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(54) **WICK ASSEMBLY FOR A DRIP TORCH**

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(56) References cited:
AU-A- 3 257 968 **US-A- 4 131 414**

- **WIKIPEDIA: "Wikipedia Drip Torch", 7 December 2021 (2021-12-07), pages 1 - 2, XP093064808, Retrieved from the Internet <URL:https://en.wikipedia.org/wiki/Driptorch> [retrieved on 20230718]**

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to drip torches which are usually used to perform controlled burns and backfire manoeuvres on vegetation; in particular, it relates to the wick or starter that ignites the liquid fuel dispensed from a tank of said torch.

STATE OF THE ART

[0002] Conducting controlled burning is a common practice in fire prevention. Controlled burning, or preset fire, is a controlled, low-intensity fire that is conducted along a control line on a plot selected for managing it. The aim of this burning is to consume fuel (dry leaves, branches, dry vegetation in general), reducing the fuel load of said plot and thus lowering the risk of fire. A backfire, or burnout, is a more aggressive type of tactical manoeuvre that is performed to influence the behaviour of the main fire, stopping its advance by consuming the fuel that is ahead of the fire.

[0003] Therefore, in the management of forests and grasslands, to perform the burning or pre-set fire, a drip torch is the most common tool used to carry out burning of this type, through which the aim is to eliminate excess build-up of dry leaves, branches or similar that serve as fuel or to recreate natural cycles of fire in an ecosystem.

[0004] A commonly used drip torch, as it is disclosed in patent application AU 32579/68, comprises a canister for holding fuel, a handle coupled to the canister for holding the same, a tube couplable to the canister, the tube formed with a loop to prevent fire from entering the fuel canister, a vent valve provided in the canister to allow air to enter the canister while the fuel leaves the tube, a nozzle coupled to the tube for supplying fuel to the outside, and a wick that ignites a fire in the fuel leaving the nozzle and which, therefore, is thrown to the ground in flames. The wick ignites and allows the fire to be directed as needed. The nozzle, the tube and the wick can be secured upside down inside the canister for storage or transport.

[0005] In general, the fuel used in the drip torch is typically a mixture of gasoline and diesel with a ratio of around 30% to 70%, respectively, although it may be necessary to adjust the amounts based on fuel and the weather conditions. Sometimes heavier oils are used to increase the adhesion of the liquid fuel to vegetation and to increase burn time and heat.

[0006] The problem with the common drip torch is that, with the wick positioned so that it is offset from the nozzle through which the liquid fuel is supplied, for example, to the side or below it, the fire of said wick tends to go out in situations with air draughts. Also, with this arrangement of the wick offset or away from the nozzle, a significant portion of the fuel that is dispensed does not ignite if the torch is not handled correctly, or if there is an air draught that causes the flame to be in a direction opposite to the direction in which the fuel is dispensed.

[0007] Another problem arises when inserting the wick of the drip torch into dense vegetation to reach the base of said vegetation, i.e., the combustible material, since the wick goes out when it comes in contact with the vegetation.

[0008] Yet another problem that occurs is related to the weight of the drip torch, particularly in those torches that can be carried by a user, since the high weight of the tank full of fuel makes it difficult to handle the torch.

[0009] Another device that can be carried by the user that makes use of the wick to ignite the fire coming from a canister is shown in the US patent US 4.131.414 which discloses a lantern with kerosene preheater comprising a cup that is provided adjacent the generator tube of a kerosene lantern for holding a measured amount of fuel. A wick located in the cup for burning the fuel at a controlled rate. A foraminous housing extends around and above the wick to control the entrainment of air with the fuel from the wick during burning and to direct the resulting flame against the generator tube thereby preheating fuel in the generator tube to its vaporization temperature until the heat of combustion of fuel at the mantle causes the vaporization of fuel in the generator to be self-sustaining. Even though there are few similar structural features with a known drip torch, the disclosed lantern cannot be employed as a drip torch as such.

[0010] Therefore, in view of the problem presented, new developments related to drip torches are necessary to provide a solution to the same.

DESCRIPTION

[0011] In accordance with the foregoing, the present invention provides a wick assembly for a drip torch according to claim 1. Embodiments of the invention are defined in the dependent claims.

[0012] The wick assembly comprises a wick operationally connectable to the nozzle, i.e., prepared to work in conjunction with the nozzle, wherein the wick is configured to be impregnated with the fuel dispensed through the nozzle and to be ignited with fire.

[0013] In particular, the wick comprises a channel that crosses the same, i.e., a channel that crosses the body defining the wick from side to side, this channel being preferably closed along its path, i.e., like a tunnel, the channel being provided with an inlet and an outlet, wherein the inlet of said channel is located around the nozzle enabling the passage of the fuel to the outlet of the channel, so that the channel is completely surrounded by the wick, it being the only fuel outlet site.

[0014] The main advantage of this arrangement is that the wick protects the nozzle, in turn protecting the flame produced at the tip of said nozzle in situations with air draughts or when the wick comes in contact with vegetation, preventing the flame on the wick from going out.

[0015] Fuel consumption is also reduced because it is

ensured that all the fuel leaving the nozzle is ignited and therefore no unignited fuel is dispensed, which is the case in traditional models of drip torches of this type.

[0016] The nozzle, as is generally known, is a frustoconical or frustopyramidal piece that has a through hole, generally aligned with a symmetrical axis or axis of revolution of said piece, wherein this hole is even enabled to allow passage to the fuel conveyed by the tube. According to the foregoing, the channel of the wick surrounds the nozzle in such a way that an inner wall of said channel leaves sufficient space with the hole so that the fuel can leave the nozzle, impregnate said wick and leave outward from said wick.

[0017] In an alternative embodiment, the wick is designed as a tubular body, so that the channel is formed in the inner region of said tubular body.

[0018] In another alternative embodiment, the wick is designed as a laminar body that is wound around the nozzle in such a way that the channel corresponds to an inner region formed by the winding of the laminar body.

[0019] Furthermore, the wick assembly comprises a support couplable to the nozzle and/or to the tube, wherein the wick is couplable to said support, said support being configured to hold the wick and enable aeration of the same.

[0020] The support comprises a body essentially in the shape of a bushing, which has a coupling end configured to be coupled to the nozzle and/or to the tube, this bushing being configured to house the wick, wherein a side wall of the bushing comprises openings intended for aeration of the wick.

[0021] The invention also envisages a drip torch for controlled burns, where the particularity of this torch is that it comprises the wick assembly as described heretofore, said assembly being coupled to the nozzle and/or to the tube of said torch.

[0022] In an embodiment of the drip torch, the tank is made of polyethylene in such a way that its weight is significantly reduced in comparison with the tanks used in similar drip torches.

BRIEF DESCRIPTION OF THE FIGURES

[0023] The foregoing and other advantages and features will be more fully understood from the following detailed description of exemplary embodiments with reference to the accompanying drawings, which should be considered by way of illustration and not limitation, wherein:

- Fig. 1 is a plan view of the wick assembly, in which the nozzle being circumferentially surrounded by the wick can be seen.
- Fig. 2 is a view of an embodiment of a drip torch in which the wick assembly of the invention is used.

DETAILED DESCRIPTION OF AN EXEMPLARY EMBODIMENT

[0024] In the following detailed description, numerous specific details are set forth as examples to provide a thorough understanding of the relevant teachings. However, it will be apparent to those skilled in the art that the present teachings can be implemented without such details.

[0025] In a practical embodiment, the invention discloses a wick assembly 1, intended to be used in a drip torch 10, hereinafter torch 10, wherein said torch 10 is of the type that can be carried in hand by a torchbearer and is used to conduct prescribed burns for controlling burns or main fires.

[0026] The torch 10, as shown in Figure 2, comprises a canister 2 intended to contain liquid fuel, the canister 2 comprises a bottom and a mouth 2C opposite the bottom through which the liquid fuel is fed and leaves, a handle 2B conveniently coupled to the canister 2 to hold and convey the same, and a tube 3 couplable to the canister 2.

[0027] Preferably, the material from which the canister 2 is made is polyethylene, whereby the weight is significantly reduced in relation to similar canisters.

[0028] As illustrated in Figure 3, the tube 3 is coupled at a first end to a connector 3A, as a fitting, said connector 3A being configured to be coupled in the mouth 2C of the canister 2 through a retaining ring 2D. In this sense, in the mouth 2C there is a sleeve 2E intended for the releasable coupling of the connector 3A, wherein said connector 3A is fixed in the sleeve 2E by the retaining ring 2D. In the embodiment shown, the coupling between the connector 3A and the retaining ring 2D is press-fit, while the coupling between the retaining ring 2D and the sleeve 2E is of the threaded type. It is important to note that in this sleeve 2E all the necessary means are arranged for a tight coupling of said sleeve to the mouth 2C, of the retaining ring 2D and of the connector 3A, so that the fuel can only flow from the canister 2 through the tube 3.

[0029] On the other hand, an adjustable vent valve 2A is arranged in a region close to the mouth 2C in the canister 2, wherein this valve 2A allows air to enter the canister 2 to make it easier for the fuel to leave through the tube 3, enabling the output of said fuel to be adjusted.

[0030] The tube 3, as shown in Figures 2 and 3, comprises on its path to a second end, opposite the first end, a loop/trap 3B intended to prevent fire from entering the canister 2 and the explosion of the fuel contained in said canister 2.

[0031] Furthermore, the torch 10 comprises a nozzle 4 couplable to the second end of the tube 3, said nozzle 4 being configured to supply fuel to the outside. The nozzle 4 comprising a through hole 4A that is in fluid communication with the tube 3, wherein the fuel is dispensed through this hole from the canister 2 to outside the torch 10.

[0032] The particularity of the present invention lies in the arrangement of a wick assembly 1 couplable to the tube 3 and/or to the nozzle 4, wherein, as shown in Figures 1 and 2, the assembly comprises a support 7 couplable to the nozzle 4 and/or to the tube 3. In the illustrated embodiment, the support 7 has the shape of a bushing, this support will be referred to hereinafter as bushing 7, wherein the bushing 7 comprises a base 7A by which it is coupled to the tube 3 and/or to the nozzle 4. In the preferred embodiment, the bushing 7 is coupled by the base 7A to the tube 3 in an essentially concentric manner to the nozzle 4 and/or to the hole of said nozzle 4.

[0033] As shown in Figure 1, the bushing 7 is configured to house a wick 5, wherein said wick 5 is prepared to be impregnated by the fuel and to be ignited with a flame, which in turn ignites a flame in the fuel dispensed through the nozzle 4.

[0034] In the preferred embodiment, the wick 5 consists of an essentially tubular body, wherein the interior of said tubular body forms a channel 6 intended for the passage of fuel from the nozzle 4 outward from the torch 10 for its dispensing. The channel 6 therefore comprises an inlet and an outlet, wherein the inlet of said channel 6 is arranged around the nozzle 4, i.e., completely surrounding it, so that the channel 6 surrounds the nozzle 4 circumferentially, seen from the tip to an axial axis or axis of revolution of the nozzle 4 or the hole, the channel 6 being the route for conveying the fuel to the outside.

[0035] This arrangement of the wick 5 relative to the nozzle 4 was carried out to protect the flame once produced both on the wick 5 and on the tip of said nozzle 4 in situations with air draughts, preventing the flame on the wick 5 from going out. In addition, optimum fuel consumption is achieved since it is ensured that all the fuel leaving the nozzle 4 is ignited and therefore no unburned fuel is dispensed.

[0036] It also prevents the flame from going out when the user or torchbearer inserts the tip of the wick 5 or of the wick assembly 1 into dense vegetation to reach the base of said vegetation.

[0037] The channel 6 is arranged in such a way that there is sufficient free space with the hole 4A for the passage of fuel and air required for combustion. Therefore, the size of the channel 6 and/or the thickness of the wick 5 can be adjusted according to each situation.

[0038] Furthermore, as illustrated in Figures 2 and 3, the bushing 7 comprises a side wall 7B provided with holes that enable aeration of the wick 5.

[0039] The wick 5, on the other hand, extends essentially over the entire length of the bushing 7. Likewise, the materials from which the wick 5 can be made are those typically used in applications of this type.

[0040] On the other hand, the coupling between the connector 3A and the mouth 2C of the canister 2 by means of the retaining ring 2D allows the coupling to be inverted, so that the tube 3 and the wick assembly 1 are inserted into the canister 2, for transport and storage. In accordance with the foregoing, there is a cap 3C couplable to the connector 3A, said cap 3C being configured to, in a coupled state to the connector 3A, block the flow of fuel towards the tube 3, preventing accidental fuel leaks or spills. In addition, the cap 3C is connected to the connector 3A in such a way, for example by means of a chain, that even if it is not coupled to said connector 3A, it remains connected to prevent its loss or prevent it from falling into the canister 2.

[0041] Throughout the description and the claims, the word "comprise" and its variants are not intended to exclude other technical features, components or steps. The described practical examples and drawings have been provided by way of illustration and are not intended to limit the present invention.

Claims

1. A wick assembly (1) for a drip torch (10), the torch (10) comprising a canister (2) configured to store liquid fuel, a tube (3) couplable at a first end to the canister (2), the tube (3) being configured to convey the fuel from the canister (2) to a nozzle (4) couplable to a second end of the tube (3) opposite the first end, the nozzle (4) being configured to dispense the fuel, the wick assembly (1) comprises:

    - a wick (5) operationally connectable to the nozzle (4), the wick (5) being configured to be impregnated with the fuel and to be ignited with fire, the wick (5) comprises a channel (6) that crosses the same, the channel (6) being provided with an inlet and an outlet, wherein the inlet is arranged around the nozzle (4) enabling the passage of the fuel to the outlet of the channel (6);

    characterised in that it comprises:

    - a support (7) couplable to the nozzle (4) and/or to the tube (3), the wick (5) being couplable to said support (7), the support (7) being configured to hold the wick and enable aeration of the same, wherein the support (7) comprises a body essentially in the shape of a bushing with a coupling end (7A) configured to be coupled to the nozzle (4) and/or to the tube (3), and configured to house the wick (5), wherein a side wall (7B) of the bushing comprises openings intended for aeration of the wick (5).

2. The assembly according to claim 1, wherein the wick (5) is a tubular body, so that the channel (6) is formed in the inner region of said tubular body.

3. The assembly according to claim 1, wherein the wick (5) is a laminar body that is wound around the nozzle (4) in such a way that the channel (6) corresponds

to an inner region formed by the winding of the laminar body.

4. A drip torch (10) for performing prescribed burns comprising a canister (2) configured to store liquid fuel, a tube (3) couplable at a first end to the canister (2), the tube (3) being configured to convey the fuel from the canister (2) to a nozzle (4) couplable to a second end of the tube (3) opposite the first end, the nozzle (4) being configured to dispense the fuel, the drip torch (10) **characterised in that** it comprises the wick assembly (1) according to any of claims 1 to 3 coupled to the tube (3) and/or to the nozzle (4).

5. The torch according to claim 4, wherein the canister (2) is made of polyethylene.

Patentansprüche

1. Dochtbaugruppe (1) für eine Tropffackel (10), wobei die Fackel (10) einen Behälter (2), der konfiguriert ist, um flüssigen Brennstoff aufzubewahren, ein Rohr (3), das an einem ersten Ende mit dem Behälter (2) koppelbar ist, umfasst, wobei das Rohr (3) konfiguriert ist, um den Brennstoff aus dem Behälter (2) zu einer Düse (4) zu befördern, die mit einem zweiten Ende des Rohrs (3) gegenüber dem ersten Ende koppelbar ist, wobei die Düse (4) konfiguriert ist, um den Brennstoff abzugeben, wobei die Dochtbaugruppe (1) umfasst:

   - einen Docht (5), der betriebsmäßig mit der Düse (4) verbindbar ist, wobei der Docht (5) konfiguriert ist, um mit dem Brennstoff getränkt zu werden und mit Feuer entzündet zu werden, wobei der Docht (5) einen Kanal (6) umfasst, der denselben durchquert, wobei der Kanal (6) mit einem Einlass und einem Auslass versehen ist, wobei der Einlass um die Düse (4) herum angeordnet ist, wodurch der Durchgang des Brennstoffs zu dem Auslass des Kanals (6) ermöglicht wird;

   dadurch gekennzeichnet, dass sie umfasst:

   - einen Träger (7), der mit der Düse (4) und/oder dem Rohr (3) koppelbar ist, wobei der Docht (5) mit dem Träger (7) koppelbar ist, wobei der Träger (7) konfiguriert ist, um den Docht zu halten und die Belüftung desselben zu ermöglichen, wobei der Träger (7) einen Körper im Wesentlichen in Form einer Buchse mit einem Kopplungsende (7A) umfasst, das konfiguriert ist, um mit der Düse (4) und/oder dem Rohr (3) gekoppelt zu werden, und konfiguriert ist, um den Docht (5) aufzunehmen, wobei eine Seitenwand (7B) der Buchse Öffnungen umfasst, die für die Belüftung des Dochts (5) bestimmt sind.

2. Baugruppe nach Anspruch 1, wobei der Docht (5) ein röhrenförmiger Körper ist, sodass der Kanal (6) in dem Innenbereich des röhrenförmigen Körpers gebildet ist.

3. Baugruppe nach Anspruch 1, wobei der Docht (5) ein laminarer Körper ist, der derart um die Düse (4) herum gewickelt ist, dass der Kanal (6) einem durch die Wicklung des laminaren Körpers gebildeten Innenbereich entspricht.

4. Tropffackel (10) zum Durchführen von vorgeschriebenen Verbrennungen, umfassend einen Behälter (2), der konfiguriert ist, um flüssigen Brennstoff zu speichern, ein Rohr (3), das an einem ersten Ende mit dem Behälter (2) koppelbar ist, wobei das Rohr (3) konfiguriert ist, um den Brennstoff aus dem Behälter (2) zu einer Düse (4) zu befördern, die mit einem zweiten Ende des Rohrs (3) gegenüber dem ersten Ende koppelbar ist, wobei die Düse (4) konfiguriert ist, um den Brennstoff abzugeben, wobei die Tropffackel (10) **dadurch gekennzeichnet ist, dass** sie die mit dem Rohr (3) und/oder der Düse (4) gekoppelte Dochtbaugruppe (1) nach einem der Ansprüche 1 bis 3 umfasst.

5. Fackel nach Anspruch 4, wobei der Behälter (2) aus Polyethylen hergestellt ist.

Revendications

1. Ensemble de mèche (1) pour une torche d'égouttement (10), la torche (10) comprenant un réservoir (2) configuré pour stocker du combustible liquide, un tube (3) pouvant être accouplé à une première extrémité au réservoir (2), le tube (3) étant configuré pour transporter le carburant du réservoir (2) vers une buse (4) pouvant être accouplée à une seconde extrémité du tube (3) opposée à la première extrémité, la buse (4) étant configurée pour distribuer le carburant, l'ensemble de mèche (1) comprend :

   - une mèche (5) pouvant être reliée de manière opérationnelle à la buse (4), la mèche (5) étant configurée pour être imprégnée du combustible et enflammée par le feu, la mèche (5) comprend un canal (6) qui la traverse, le canal (6) étant pourvu d'une entrée et d'une sortie, dans lequel l'entrée est disposée autour de la buse (4) permettant le passage du carburant vers la sortie du canal (6) ;

   caractérisé en ce qu'il comprend :

   - un support (7) pouvant être accouplé à la buse

(4) et/ou au tube (3), la mèche (5) pouvant être accouplée audit support (7), le support (7) étant configuré pour maintenir la mèche et permettre l'aération de celle-ci, dans lequel le support (7) comprend un corps essentiellement en forme de douille avec une extrémité d'accouplement (7A) configurée pour être accouplée à la buse (4) et/ou au tube (3), et configurée pour loger la mèche (5), dans lequel une paroi latérale (7B) de la douille comprend des ouvertures destinées à l'aération de la mèche (5).

2. Ensemble selon la revendication 1, dans lequel la mèche (5) est un corps tubulaire, de sorte que le canal (6) soit formé dans la région intérieure dudit corps tubulaire.

3. Ensemble selon la revendication 1, dans lequel la mèche (5) est un corps laminaire qui est enroulé autour de la buse (4) de telle manière que le canal (6) correspond à une région intérieure formée par l'enroulement du corps laminaire.

4. Une torche d'égouttement (10) pour effectuer des brûlages dirigés comprenant un réservoir (2) configuré pour stocker du combustible liquide, un tube (3) pouvant être accouplé à une première extrémité au réservoir (2), le tube (3) étant configuré pour transporter le carburant du réservoir (2) vers une buse (4) pouvant être accouplée à une seconde extrémité du tube (3) opposée à la première extrémité, la buse (4) étant configurée pour distribuer le carburant, la torche d'égouttement (10) **caractérisée en ce qu'**elle comprend l'ensemble de mèche (1) selon l'une quelconque des revendications 1 à 3 accouplée au tube (3) et/ou à la buse (4).

5. Torche selon la revendication 4, dans laquelle le réservoir (2) est en polyéthylène.

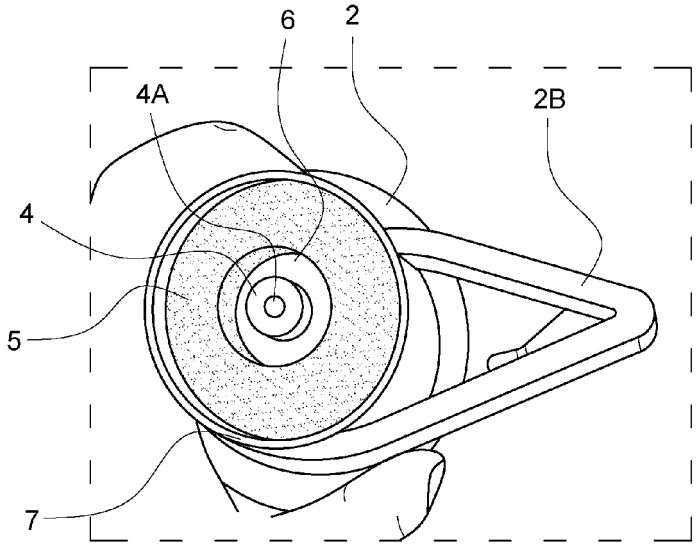


FIG. 1

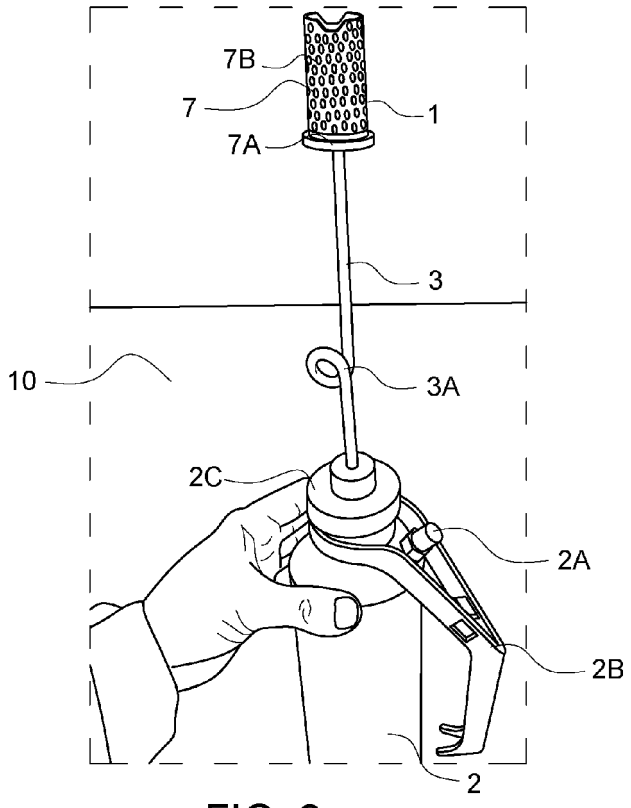


FIG. 2

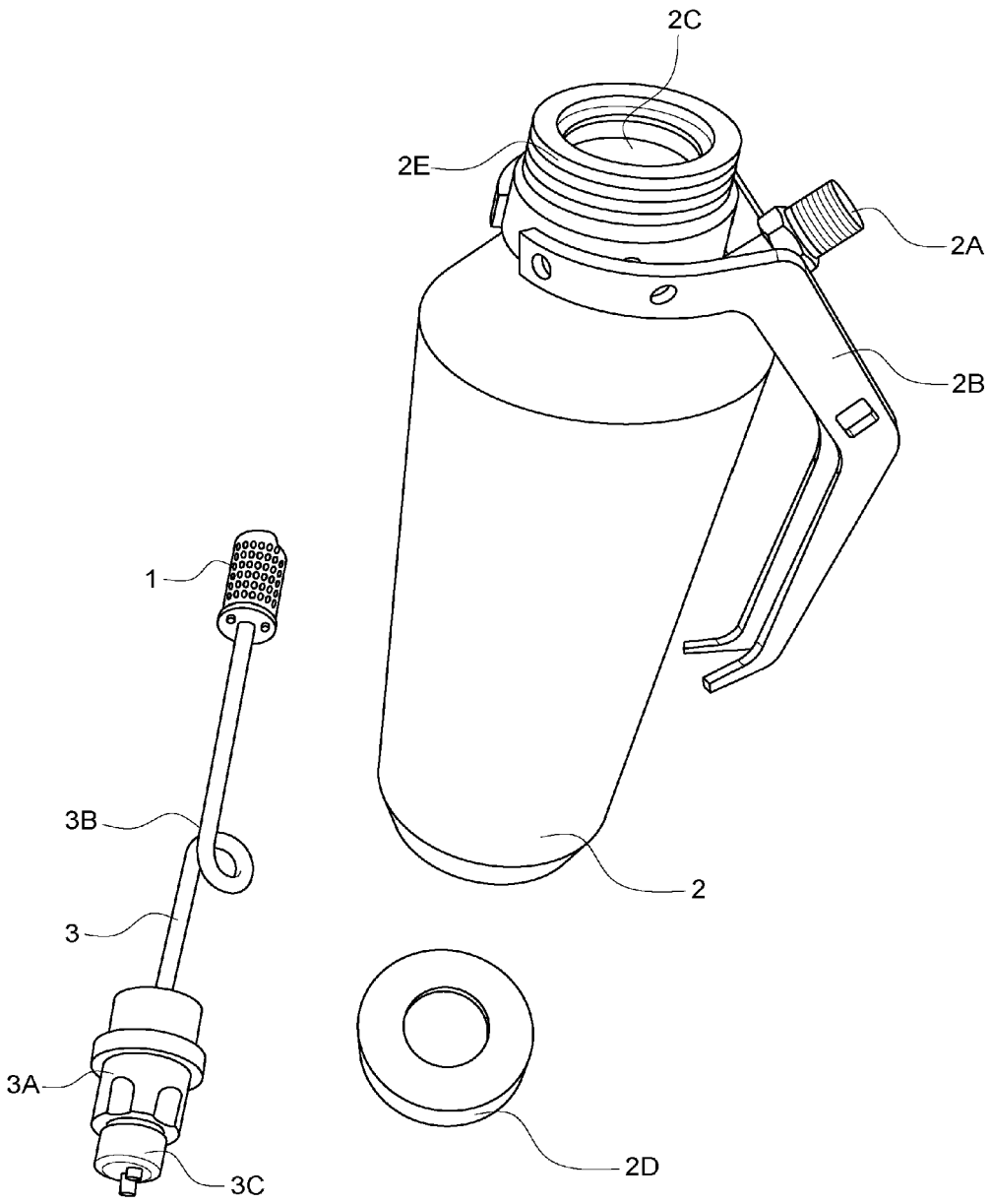


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- AU 3257968 **[0004]**
- US 4131414 A **[0009]**