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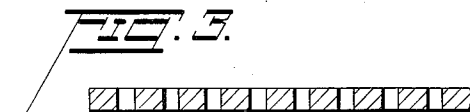
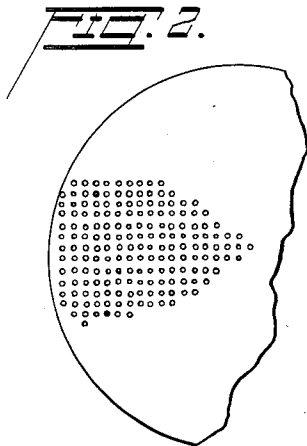
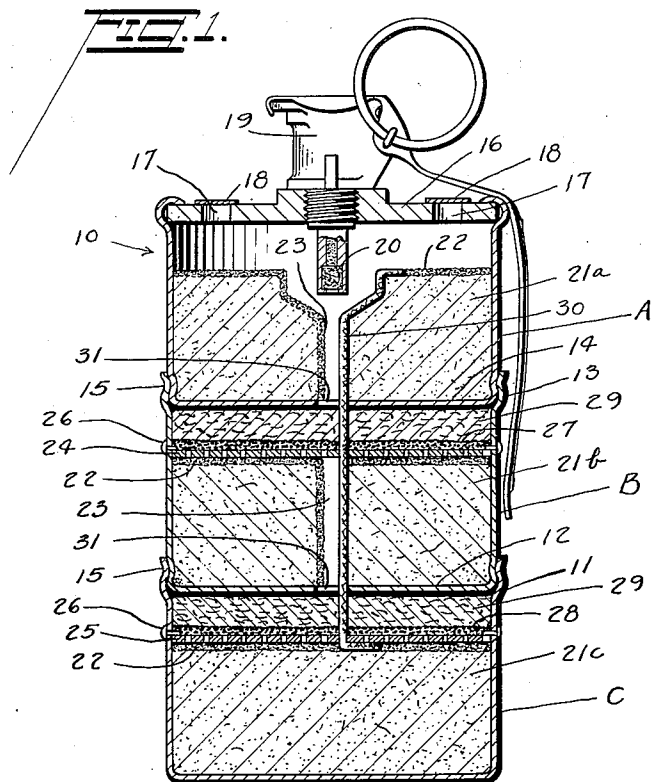
A. LOWY

2,094,562

HAND GRENADE

Filed Feb. 20, 1935

2 Sheets-Sheet 1



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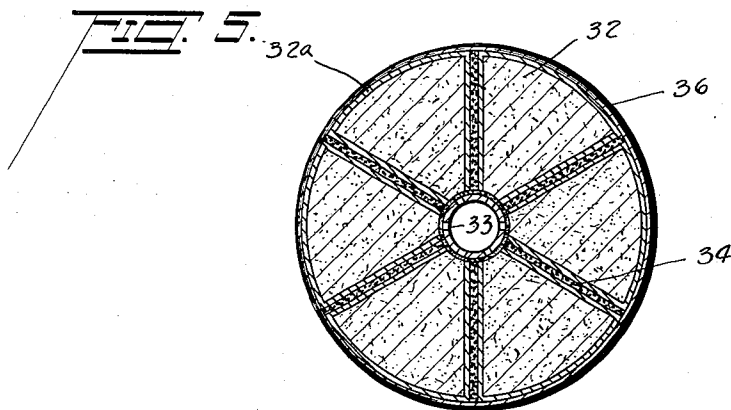
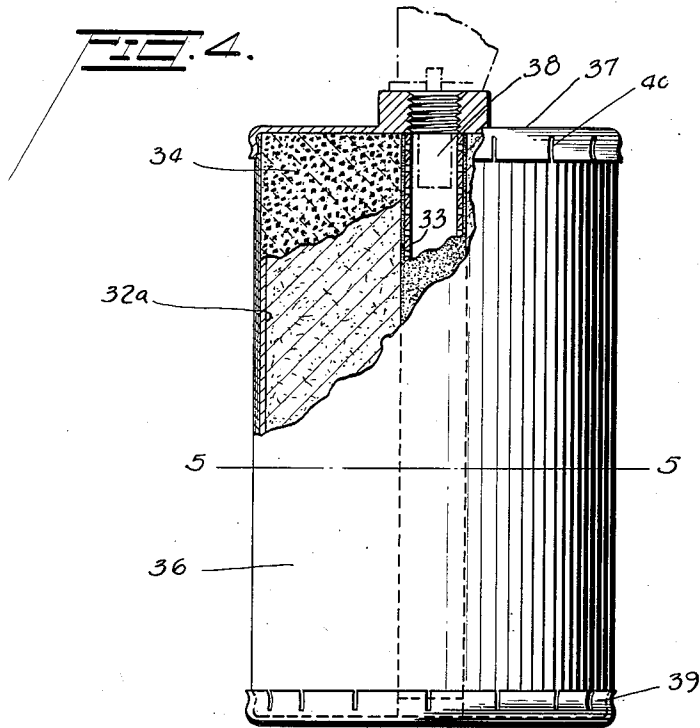
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,094,562

HAND GRENADE

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Application February 20, 1935, Serial No. 7,447

7 Claims. (Cl. 102—29)

The present invention relates generally to gas dispersing apparatus adapted for embodiment in hand grenades, aerial grenades or projectiles for large caliber guns and primarily comprises a multiplicity of independent gas dispersing separable sections operatively combined into a unitary structure similar in outward appearance to the conventional unitary gas dispersing device.

The primary object of the present invention resides in the operative combination of the gas dispersing sections of the device.

A secondary object of the invention is to provide in a device of this character either an instantaneous or delayed means for operative separation of these sections in the immediate area where the dispersion of gas is desired. In cases where instantaneous means are provided I prefer, although not absolutely necessary, to use a plurality of, but not exceeding three sections and thereby avoid the possibility of building up back pressure tending to prevent operative separation between sections although it is obvious that where delayed means is provided, any number of sections may be employed without any such possibility arising as will become apparent from further description.

A further object of the present invention is to provide a sectionalized container designed for assembly as a unitary structure wherein said sections are adapted for being separated from each other upon ignition.

A still further object of the present invention is to provide in a device of this character, a plurality of longitudinally disposed separable segmental or triangular shaped sections operatively combined into a unitary structure wherein said sections are adapted for being separated from one another upon ignition.

A specific object of this invention is to provide means for telescopic assembly of the aforesaid sections.

A further specific object of the present invention is to provide means for simultaneously separating said sections and igniting predetermined burning areas of said sections.

A still further object of the present invention resides in filling each separable section of said container with specific mixtures of a combustible and a gas producing substance which specific mixtures may have different and distinct incapacitating effects or which may specifically comprise a combination of incapacitating gases and a flare producing mixture.

The above and other objects will appear more fully hereinafter in the detail description of the

apparatus illustrated in the accompanying drawings. It is to be expressly understood, however, that the drawings are for purposes of illustration only and are not designed as a definition of the limits of the invention, primary reference being had, for this purpose, to the appended claims.

In the drawings, wherein like reference characters refer to like parts throughout the several views:

Figure 1 of the accompanying drawings illustrates a present preferred embodiment of the invention.

Figure 2 is a detail view of the perforated metal gauze used for closing the sections.

Figure 3 is an enlarged cross sectional detail view of the metal gauze.

Figure 4 is a modification of Figure 1.

Figure 5 is a sectionalized view taken along line 5—5 of Figure 4.

Referring to the drawings, a container 10, similar in outward appearance to a conventional gas dispersing device, such for example as a hand grenade, is provided.

This container comprises a plurality of independent sections A, B, and C, superposed one above the other in telescopic relationship; for example, the upper end of the section C which in the present embodiment of the invention forms the base section of the container is provided with an enlarged flared portion 11 within which the lower end 12 of the next adjacent section B is snugly telescoped. In a similar manner, the upper end of the section B is provided with a similar flared portion 13 within which the lower end 14 of the upper section A is snugly telescoped. From the foregoing, it becomes apparent that any number of telescoping sections may be provided without departing from the spirit of the invention; accordingly, I do not desire it to be understood that I intend to limit myself to the precise number of sections illustrated in the drawings although circumstances may and do arise wherein a limitation of the number of sections used may be desired. After assembly, the telescoping portions of adjacent sections are, if desired, suitably crimped, as shown by the numeral 15, to effectively maintain said sections in assembled relation.

The upper section A is closed by a top plate 16 having provided therein a plurality of openings 17. These openings are normally covered by strips of adhesive tape 18, though other materials and means for closing these openings prior to the functioning of the device may be employed, if desired.

Associated with the container 10 and supported by the top plate 18 is a suitable firing mechanism 19 including the usual firing pin and primer 20. In connection with the firing mechanism 19, it has been found desirable to use a bouchon mechanism suitably modified to give the desired timed ignition of the mixture within the container. However, I do not wish to limit myself to any particular firing mechanism inasmuch as it will be apparent to those skilled in the art that any device which will properly ignite the mixtures within the container may be successfully employed.

Prior to assembling the several sections into unitary relationship, each section is loaded with a specific mixture 21a, 21b, and 21c, consisting of a suitable gas producing substance and a combustible which is usually loaded into each section under pressure to provide a substantially solid mass. To insure rapid burning, the exposed top surface of each mixture is thereafter coated with a suitable booster material generally indicated by the numeral 22. The booster material may be one of several kinds; for example, nitro-cellulose compounds, gun powder mixtures, mixtures of gun powder and nitro-cellulose compounds or any other combination of chemicals which when caused to react produce heat to vaporize the physiologically active chemical compounds and preferably mixed with an acetone binder, may be used.

The gas producing substances may be any one or a mixture of several types of such compounds. If a lachrymatory or crying gas is desired, a chloro-acetophenone compound known as "CN" may be used. If a sternutatory or sneezing gas is desired a diphenylamine-chloroarsine gas may be utilized. If it is desired to emit a lachrymatory smoke or fog gas upon ignition of said container, the sections may be loaded with a mixture including ammonium chloride, a binder of vaseline and precipitated chalk and a fuel such as gun powder. Fumigatory or poisonous gases may also be used, e. g. paraformaldehyde. It is to be understood, however, that other forms of fuel and gas producing substances may be used within the scope of the invention, as the foregoing examples are given by way of explanation of the invention and not by way of limitation. For example, I contemplate the use of a well known white or colored flare producing mixture in any one or more of the sections which mixture may consist, by way of example, of potassium nitrate, magnesium and inert materials. When such a mixture is loaded in any one of the separable sections, it becomes readily apparent that an illumination of a restricted area may be effected together with a dispersion of incapacitating gases in the immediate vicinity. I also contemplate the utilization in one of said sections of an incendiary mixture, such as—for example, phosphorus or other well-known easily ignitable hard to extinguish materials.

To insure a rapid burning of the specific mixtures contained within each section, in my present preferred form, I provide a foraminous tubular member 23 extending through the mixtures of the sections containing a secondary booster material in operative relation with the coating of booster material applied to the exposed top surface of the combustible mixture.

Above the coating of booster material in each section B and C, I position a perforated metal sheet 24 and 25 suitably held in place by drive pins 26. The sheets 24 and 25 have loosely coated

thereon a powder charge 27 and 28 respectively comprising preferably a predetermined mixture of the usual charges in ammunition, such for example as nitro-cellulose compounds or other suitable combinations of chemicals which when caused to react produce heat and pressure and thereby effect a disintegration of the container 10 into its several component parts. The space above each powder charge 27 and 28 is thereafter suitably packed with light cotton wads 29 to properly maintain the powder charges in firing position on the perforated sheets 24 and 25. The powder charges by reason of their close proximity to the combustible mixtures in these separable sections will effect an instantaneous burning of the combustible mixture approximately throughout their entire cross sectional areas.

To effect ignition of the combustible mixtures in the sections B and C, after the firing of the bouchon mechanism, I provide a fuse 30, the upper end of which may be in suitable operative engagement with the coating of booster material in the section A and which extends downward through suitable openings 31 into operative engagement with the powder charge 27 and 28 of the sections B and C. At its lower end the fuse 30 is preferably anchored to the coating of the booster material in the lower section. The fuse 30 may be either a time fuse intended to effect successive operative separation of the sections of the container, or it may equally as well be an instantaneous fuse in which case an operative separation of the sections will be simultaneously obtained. Although in practice I have found that the form of my invention illustrated in the accompanying drawings and referred to in the above description as the preferred embodiment in that I have provided a new and novel sectionalized container in which the specific mixtures are fired by a single ignition means with a resulting fast burning of the said mixtures, yet realizing that the conditions concurrent with the adoption of my invention will necessarily vary, I desire to emphasize that various minor changes in details of construction, proportion, arrangement of parts, and manner of operation, may be resorted to within the scope of the appended claims without departing from or sacrificing any of the principles of the invention.

A modification of the invention is illustrated in Figures 4 and 5 wherein is provided a plurality of independent sections 32 each formed as a segmental or triangular shaped sector which when united together form a unitary structure. Each section comprises an intimate mixture of a combustible and a gas producing substance united together into a cake form by the application of pressure which if desired may be enclosed in a foraminous container 32a. The gas producing substance in any section may be any one or a mixture of several types of the compounds hereinabove enumerated. The inner ends of each section are foreshortened to provide a central opening for receiving a foraminous tubular member 33 which is coated with a suitable booster composition 34. As shown more particularly in Figure 5, there is interposed between adjacent sections a secondary coating 34 of a powder charge of the type set forth hereinabove with respect to Figure 1.

After assembly of the sections an outer cover 36, preferably of cardboard or wrapping material is provided to maintain the assembled relationship of the sections. The upper ends of the sections and cover 36 are closed by a metallic top plate 37,

the peripheral edge of which may be bent over and suitably crimped to operatively hold the sections together. This top plate supports a suitable firing mechanism (shown in phantom) including the usual primer 38 which is operatively associated with the upper end of the foraminous tubular member 33 and in communication with the powder charge 34. The lower ends of the sections 32 and cover 36 are held together in assembly by a lower metallic plate 39, the peripheral edge of which may be bent over and suitably crimped to hold the sections 32 together. From the foregoing description it will be apparent that upon operation of the firing mechanism the primer 38 will be ignited and in turn will ignite the powder charge 34 to thereby obtain an explosive effect and instantaneous separation of the sections 32. Dependent upon the strength of metal used in the upper and lower plates it has been found desirable in this modified construction to provide the annular flanged portions with a plurality of spaced saw cuts or weakened portions 40 to thereby insure efficient and simultaneous separation of the sections.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a gas dispersing device, a container comprising a plurality of separable gas dispersing sections, each of said sections being adapted for independent dispersion of gas at a point remote to the other sections of the plurality and each containing an intimate mixture of a combustible and a gas producing substance, suitably cored to receive ignition means in operative relation with the said plurality of sections and secondary ignition means placed intermediate of adjacent sections whereby the specific mixture of at least one section is ignited and sufficient pressure developed by said last named means to operatively separate adjacent sections.

2. In a gas dispersing device, a sectionalized container, the adjacent sections of which are disposed in operative relation, each of said sections being adapted for independent dispersion of gas at a point remote to the other sections of the plurality and each section containing a specific mixture of a combustible and a gas producing substance, means for igniting the specific mixture

in each section and for operatively and simultaneously separating said adjacent sections.

3. In a gas dispersing device, a sectionalized container, the adjacent sections of which are disposed in operative relation, each of said sections being adapted for independent dispersion of gas at a point remote to the other sections of the plurality and each section containing a specific mixture of a combustible and a gas producing substance, means for igniting the specific mixture in each section and for operatively and successively separating said adjacent sections.

4. A container for ignitable gas dispersing substances and fuels comprising a plurality of sections and each of said sections being adapted for independent dispersion of gas at a point remote to the other sections of the plurality and united in superposed telescopic separable engagement a pressure area between said sections containing an explosive charge, and means carried by said container for igniting said substances and fuels and said explosive charge insuring operative separation of said sections.

5. A container for ignitable gas dispersing substances and fuels comprising a plurality of separable sections containing an intimate mixture of a combustible and a gas producing substance, an explosive charge disposed in operative relation to said intimate mixture and the base of the next adjacent section, and means for igniting the explosive charge and intimate mixtures simultaneously.

6. A container for ignitable gas dispersing substances and fuels comprising a plurality of separable sections, wherein at least one of said sections embodies an intimate mixture of a combustible and a gas producing substance, a booster material, a closure member consisting of a metal gauze, an explosive charge supported by said gauze and means for ignition thereof.

7. In a gas dispersing device, a container comprising a plurality of radially disposed separable gas dispersing sectors, each of said sections being adapted for independent dispersion of gas at a point remote to the other sections of the plurality and each containing an intimate mixture of a combustible and a gas producing substance and ignition means in operative relation with the said plurality of sectors.

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