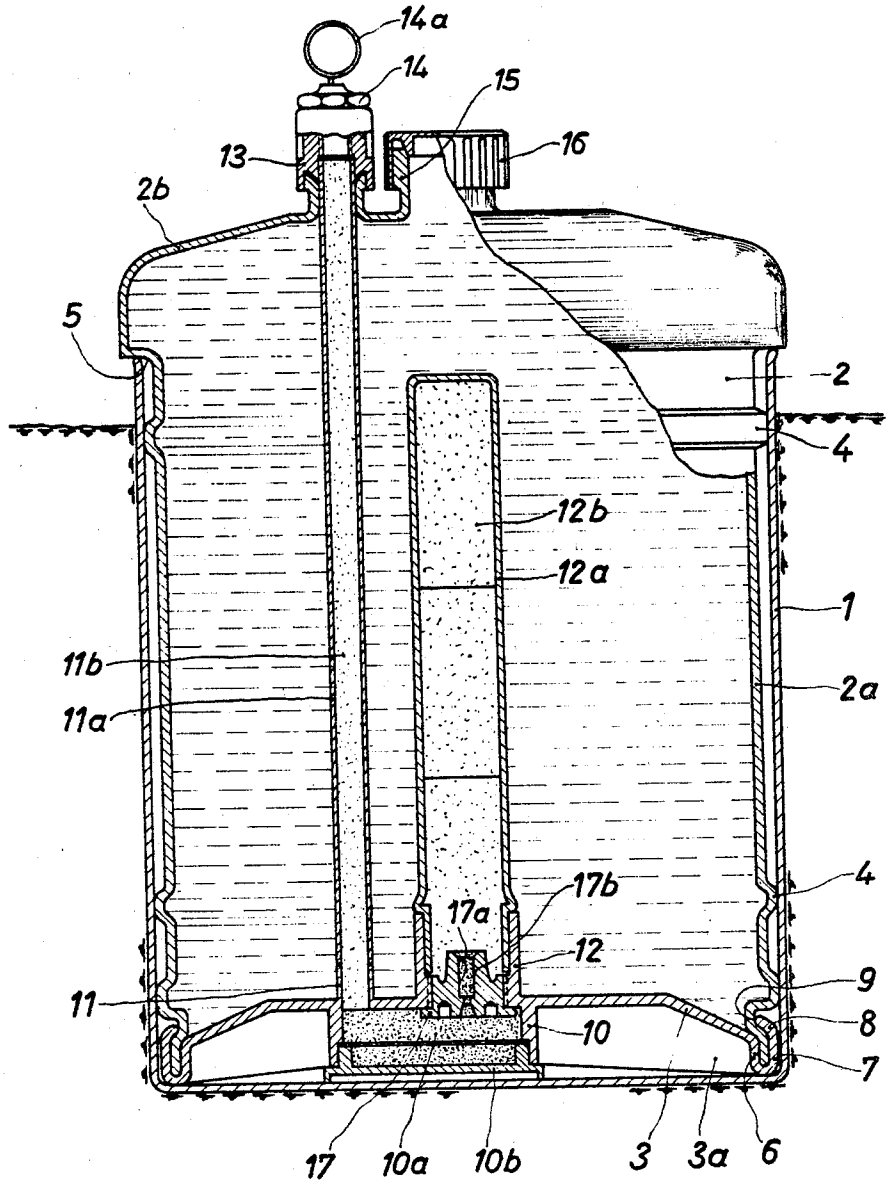
Sept. 3, 1968 W. GÄHLE 3,399,468

SPRAYING CANISTER

Filed May 5, 1966



Inventor:
Walter Gähle
By
Watson, Cole, Grindle & Watson
Attys.

United States Patent Office

3,399,468
Patented Sept. 3, 1968

3,399,468

SPRAYING CANISTER

Walter Gähle, Unterluss-Hohenrieth, Germany, assignor to Firma Rheinmetall G.m.b.H., Dusseldorf, Germany

Filed May 5, 1966, Ser. No. 547,862
Claims priority, application Germany, May 8, 1965, R 40,581
6 Claims. (Cl. 35—25)

ABSTRACT OF THE DISCLOSURE

A spraying canister for simulating the discharge of poison gases over terrain having a container to hold a mock gas with a detonator and a time-delay mechanism and a propellent and explosive charge to burst the container and spray out the contents thereof.

The invention relates to a spraying canister for simulating the discharge of poison gases over terrain, consisting of a container holding a training (or mock poison) gas, a detonator and time delay mechanism inserted into the lid of the container, a propellent charge for ejecting the spraying canister from a discharge cup, and an explosive chare for bursting the container and spraying out the contents.

Spraying canisters of this type are known. They are used, on the one hand, to simulate grenades, rockets and bombs filled with poison gas and, on the other hand, the gaseous medium used, which generally consists of a neutral fluid, has to be detected in the countryside which is achieved by contacting it with a dispersed powder to colour it and make it very clearly visible.

Spraying canisters of this kind essentially consist of a training gas container made of sheet steel (fitted with a detonator, propellent charge and explosive charge), which can be shot out of a discharger cup, the explosive charge only igniting and destroying the container, thus spraying out the contents, when the container has reached a given height above the ground.

Since the fluid content of these canisters is about 10 litres and the maximum height reached by the canister when shot from the discharger cup is about 30 metres, it will be appreciated that quite stringent requirements have to be fulfilled as to the strength not only of the canister itself but also of the discharger cup.

In the case of the discharger cup, these requirements can be fulfilled relatively simply and cheaply by burying it in the earth almost up to the upper edge. This surrounding wall of earth is of great importance for the discharger cup containing the spray canister both because of the protection provided before bursting, when the propellent charge pressure is too high, and because it acts as a bedding to achieve a satisfactory firing; also as it provides camouflage thus enhancing the surprise effect.

Because it is made of sheet steel the spraying canister container has sufficient strength and stability on firing that there is no danger of the container exploding prematurely.

The disadvantage of such a sheet steel canister is that it splinters when exploded, which means that the spraying canisters can only be used on practice training grounds. However, from a military point of view these spraying canisters should be capable of discharge in all types of terrain, in order to accustom troops with the means of producing poison gases to a greater extent than has previously been possible.

Another disadvantage of these known spraying canisters is that in the firing position there is an annular gap between the canister and the discharging cup which allows dirt and moisture to infiltrate. The result is that water and dirt can collect at the bottom of the discharging cup round the casing of the spraying canister propellent charge, so that in bad cases the propellent charge is so impaired that it misfires.

The object of the invention is to reduce or eliminate these disadvantages and drawbacks, and this is achieved by making the spraying canister container of a synthetic material which disintegrates into small parts which are not dangerous, the required stability of the canister during firing being provided by ribs thereon.

It has been found that a low-pressure polyethylene sold under the name of "Hostalen GF 5740," is particularly suitable for the spraying container material. Despite the large capacity of the container of 10 litres of fluid, with this material it is possible to use a relatively small wall thickness which not only gives the container excellent stability on firing, but also means that there is no danger when it disintegrates. The container disintegrates into small particles, which can no longer be called splinters, so that this novel spraying canister can be used during manouvres in any type of training ground and countryside.

Other advantages and details of the invention will be explained in greater detail with reference to the accompanying drawing, which shows a spraying canister inserted into a discharging cup ready for firing.

As in previous constructions, the discharging cup **1** is of a simple, cylindrical sheet steel holder, which is preferably, as shown, buried up to the upper rim in the earth. The spraying canister complete with all detonating, propellent and explosive components is inserted into this holder. The spraying canister essentially consists of a thin-walled container **2** having a one-piece, cylindrical shell **2***a* with a cap **2***b* fitted to it, and an insertable bottom **3**, all made of a synthetic material capable, on explosion of the canister, of disintegration into small, harmless parts. In the upper and lower regions of the shell **2***a* there are circumferential, riged reinforcing ribs **4** projecting radially outwards which not only increase the stability of the container, whilst keeping the same wall thickness, but also above all act as guide devices in the discharging cup and provide a seal between the container **2** and discharging cup **1**. The cap **2***b* formed integrally with the shell **2***a*, has a diameter which is sufficiently larger than the reinforcing ribs **4** of the shell **2***a*, for the shoulder **5** connecting the cap **2***b* to the shell **2***a* to act as support resting with its lower edge on the rim of the discharging cup **1**. This shoulder **5** of the cap engaging over the rim of the discharging cup **1** has the particular advantage over the previous design that—so long as the spraying canister is held in the discharging cup—neither dirt nor rain can penetrate into the discharging cup **1**. In addition, the dimensions of the container from the shoulder **5** to the bottom edge of the base **3** can be so chosen in relation to the height of the discharging cup that the base of the container does not extend to the bottom of the discharging cup, so that the spraying canister **2** is suspended in the discharging cup **1** from its shoulder **5**. The base **3** is

arranged to project a substantial amount inside of the container **2**. Thin, but deep, radial ribs **3***a* give the base exceptional stability. The base **3** has a doubled-back rim formed by edges **6** and **7** which fit tightly round the lower end of the shell **2***a*, the outer edge **7** having an inwardly directed hook **8** engaging in a recess **9** in the outer surface of the shell **2***a*. When the base **3** is inserted, the hooked edge expands slightly and snaps into the recess **9**. This quick and efficient fixing of the base **3** can be improved still further if both edges **6** and **7** are fixed to the shell **2***a* by a suitable adhesive. The outer edge **7** corresponds in diameter to the reinforcing ribs **4** and therefore has the important function of being the guide and seal element closest to the propellent charge located in the base **3**.

The base **3** is fitted with various attachments, e.g. with an attachment **10** for holding a propellent charge **10***a*, an attachment **11** for connecting to a detonator and delay tube **11***a* containing the detonating and delay system **11***b* and an attachment **12** for holding a capsule **12***a* containing an explosive charge **12***b*. The detonating and delay system tube **11***a* projects upwards beyond the cap **2***b* and is fixed by a nut **13** which in turn mounts a detonator, e.g. a friction igniter **14** operated by a pull wire **14***a*. The cap **2***b* also has a filling connection **15** closed by a cap **16**.

To close the attachment **10** containing the propellent charge **10***a* there is a lid **10***b* which is about level with the lower edge of the container.

Between the attachments **10** and **12** is a threaded plug **17** having a central bore **17***b* which contains a delay mechanism **17***a*.

The mode of operation of this spraying canister is as follows.

As already mentioned, the spraying canister **2** as shown in the drawing is inserted into the discharging cup **1** ready for firing. When the friction wire **14***a* is pulled, the ignition system of the friction igniter **14** reacts and transmits an ignition spark to the time fuse **11***b*. The time of combustion of this fuse is such that troops can leave the zone of activity of the spraying canister without hurrying. When the time fuse **11***b* has burnt down to the base **3**, it ignites the propellent charge **10***a* so that a high gas pressure builds up beneath the base **3** which projects and accelerates the spraying canister to a height of about 30 metres, depending on the position of the buried discharging cup.

Meanwhile, the propellent charge **10***a* has also ignited the time fuse **17***a* in the central bore **17***b*. The combustion time for the fuse **17***a* corresponds approximately to the flight duration of the spraying canister so that at the moment at which the canister reaches its maximum height, the fuse **17***a* detonates the explosive charge **12***b* which in turn bursts the container **2** and sprays its fluid contents over a wide area.

Since primarily the purpose of the spraying canister is to simulate the liberation of poisonous gases, to be used in action, the "opposing" troops must not be hurt either by the disintegrated container or by its contents. The container disintegrates into small parts which are not dangerous because of their small weight. The gaseous contents consist of a neutral fluid with the special property that its presence can be detected in the countryside by colouring produced by a dispersed powder.

The flight duration, height of trajectory, time of explosion and scattering area diameter can be changed by altering the characteristics of the ignition time fuses **11***b* and **17***a* and the propellent and explosive charges **10***a* and **12***b*.

I claim:

1. A spraying canister comprising a container for holding a mock poison gas, the container being made of a synthetic material capable of disintegration into small pieces which are not dangerous, the said container having a lid mounting an ignition and fuse system, a propellent charge for firing the spraying canister from a discharge receptacle, an explosive charge for bursting the said container and scattering the said contents thereof, the said container having ribs on a surface thereof for providing stability to the said container during the said firing of the spraying canister, a cylindrical shell, a gap formed as a one-piece construction with said shell, and a base insertable into the end of said shell opposite said cap, said ribs being disposed in respectively upper and lower regions of said shell, said ribs being outwardly projecting circumferentially extending reinforcing ribs adapted to act as guide and sealing rings during firing of said canister from said receptacle, the said container cap being circular and has a diameter greater than that of said reinforcing ribs and defines a shoulder extending from said shell, and said shoulder adapted to rest on an edge of said discharge receptacle and thereby to act as a support for said canister.

2. A spraying canister as claimed in claim **1**, wherein said base has inner and outer edge walls together defining a double-edged rim for said base, said outer edge having a hooked portion, and in which said shell has at the end opposite said cap a recess in the outer surface thereof, said double-edged rim fitting over said end of the shell with said hooked portion engaging in said recess.

3. A spraying canister as claimed in claim **1**, wherein the said base is dished inwardly of the container, and wherein said propellent charge attachment is a capsule extending from said base approximately to the end of said shell remote from said cap, a cover closing the said capsule on the underside thereof, and two independent attachments projecting into the interior of said container from the end of said capsule adjacent the said base.

4. A spraying canister as claimed in claim **1**, in which an attachment is provided for holding said explosive charge is closed in the region of said base by a threaded plug having a central bore, and a time fuse housed in said central bore.

5. A spraying canister adapted to be fired from a hollow receptacle comprising a container for holding a mock poison gas, the said container having a lid mounting an ignition and time fuse system, means adapted to house a propellent charge for firing the said spraying canister from said receptacle, means adapted to house an explosive charge for bursting said container and scattering the said contents thereof, said container being made of a low-pressure plastics material capable on said bursting of the container of disintegration into small harmless pieces, said container further having a cylindrical shell portion formed with integral, outwardly projecting circumferential ribs adapted to engage in sealing relation with said receptacle, and to impart mechanical stability to said container during said firing thereof, said shell having an open end closed by an insertable base member adapted to engage with the wall of said shell at the said open end thereof and to project outwardly of said wall to an extent corresponding to the projection of said ribs, and said base being dished towards the interior of said container and has stiffening ribs extending radially of said shell.

6. A spraying canister adapted to be fired from a hollow receptacle comprising a container for holding a mock poison gas, the said container having a lid mounting an ignition and time fuse system, means adapted to house a propellent charge for firing the said spraying canister from said receptacle, means adapted to house an explosive charge for bursting said container and scattering the said contents thereof, said container being made of a low-pressure plastics material capable on said bursting of the container of disintegration into small harmless pieces, said container further having a cylindrical shell portion formed with integral, outwardly projecting circumferential ribs adapted to engage in sealing relation with said receptacle, and to impart mechanical stability to said container during said firing thereof, said shell having an open end closed by an insertable base member

adapted to engage with the wall of said shell at the said open end thereof and to project outwardly of said wall to an extent corresponding to the projection of said ribs, and said base being dished towards the interior of said container, and means mounting said propellent charge housing means centrally on said base on the outer side thereof, and wherein said outwardly projecting portion of said base when engaged with said receptacle wall functions as a primary seal to prevent leakage of propellent charge gases during said firing of said canister.

References Cited

UNITED STATES PATENTS

811,048	1/1906	Friedel	108—8 X
2,340,047	1/1944	Dunn	89—1.3
3,102,477	9/1963	Stefan et al.	102—8
3,344,742	10/1967	Schneider	102—8 X

EUGENE R. CAPOZIO, *Primary Examiner.*

P. WILLIAMS, *Assistant Examiner.*