, cannot be handled as readily nor inserted into the gun as easily as a container having a 85 definite rigid shape, and there is, consequently, no way of maintaining close contact nor any fixed relation between the silk casing and the primer discharge, and thus its use introduces an element of chance as to whether the charge will be exploded. 90

I have provided a container which overcomes all of the disadvantages above mentioned and which, besides, possesses decided advantages over those of the prior art. 95

My invention consists primarily of a container made of a substance contributing to the propellent power of the gases of the explosion. I prefer to form my container of nitrocellulose or compositions containing the 100 same, and preferably of a composition which burns completely and instantaneously with the explosive charge so that the gases from the burning of the container will add to the propellent effect of the charge. 105

I shall first describe some of the best em-

bodiments of my invention known to me, and shall then more fully point out the advantages thereof.

My invention is capable of being carried out in many different ways, and the embodiments thereof which I shall describe are to be regarded as typical only of many possible embodiments and my invention is not to be confined thereto.

10 In the drawings I have shown a container, all of the different parts of which are made of nitrocellulose or a nitrocellulose composition, such for example as a composition containing: 75% by weight pyroxylin (containing 11% by weight nitrogen), and 25%
15 by weight camphor. These parts may be made from a sheet material having the above composition, but it is to be understood that in the making of the sheet material any plastic composition containing volatile solvents or not, if desired, may be used. Such composition containing volatile solvents may be the following: 75 parts by weight pyroxylin (containing 11% by weight nitrogen), 23
20 parts by weight camphor, 2 parts by weight volatile solvents, as for example a mixture containing volatile solvents as follows: 50% by weight methyl alcohol 50% by weight ethyl alcohol.

30 Referring especially to Fig. 1, I may provide a container comprising an outer cylindrical casing 1, which may be made in the form of a tube by welding or cementing the two edges of the sheet material together, or
35 which may be made from the above plastic composition by extrusion through suitable dies or by distending a thin layer of the said plastic material against the internal surface of a mold having the shape of said cylindrical casing 1 by air or steam pressure. In cementing these parts together, as well as any of the other parts that are herein described as being cemented together, I may
40 use any desired appropriate cement, but, by way of example, I may use a cement containing: 10 parts by weight of pyroxylin, 90 parts by weight of a solvent, such for example as acetone, amyl acetate or an ether alcohol mixture containing 70% by weight
50 of ether and 30% by weight of ethyl alcohol. Within the cylindrical casing 1 there is inserted a main charge 2 of any desired explosive, as for example nitrocellulose smokeless powder. In the rear of this there is
55 located a perforated diaphragm 3, having an annular flange 4 cemented to the interior of the casing 1, said diaphragm having, if desired, perforations 5 for the ignition of a charge 2, and an annular strengthening rib 6. In the rear of the diaphragm 3 there is a body 7 of black powder for the ignition of the charge 2, and in the rear of the black powder charge 7 there is an end closure 8 having a flange 9 that is adapted to
60 be cemented to the interior of the casing 1.

The closure 8 is also provided with straps 12 and 13 for use in handling the container. Said closure also has an annular strengthening rib 10 and a central opening 11, through which to fire the charge 7. Said opening 11 is closed by a membrane 14
70 which is preferably cemented to the closure 8. Said membrane 14 may be comprised of any desired material which will be shattered or consumed by the flash from the primer 75 of the usual type used in connection with explosive charges of this character, but preferably it is comprised of a waterproof material, such as sheet pyroxylin plastic, the composition of which is described above, or
80 ballistite, comprising a mixture of: 40 parts by weight of nitroglycerin, and 60 parts by weight of nitrocellulose (containing 12.6% by weight of nitrogen). The ballistite referred to is a detonating composition, but all
85 these materials will readily shatter under the influence of the primer.

At the forward end of the charge 2 there is a diaphragm 15, having a flange 16 cemented to the interior of the casing 1. Beyond this diaphragm 15 there are one or more unit or increment charges 17, having substantially one-third, or any other proportionate part, of the propellant effect of the charge 2. Said increment charges 17 are
95 inclosed within a subsidiary cylindrical casing 18 made in the same manner as the casing 1 and having a rearward closure 19 provided with a flange 20 cemented in the interior of said casing 18, as well as a forward closure 21 provided with a flange 22,
100 also cemented in the interior of the casing 18. My unit or increment charges can be made water- and moisture-proof. The casing 18 is also provided with a strap 23 for
105 inserting or removing the casing 18 into and from the casing 1. At the forward end of the casing 1 there is an end closure 24, having a flange 25 which fits in the casing 1, which may or may not be cemented thereto.
110 Said closure 24 carries a strap 25 to assist in the insertion and removal thereof to and from the casing 1.

The embodiment of my invention shown in Fig. 2 is constructed in the same manner
115 as the form of my invention shown in Fig. 1, except that in this instance there is a perforated diaphragm 26, constructed the same as the diaphragm 3, with the difference, however, that the diaphragm 26 has a tubular extension 27, carrying a charge 28 of the
120 same character as the charge 7, in order to more effectively bring about the ignition of a charge 29, surrounding the tube 27 of the same character as the charge 2. The diaphragm 26, as shown, is provided with an annular rib 30, and a disk 31 is placed over the said rib and secured to the outer face of the disk 26, thus retaining the charge 28 (for instance, a black powder), and yet exposing
130

it to the action of the primer discharge. The disk 31 may be made of any of the materials before mentioned.

A cap 32 is slipped over the end of the container to protect the disk and the charge beneath it from injury and moisture. The forward end of the container shown in Fig. 2 is closed by a flanged disk 33, whose flange is projected outward, so that it can be readily pressed against the shell of the container when cementing the diaphragm in place. The facing of the flange outward also permits the diaphragm to be crowded against the explosive within the container without danger of the flange catching on the grains of explosive and preventing the diaphragm itself from coming in contact throughout its surface with the explosive.

In using the containers such as shown in Fig. 1, it is merely necessary to insert one of the containers, provided with the explosive charges as described, in a gun, and then to fire the same in the usual manner. In the handling of the container provided with the explosive charges, the former may be grasped by the straps 10 and 11. If, before insertion into the gun, it is desired to decrease the velocity of the shell, this can be accomplished by removing the increment charge 17 and by omitting the same altogether or replacing it with a smaller increment charge. In making changes of increment charges, the straps 23 and 25 are used. Before using the container shown in Fig. 2, it is necessary first to remove the cap 32.

My container possesses, among other advantages, the following advantages:

As the material in my container is of a nature to be more or less completely consumed during the explosion, the gases of combustion add to the propellent force of the explosive. Thus, the walls of my container, in their combustion, replace to a considerable extent the propulsive effect of the solid explosive which they displace.

When my container is made of nitrocellulose and is charged with smokeless powder, the chemical natures of the container and the explosive charge are in a general way very much alike, differing chiefly as to the percentage of nitrogen present and in the solvents used, and, under these circumstances, my container may be said to consist of explosive material related to the explosive propellents used.

My container is exceedingly light in weight and, in effect, and considering the fact that the combustion of its walls adds to the effectiveness of the explosion, it is as though there were neither substantial loss of weight or propulsive effort, so far as the side walls of my container are concerned. A soldier could carry many more cartridges having side walls constructed in accordance

with my invention than he could carry of cartridges having the usual all-metal containers.

My container is water- and moisture-proof and is not subject to corrosion.

Although my container is light in weight, yet it has sufficient strength to resist all ordinary strains of handling and shipment.

My container leaves no unburned residue in the barrel of the gun, and, consequently, there is no "flare-back" produced when the breech of the gun is opened.

The unit or increment charges, when made in accordance with my invention, are of a rigid, definite form, and can be made to fill the container completely. The container can be made moisture-proof and yet access is easily afforded to the increment containers for the purpose of removing one or more of them. The increment charge containers are perfectly waterproof and are not in any manner injured by being laid on the ground or exposed to the weather when they are removed from the container.

My containers are rigid and of a definite shape and can, therefore, be handled with the utmost readiness in inserting them into a gun. Being of a fixed length, whether or not one or more of the increment charges has been removed, my containers maintain close contact with, or any desired fixed relation with, the primer discharge, so there is certainty that the explosive within the container will be set off.

I claim:

1. A container for explosive charges made of waterproof quick-burning material, having therein a removable container for an increment charge.
2. A container for explosive charges made of a material containing nitrocellulose, having therein a removable container for an increment charge.
3. A container for explosive charges made of a material containing nitrocellulose and camphor, having therein a removable container for an increment charge.
4. A container for explosive charges made of waterproof quick-burning material, having therein a removable container for an increment charge as well as a removable closure beyond the removable container.
5. A container for explosive charges made of a material containing nitrocellulose, having therein a removable container for an increment charge as well as a removable closure beyond the removable container.
6. A container for explosive charges made of a material containing nitrocellulose and camphor, having therein a removable container for an increment charge as well as a removable closure beyond the removable container.
7. A container for explosive charges made of waterproof quick-burning material and

having therein a removable container for an increment charge made of similar material.

8. A container for explosive charges made of waterproof quick-burning material and having therein a removable container for an increment charge made of similar material, said container for an increment charge being made impervious to water.

9. A container for explosive charges carrying a main explosive charge in its rear portion, and a subsidiary casing located within the forward portion of said container and carrying an increment charge, said casing being removable from said container.

10. A container for explosive charges carrying a main explosive charge, having therein a casing carrying an increment charge, said casing being removable from said container.

11. A container for explosive charges carrying a main explosive charge in the rear

portion, and a subsidiary casing located within the forward portion of said container and carrying an increment charge, said casing being removable from said container, said casing and container both being made of water-proof-quick burning material.

12. A container for explosive charges carrying a main explosive charge in its rear portion, and a subsidiary casing located within the forward portion of said container and carrying an increment charge, said casing being removable from said container, said casing and container both being made of a material containing nitrocellulose.

In testimony that I claim the foregoing I have hereunto set my hand.

KELLOGG KENNON VENABLE CASEY.

Witnesses:

G. D. HOPKINS,
STANLEY L. ABRAMS.