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FIRE EXTINGUISHER

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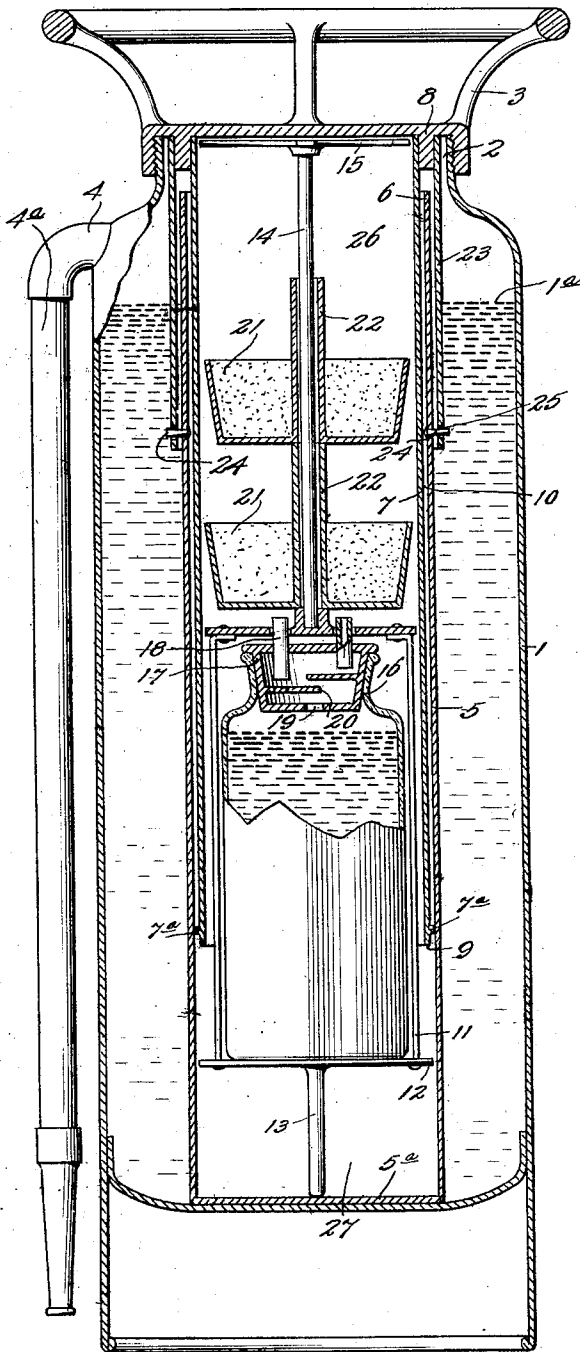


Fig. 1.

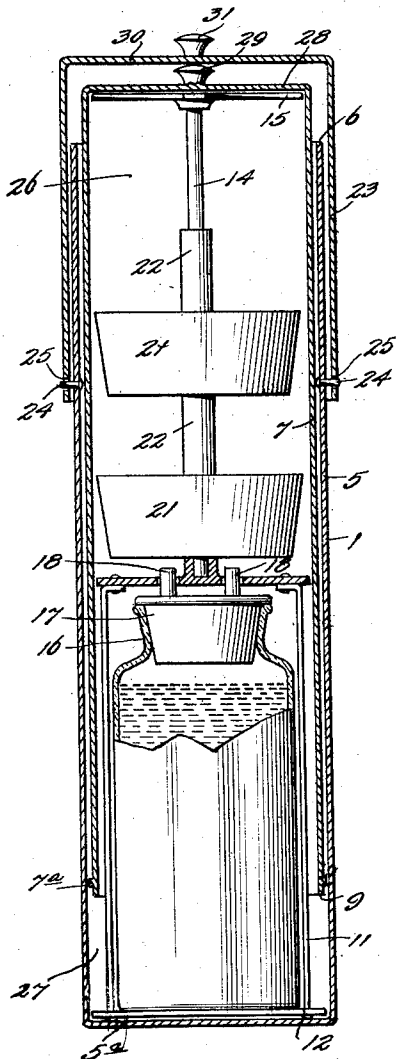


Fig. 2.

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FIRE-EXTINGUISHER

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This invention relates to fire extinguishers of the type in which a fire extinguishing liquid contained in a reservoir is discharged therefrom by a gas pressure generated in the reservoir by the reaction of the admixing of gas generating materials normally maintained in the reservoir; and it is the primary object of the invention to simplify, to improve the general construction of fire extinguishers of this type to cheapen the cost of construction and increase the efficiency thereof.

A further object of the invention is to provide an extinguisher of this type in which the gas generator is started, or the gas generating materials mix, by inverting the extinguisher.

It is a further object of the invention to provide an improved generator adapted to be removably mounted in the reservoir whereby the generator may be removed from the reservoir for the purpose of re-charging, cleaning or the substitution of another generator.

It is another object of the invention to provide an improved gas generator in which the gas generating materials are normally held in a separated condition and free from the liquid in the tank.

It is another object of the invention to provide new means to hold the gas generating materials, the acid and the alkali in a separated condition in the generator in the upright position of the extinguisher and to cause them to admix when the chamber is inverted.

It has been found in this type of extinguisher that when the extinguisher is inverted the reaction of the gas generating material within the generator has been so violent that part of the reacting chemicals have been projected into the reservoir with the gas pressure created. The acid if projected from the reservoir with the fire extinguishing liquid will be detrimental to electrical equipment, delicate fabrics, rugs and other material, therefore, it is a further object of this invention to provide means to exclude the gas generating materials from the reservoir when the extinguisher is inverted.

Often times extinguishers of this type are

used on automotive vehicles, motor boats, etc., and are subject to jar and vibration. Inasmuch as the outlet of the generator is always open to reservoir and the fire extinguishing liquid in the reservoir is likely to be splashed into the generator in the normal upright position of the extinguisher, due to the jar or the vibration or rough handling. Should any of the fire extinguishing liquid enter the generating chamber it would tend to retard the action of the gas generating materials when the extinguisher is inverted or if coming in contact with them in a normal upright position of the extinguisher might tend to deteriorate one or the other of the gas generating materials, therefore, it is the further object of this invention to provide means in the form of an air bell to exclude the fire extinguishing fluid from the interior of the generator in the normal upright position of the extinguisher.

In addition to the above it has been found that due to the vibration and jar of the extinguisher that the liquid gas generating material contained in the generator has been spilled or splashed from its container which in the case of acid has a deteriorating effect on the metal container in which it is held. This container if corroded would tend to leak and allow the fire extinguishing liquid to enter the generator and render the device inoperable under the conditions aforesaid mentioned, therefore, to overcome this condition it is a further object of this invention to maintain the means for containing the fluid gas generating material always open to the exterior thereof and to provide means to eliminate the splash of the liquid therefrom due to jar or vibration of the extinguishers when carried on motors, vehicles or otherwise subjected to the aforesaid conditions of jar and vibrations.

It has been experienced with extinguishers of this type where gas has been conducted from the seat of the re-acting gas generating materials such as soda and acid by means of a tube restricted in area that the tube became clogged with the elements of reaction in the form of sodium sulphate, and could not be easily cleaned, therefore, it is the fur-

ther object of this invention to provide means to convey the generated gas from the generator in a gas passage which affords a spacious area which cannot be clogged, overlooked
5 or neglected and which cannot be obstructed and which will be easy to inspect, clean and afford an always open passage.

In extinguishers of this type it is very necessary that the pressure producing elements be inspected from time to time. This
10 should be rendered as easy as possible, therefore, in order that the gas generating materials in the generator may be inspected with the least possible damage and the greatest
15 ease, it has been arranged to have the generator supported in axial alignment with and near the opening of the extinguisher. Therefore, in order to provide means to facilitate inspecting a further object of this invention
20 is to provide means for withdrawing the generator from the reservoir to afford easy inspection or renewal of gas generating material.

It has been found in extinguishers of this type also that certain gas generating materials contained within the generator are
25 subject to deterioration due to the entrance of the outside atmosphere into the generator. In order to obviate this condition a seal has been arranged and interposed between the
30 outlet of the generator and the exterior of the extinguisher it being a further object of this invention to provide a new means to exclude outside atmosphere from the generator.
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It has been found that when bicarbonate of soda has been used as one of the gas generating materials and has stood for a considerable time a skim incrustation forms over
40 the top of it in its container, sometimes delaying the projection of the soda from its container. therefore, it has been arranged to obviate this condition by providing a sliding container which when the extinguisher
45 is inverted will fall with an impact thereby projecting the soda or the dry element from its container it being a further object of this invention to provide means to forcibly eject by impact the dry gas generating
50 material from its container when the extinguisher is inverted.

In this particular construction as is shown in the illustration it is necessary that the gas generating material be so positioned that
55 when the extinguisher is inverted the gas generating materials will be projected together into the gas generating chamber so that they may admix and create a gas pressure when the extinguisher is inverted. It
60 is also an advantage to have a free movement for the sliding containers. Therefore, it is a further object of this invention to provide means for positioning the gas generating material containers in a predetermined
65 position in the generator and to maintain

them in a predetermined position both in the normal upright and in the inverted position of the reservoir.

In extinguishers of any type it has always
70 been found to be a detriment to have valves or movable parts which are likely to corrode, stick and become inoperable to close the generator from the fire extinguishing liquid container.

In this particular structure I provide for
75 an always open generator, open from the gas generating chamber to the exterior thereof affording an always open gas passage free from obstruction, valves and other impeding elements and still so constructed as to exclude the outside atmosphere and the fire
80 extinguishing fluid from the generator in the upright position of the extinguisher, therefore, it is the object of this invention to provide means comprising an air bell to exclude the outside atmosphere and the fire
85 extinguishing liquid from the generator in the upright position thereof providing for an always open gas generator free from
90 valves.

It has been my experience that the gas generating materials foam up in their reaction to a considerable height in the generator and are carried therefrom by the gas
95 pressure to the exterior of the generator due to a straightaway gas passage, therefore, in order to obviate such a condition it is a further object of this invention to provide baffles or staggering means in the line of the chemical reaction and gas flow to baffle and
100 stagger the generated gas to render it dry and to maintain the reaction within a limited space and to maintain the gas generating materials within the generator as the soda
105 containers.

This present application is supplementary in part of my co-pending application, Serial No. 392,224 and for further improvements on the generator disclosed by said application.
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Other objects and advantages will hereinafter appear.

In the drawings accompanying and forming a part of this specification Figure 1 is a sectional side elevation of a fire extinguisher
115 illustrating an embodiment of my improved chemical gas generator applied thereto.

Figure 2 is a longitudinal sectional view showing a modified form of the generator illustrated in Figure 1.
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Similar characters of reference designate like parts throughout the different views of the drawings.

In Figure 1, of the drawings, I have shown an embodiment of my invention with a fire
125 extinguisher comprising a reservoir or tank 1, to contain a fire extinguishing fluid 1a, such as carbon tetrachloride or any other fire-extinguishing fluid. The reservoir has an opening 2, with a removable cover 3, said
130

reservoir having an outlet 4, arranged with a hose 4a connected thereto. Contained in the reservoir in axial alignment with the opening 2, is a cylinder 5, having a solid bottom 5a, thus forming the outer shell of the generator. The bottom end of said cylinder rests on the bottom of tank 1. The other end 6, is open and lies adjacent the opening 2, in tank 1, in the normal upright position of the extinguisher. This opening 6, constitutes the outlet of the generator. Within the cylinder 5, is another cylinder 7, with a smaller outside diameter than the inside diameter of cylinder 5. This second cylinder is solidly connected and attached to an annular projection 8, from the reservoir cover 3, thereby forming a solid closure or top for cylinder 7. Cylinder 7 has an open lower end 9, extending to adjacent the bottom of cylinder 5, in the normal upright position of the extinguisher and becomes the inlet to the outlet 6. Cylinder 7 being of less outside diameter than the inside diameter of cylinder 5, forms an area or passage 10, between exterior of cylinder 7, and the interior of cylinder 5, extending between inlet 9 and the outlet 7, thereby forming a spacious passage between the two cylinders for the generated gas to pass from inside the cylinder 7, through inlet 9, passage 10, and through outlet 6 to the exterior of the generator. The length of cylinder 5 and cylinder 7 determine the length of the gas passage 10. The length of cylinder 7, becomes operative to maintain the gas generating materials in cylinder 7 and exclude them from tank 1, when the tank is inverted.

It will be readily seen that the gas passage 10 is of such a character that it can be easily cleaned, inspected and kept free from obstruction. All this can be accomplished by removing one cylinder from the other. Attached to cylinder 7, are lugs or pins 7a to maintain a spaced apart relation between cylinder 5 and cylinder 7. Within cylinder 5 is a bottle cage 11, with a spider or disc 12, extending beyond its sides as a projection and in alignment with cylinder 5, operable to maintain the cage in a predetermined position. Said cage 11, is supported by a rod 13, resting on the base 5a, to elevate the cage and provide a chamber below the base of the cage. Attached to the top of the cage 11, is a rod 14, extending into the open end of cylinder 7, to a point adjacent the top thereof, the advantage of this rod will later appear. On the end of the rod 14, is a disc or projection 15 of the same diameter or less than the inside diameter of cylinder 7, operable to position the rod centrally of cylinder 7. A receptacle 16, such as a bottle for a gas generating material such as 45 percent sulphuric acid is contained within the bottle cage 11. A non-splash hollow stopper 17, is placed in the neck of the bottle to prevent the splash of

the fluid gas generating material from the receptacle. The stopper has openings in its top in which tubes 18 are inserted and extend into the hollow space of the stopper to act as additional baffling means. An opening 19, is in the bottom of the stopper and baffles 20, are interposed between the opening 19 in the bottom and the outlet tubes 18 in the top to retard the splash of the fluid from the receptacle due to jar and vibration. Slidably mounted on rod 14, are containers 21 adapted to hold a gas generating material such as bicarbonate of soda. Attached to the bottom of each container is a tube 22, slidably mounted on rod 14, with the end of the tube extending a distance above the top of the container operable when the extinguisher is inverted to permit the container to slide down the tube and strike the bottom with a sharp impact thereby projecting the soda therefrom when the extinguisher is inverted and to hold the container away from the projected soda thereby permitting the acid that flows from receptacle 16 to freely admix with the soda to create a gas pressure. Said containers also act as a baffle to the reacting gas generating materials and the flow of the generated gas.

Exterior of cylinder 5 is a cylinder 23, solidly connected and attached to an annular projection from cap 3, thereby forming a solid top or closure for said cylinder 23. The cylinder 23, extends from cap 3 into tank 1, to a point below the level of the fire extinguishing fluid in the tank thereby forming an air bell over the open end of cylinder 5 and becomes operable to exclude the fire extinguishing liquid in tank 1 and the outside atmosphere from exterior tank 1, from the cylinder 5, in the normal upright position of the extinguisher. Attached to cylinder 5, is a pin 24, cooperating with the slot 25 in cylinder 23, thereby forming a bayonet catch operable to withdraw the cylinder 5, and its contents from the extinguisher tank 1, when the cover 3 is removed therefrom. It is then perfectly obvious that tube 5 with its contents can be readily removed from cylinder 23, by releasing the pins from the slot 25, and the contents, namely the gas generating material from tube 5, can be readily withdrawn and inspected. It will be noted that at the top end of cylinder 7 in a normal upright position of the extinguisher the space 26, constitutes a gas generating chamber into which the gas generating materials are projected when the extinguisher is inverted and likewise in space 27 to the bottom of tube 5 in a normal upright position of the extinguisher also becomes a chamber for the reception of the residue of the gas generating materials when the extinguisher has been returned to normal after having been inverted.

In the modification shown in Figure 2, the construction is substantially similar to the

construction shown in Figure 1, with the exception that instead of the top of cylinder 7, being part of the tank cover 3, it has a separate solid top 28, attached thereto is a button or ring 29, operable to lift the cylinder 7, from cylinder 5. Cylinder 23, instead of having a top formed by the tank cap 3 has a solid separate top 30, with a button or ring 31 attached thereto for withdrawing the entire generator from tank 1, by means of pins 24 and a bayonet catch 25. In this modification it will also be noted that the rod 14, and disc 15, are operable to maintain cylinder 7 in a predetermined position with its open end 9, in a spaced apart relation to the bottom 5a of cylinder 5. It is obvious from the illustration in Figure 2, that the generator is a complete unit exclusive of any part of the extinguisher tank or cover.

It is obvious that in assembling the generator that inasmuch as cylinder 23 and cylinder 7 are solidly attached to cover 3 and the gas generating materials and their containers are removably supported in cylinder 5 that all that is necessary to do is to insert cylinder 5 with the soda and acid and their containers contained within between the two cylinders 7 and 23 and turn the pins on cylinder 5 into the slot or bayonet catch 25 in cylinder 23. All three cylinders and their contents are now maintained by cover 3 and can then be inserted into tank 1, filled with the fire extinguishing liquid and the cover 3 screwed down tight. The extinguisher is now ready for use in the fire emergency.

Operation

In the fire emergency the operation of the device is as follows:—Turn the extinguisher upside down, the acid contained in receptacle 16 flows through the stopper 17, into the gas generating chamber 26, the soda containers 21 are projected downward and eject the soda contained therein into the generating chamber 26, where the soda and the acid unite to create a gas pressure which passes upward to the top of the cylinder 7, to inlet 9, of the gas passage 10, thence through the gas passage 10 between cylinder 7, and cylinder 5 to the end of cylinder 5 to outlet 6. Then upward outside of cylinder 5 and inside of cylinder 23 into the reservoir or tank to the top of the fire extinguisher fluid therein, thereby forcing the fluid 1a through the outlet of the reservoir 4, through the hose 4a on to the fire.

It will be understood that the mechanism herein described may be utilized for expelling from a container fluid of other nature than fire extinguishing fluid, and while I have set forth this particular utility and application of the invention because it is preferred not intending to restrict it to this specific use, but claim the right to all uses to which the subject matter embodied in the several claims may be put.

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

1. In a fire fighting device, a liquid container having an outlet above the normal liquid level, an opening in said container having a removable cover, a gas generator comprising two cylinders one of the cylinders having a solid bottom and an open top, the second cylinder of less outside diameter than the inside diameter of the first cylinder and so arranged as to provide a passage between the two cylinders, said second cylinder having a solid top and whose lower end extends a substantial distance into said first cylinder and defines a completely open bottom therein, said second cylinder being disposed in said first cylinder with its open bottom lowermost, gas generating materials in said generator normally held in a separated condition and operable to unite when the containers is inverted to create a gas pressure to eject the liquid from said container, said gas passage connecting the interior of the generator with the exterior thereof at a point above the level of the liquid in said container in the normal inoperative position of the extinguisher.

2. A gas generator comprising two cylinders one of the cylinders having a solid bottom and an open top, a second cylinder of less outside diameter than the inside diameter of the first cylinder whereby an open passage is provided therebetween, said second cylinder having a solid top and a bottom whose cross-sectional area is open contained in the first cylinder at a substantial distance from the open end of the first cylinder with said open bottom lowermost in the normal position of the generator, gas generating materials in said generator normally held in a separated condition and operable to unite when the generator is inverted to create a gas pressure, said passage extending from the interior of the generator to the exterior thereof and an inlet to the passage within the generator located at a distance from the reacting gas generating materials when the generator is inverted and when said generator is returned to its normal position after having been inverted to exclude the gas generating materials from the exterior of the generator.

3. A gas generator comprising two cylinders one of the cylinders having a solid bottom and an open top, a second cylinder of less outside diameter than the inside diameter of the first cylinder whereby an open passage is provided therebetween, said second cylinder having a solid top and a completely open bottom contained in the first cylinder at a substantial distance from the open end of the first cylinder with its open bottom lowermost in the normal position of the generator, gas generating materials in said gen-

erator normally held in a separated condition and operable to unite when the generator is inverted to create a gas pressure, said passage extending from the interior of the generator to the exterior thereof and means to maintain the second cylinder in spaced apart relation to the first cylinder and provide a space between the open lower end of the second cylinder and the base of the first cylinder.

4. In a fire extinguisher, a container for a liquid having an outlet therefrom above the normal liquid level, an opening in said container having a removable cover, a gas generator comprising two cylinders one of the cylinders having a solid bottom and an open top, a second cylinder of less outside diameter than the inside diameter of the first cylinder and so arranged as to provide a passage between the two cylinders, said second cylinder having a solid top and whose lower end extends a substantial distance into said first cylinder and defines a completely open bottom therein, said second cylinder being disposed in said first cylinder with its open bottom lowermost in the normal position of the generator, gas generating materials in said generator normally held in a separated condition and operable to unite to create pressure to eject the liquid from the container when the container is inverted, said passage connecting the interior of the generator to the exterior thereof and means to exclude the fire extinguishing liquid from the generator when the container is upright or subjected to movement.

5. In a fire fighting device in combination a container for a fire extinguishing liquid having an outlet, an opening in said container and a closure therefor, a gas generator in said container, gas generating means in said generator arranged to create pressure to expel the fire extinguishing liquid from the container, an open passage from the interior of the generator to the exterior thereof, and means to exclude the fire extinguishing liquid from the passage when the container is subjected to movement or jar.

6. In a fire fighting device a liquid container for fire extinguishing liquid having an outlet above the liquid level, a gas generator in said container comprising a cylinder having a solid bottom and open top, an open-ended second cylinder having a closed top with the closed top uppermost contained in said first cylinder, a passage between the two cylinders opening into the container and an inlet to said passage so positioned within the generator as to be above the seat of reaction of the gas generating materials in said generator when the container is inverted.

7. In a fire fighting device a liquid container for fire extinguishing liquid having an outlet, a gas generator in said container having an opening into the container, gas

generating means in said generator operable to create pressure to expel the liquid from the container when the container is inverted and means comprising an air bell to exclude the fire extinguishing liquid from the interior of the generator in the normal upright position of the container or when the container is subjected to movement in or from its upright position.

8. In a fire fighting device in combination a liquid container for fire extinguishing liquid, a gas generator in said container having an always open outlet into said container and means to exclude the fire extinguishing liquid from the interior of the generator when the container is subjected to movement or jar from or in its upright position.

9. In a fire fighting device in combination a tank for a fire extinguishing liquid, a gas generator supported in said tank comprising a casing having a solid base and open top, gas generating materials within said casing arranged to unite to create pressure when the generator is inverted, a second casing having a closed top and whose lower limits define an opening inserted top uppermost into the first casing with its lower limits disposed centrally of the first casing and so positioned and arranged that the gas generating materials will be projected thereinto, admix and will not pass therefrom when the tank is inverted.

10. A gas generator comprising a tubular casing having a solid base and an open top, gas generating materials in said casing held in a separated condition and arranged to unite to create pressure when the generator is inverted, a second tubular casing having a solid top and whose lower limits defines an opening contained in said first casing operable and so arranged as to maintain the gas generating materials within the generator when the generator is inverted.

11. A gas generator comprising a tubular casing having a solid base and an open top, gas generating materials in said casing held in a separated condition and arranged to unite to create pressure when the generator is inverted, a second tubular casing having a solid top and whose lower limits defines an opening contained top uppermost in said first casing, means to maintain the open end of the second casing in spaced apart relation with the closed end of the first casing.

12. In a gas generator, a multiplicity of receptacles, gas generating materials held in a separated condition in said receptacles and arranged to unite to create pressure when the generator is inverted and means operable and so arranged as to successively provide impacts to the receptacles, when the generator is inverted, to project the contents from the receptacles.

13. In a fire fighting device a tank having an outlet to contain a fire extinguishing

liquid, an opening in said tank having a removable cover, a gas generator containing gas generating materials held in a separated condition and arranged to unite to create pressure when the tank is inverted to project the liquid therefrom contained in said tank comprising a cylinder having a solid base and an open top said top being positioned adjacent the opening in said tank, a second cylinder of less outside diameter than the inside diameter of the first cylinder attached to the cover of the tank with its open end arranged to be inserted into the open end of the first cylinder to provide means to exclude the gas generating materials from the exterior of the generator when the tank is inverted.

14. In a fire fighting device, a tank for fire extinguishing fluid having an opening and a closure therefor and an outlet above the normal liquid level of the fluid in the tank, a gas generator having an always open outlet above the normal liquid level in said tank containing gas generating materials held in a separated condition and operable to create a gas pressure to expel the fire extinguishing fluid from the tank when the device is inverted and means in said tank to exclude the atmosphere outside the generator from the interior of said generator in the upright position of the tank.

15. A gas generator comprising a cylinder with a solid bottom and an open top, a second cylinder having a closed top and whose lower end extends a substantial distance into the said first cylinder and defines a completely open bottom therein, said second cylinder being disposed in said first cylinder with its closed top uppermost in the normal upright position of the generator, said cylinders being of different diameters whereby a passage is formed therebetween; gas generating materials held in a separated condition and operable to unite to create pressure when the generator is inverted contained within the first cylinder and so positioned and arranged as to be projected into and admix in the second cylinder when the generator is inverted to create a gas pressure.

16. In a fire extinguisher in combination a tank for fire extinguishing agent, having an opening and a closure therefor and outlet therefrom, a gas generator in said tank comprising a cylinder with a solid bottom and an open top, a second cylinder having a closed top and an open bottom contained in the first cylinder with its closed top uppermost in the normal upright position of the generator, gas generating materials held in a separated condition and so positioned and arranged as to be projected into and admix in the second cylinder when the extinguisher is inverted to create a gas pressure contained within the first cylinder and means to exclude the fire extinguishing agent from the interior of the

generator when the tank is subjected to movement, jar or vibration from or in its normal upright position.

17. In a fire extinguisher in combination a tank for fire extinguishing agent having an opening and a closure therefor and an outlet therefrom, a gas generator in said tank comprising a cylinder with a solid bottom and an open top, a second cylinder having a closed top and an open bottom contained in the first cylinder with its closed top uppermost in the normal upright position of the generator, gas generating materials held in a separated condition and operable to unite to create pressure when the generator is inverted contained within the first cylinder and so positioned and arranged as to be projected into and admix in the second cylinder when the generator is inverted to create a gas pressure and means comprising an air bell to exclude the fire extinguishing agent from the generator when the tank is subjected to movement.

18. A gas generator comprising a cylinder with a solid bottom and an open top, a second cylinder of less outside diameter than the inside diameter of the first cylinder whereby to provide a space therebetween, said second cylinder being closed at the top and whose lower end extends a substantial distance into the first cylinder and defines a completely open bottom therein, said second cylinder being disposed in the said first cylinder, gas generating materials contained in said generator held in a separated condition and arranged to unite to create pressure when the generator is inverted, and means in said generator to baffle the reacting chemicals and generated gas when the generator is inverted to exclude the gas generating materials from the exterior of the generator.

19. In a fire fighting device a tank with an outlet containing a fire extinguishing liquid having an opening and a closure therefor, a gas generator in said tank comprising a cylinder having a closed base and an open top end, a second cylinder having a closed top and whose lower end defines an open bottom contained open end downward in the first cylinder and so arranged as to provide a space between the two cylinders, a third cylinder with a solid top and an open bottom covering the open end of the first cylinder, said third cylinder having a portion in spaced relation to said first cylinder and extending a substantial distance below the open top of said first cylinder and below the level of the fire extinguishing liquid and means to withdraw the generator from the tank as and for the purpose specified.

20. In a fire fighting device in combination a tank having an outlet to contain a fire extinguishing liquid, an opening in said tank having a removable cover, an open gas generator containing gas generating materials operable to create pressure when the tank is

inverted contained in said tank and means connected to the cover of the tank to exclude the fire extinguishing liquid from the generator when the tank is subjected to movement in or from its upright position.

21. In a gas generator, a receptacle to hold a gas generating liquid, a multiplicity of loosely mounted containers to hold other gas generating materials, said containers disposed for relative longitudinal movement in the generator to provide upon inversion an impact for said containers to eject the contents thereof, said containers being formed to provide different layers of the gas generating material to facilitate the reaction of the chemicals when the generator is inverted.

22. A gas generating unit comprising a receptacle having a constantly open outlet therein adapted to be placed in a liquid carrying container and operable on inversion to create a pressure and means associated with said outlet operable to exclude the liquid from the interior of said receptacle and maintain the outlet always open.

23. In a fire fighting device the combination of a tank having an outlet, a generator disposed therein and adapted to generate pressure upon inversion of said tank and means associated with said generator extending a substantial distance above the tank outlet for conducting the pressure upon inversion at substantially all points about the generator to a substantial distance above the tank outlet and toward the then liquid level of the said tank.

24. In a fire fighting device the combination of a tank having an outlet, a generator disposed therein adapted to generate pressure upon inversion of said tank, and annular means associated with said generator extending a substantial distance above the tank outlet and spaced therefrom for conducting said pressure upon inversion in an annular current to above the tank outlet and towards the then liquid level of said tank.

25. A stopper for a liquid carrying receptacle, an always open passage through said stopper and baffling means in said stopper in the line of said passage to prevent passage of liquid therethrough when the receptacle is subject to jar or shaking.

26. A stopper for a liquid carrying receptacle having an always open passage there-through and means in the line of said passage operable to exclude passage of liquid therethrough when the receptacle is subject to jar or shaking.

27. A gas generator comprising two cylinders, one of the cylinders having a solid bottom and an open top and a second cylinder having a solid top and whose lower end defines an open bottom contained in the first cylinder with its open bottom lowermost in the normal position of the generator; gas generating materials in said generator nor-

mally held in a separated condition operable to unite when the generator is inverted to create a gas pressure; an annular passage from the interior of the generator to the exterior; and inlet means therefor remote from the seat of the reaction of the gas generating materials when the generator is inverted.

28. A gas generator comprising two cylinders, one of the cylinders having a solid bottom and an open top and a second cylinder having a solid top and whose lower end defines an open bottom contained in the first cylinder with its open bottom lowermost in the normal position of the generator; the lower end of said second cylinder extending a substantial distance into the first cylinder; gas generating materials in said generator normally held in a separated condition operable to unite when the generator is inverted to create a gas pressure; and an annular passage from the interior to the exterior of the generator, said passage having an outlet immersed in the liquid of the container when in the inverted and in the normal position.

29. A gas generator comprising two cylinders, one of the cylinders having a solid bottom and an open top and a second cylinder having a solid top and whose lower end defines an open bottom contained in the first cylinder with its open bottom lowermost in the normal position of the generator; the lower end of said second cylinder extending a substantial distance into the first cylinder; gas generating materials in said generator normally held in a separated condition operable to unite when the generator is inverted to create a gas pressure; said cylinders being spaced concentrically for defining a passageway from the interior of the generator to conduct the generated gas therefrom when the generator is inverted.

30. In a fire fighting device the combination of a tank having an outlet, a generator having an opening disposed therein and adapted to generate pressure upon inversion of said tank and bell-shaped means associated with the opening of said generator extending a substantial distance above the tank outlet for conducting the pressure upon inversion at substantially all points about the generator to a substantial distance above the tank outlet and toward the then liquid level of the said tank.

Dated April 12, 1928.

GEO. T. PEARSONS.