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(54) **A FIRE EXTINGUISHER**

(57) Fire extinguisher which comprises a container provided with a particulate extinguishing agent which can be dispersed on a seat of the fire. To easily disperse the particulate extinguishing agent, which comprises for instance montmorillonite, the container comprises a side-wall provided with a discharge opening for the particulate

extinguishing agent, and the fire extinguisher comprises a handle connected via a telescopic tube to the container. In a protracted state the extinguishing agent can be dosed relatively safely. The discharge opening is preferably sealed until use using film such as metal tape.

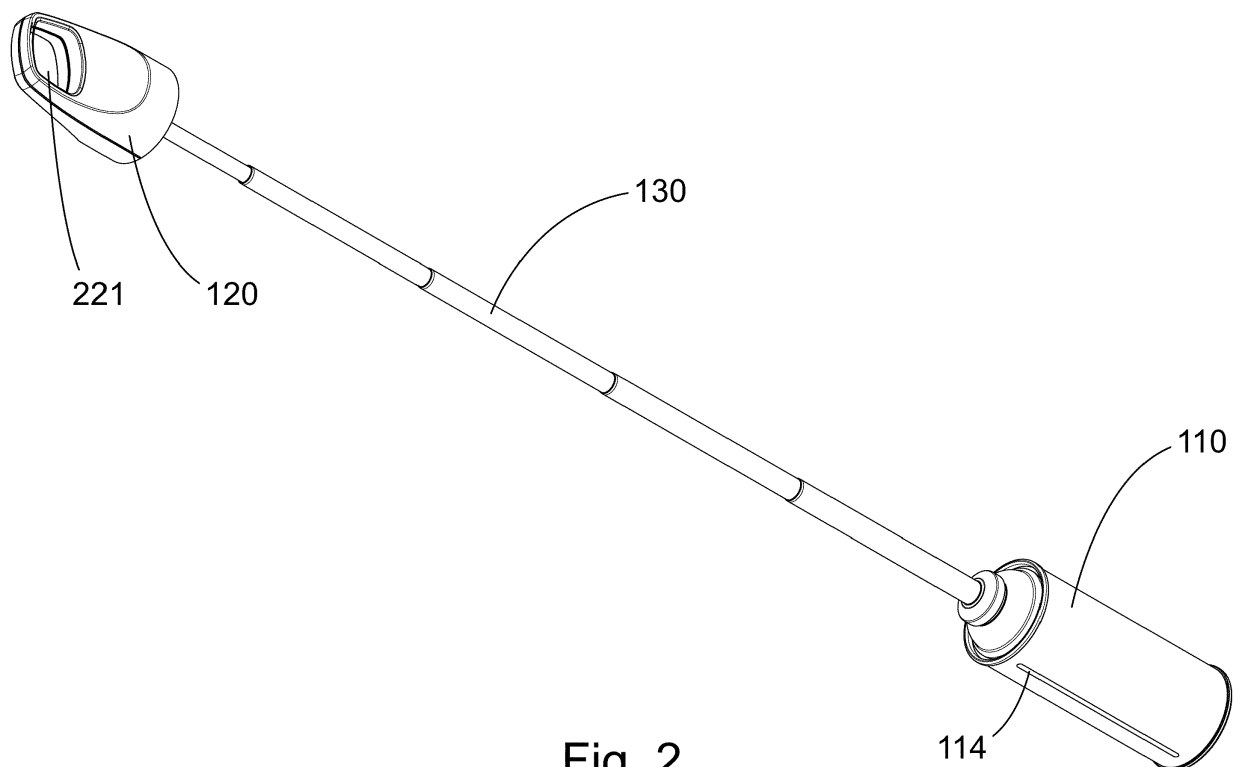


Fig. 2

Description

[0001] The present invention relates to a fire extinguisher which comprises a container provided with a particulate extinguishing agent.

[0002] Fire extinguishers are generally known in the art. These comprise a container filled with an extinguishing agent, which may be a gas (CO₂), a liquid (for instance water) preferably under pressure or brought under pressure, or a particulate solid (for instance sand). The present invention relates to a fire extinguisher of the latter type.

[0003] In contrast to fire extinguishers that use over-pressure in order to apply the extinguishing agent on the seat of the fire, applying a dry, particulate extinguishing agent on a seat of a fire is onerous.

[0004] The object of the present invention is to provide a fire extinguisher of the type above with which a dry particulate extinguishing agent can be effectively applied on a seat of a fire.

[0005] To this end, a fire extinguisher according to the preamble is characterized in that the container comprises a first end and a second end, and the fire extinguisher

- comprises a sidewall extending between the first end and the second end of the container, which sidewall is provided with a discharge opening for the particulate extinguishing agent, and
- comprises a handle which is connected to the container by means of a telescopic tube;

wherein the fire extinguisher

- can be in a first state in which the handle is retracted; and
- can be in a second state in which the handle is protracted.

[0006] To use the fire extinguisher the handle is pulled outward, i.e., the fire extinguisher is brought into the second state. Hereby the extinguishing agent can be dispersed on or in the seat of the fire by a user from a relatively safe distance to the seat of the fire. Dispensing the extinguishing agent that can be dispersed from the container, can be initiated by orienting the discharge opening downwards and can be stopped by orienting it upwards. A practical container will have a volume of less than 5 kg of extinguishing agent, such as less than 2 kg of extinguishing agent. The amount of extinguishing agent will be at least 100 g. The device is highly effective for quenching burning fat, such as in a pan with burning frying fat in a kitchen.

[0007] The telescopic tube can be located off-center, as a result of which, depending on the arrangement with respect to the discharge opening, the fire extinguisher is preferably in a position in which it dispenses or to the contrary does not dispense extinguishing agent.

[0008] The telescopic tube is for instance attached against the sidewall of the container. Preferably, the discharge opening will not lie on the central axis of the telescopic tube.

5 **[0009]** According to a favourable embodiment, the discharge opening is a discharge opening having the shape of a slit.

[0010] Thus, it is easy to distribute extinguishing agent over a relatively large surface, especially by moving the container with the handle transverse to the longitudinal direction of the slit. In practice, the slit will have a length of at least 5 cm, preferably more than 10 cm. In case of a granular extinguishing agent (e.g., a granulate) the width of the slit will be larger than with a powdered extinguishing agent, and is for instance between 0.3 and 8 mm, preferably between 0.4 mm and 5 mm. The slit-shaped discharge opening extends for instance transverse to the telescopic tube but in that case will not be in the same plane as the telescopic tube.

10 **[0011]** According to a favourable embodiment, the slit-shaped discharge opening extends parallel to the telescopic tube.

[0012] With such a fire extinguisher a fire can be quenched in a highly effective way. The slit-shaped discharge opening will advantageously extend in the same direction as the direction of the first end toward the second end of the container.

15 **[0013]** According to a favourable embodiment,

- in the first state the handle is situated relatively close to the first end, and the first end is situated between the second end and the handle; and
- in the second state the handle is situated relatively far away from the first end.

20 **[0014]** Such a fire extinguisher facilitates extinguishing a fire, especially in the case of a slit-shaped discharge opening which extends parallel to the telescopic tube.

[0015] According to a favourable embodiment, the particulate extinguishing agent comprises a granulate that will desintegrate under the influence of heat.

[0016] A granulate is composed of smaller particles. The granulate will desintegrate under the influence of heat, as a result of which a better extinguishing action is achieved. Compared to a powder a granulate will not, or to a lesser degree, fly about or get blown away, and can therefore be applied to the seat of a fire more precisely.

25 **[0017]** According to a favourable embodiment, in the first state the discharge opening is sealed with a removable sealing.

[0018] Thus, any loss of the particulate extinguishing agent in the first state can be avoided or limited. There is also no need to store or transport the container with the discharge opening thereof oriented upwards.

30 **[0019]** According to a favourable embodiment, the seal has the form of a film provided with a tear section that is defined by means of perforations.

[0020] The film will tear readily and the tear section

defined by the perforations can thus be easily removed. The tear section will be provided with a tab or the like in order to facilitate the gripping thereof. The film is preferably a metal film, for instance aluminum film, advantageously in the form of aluminium tape.

[0021] According to a favourable embodiment, the sealing is tape.

[0022] Such a sealing is cheap. The tape may comprise a non-sticking finger grip for the easily gripping and removing the tape.

[0023] According to a favourable embodiment, the sealing is attached to the handle, and a transfer from the first state to the second state will also expose the discharge opening.

[0024] Thus, with one operation the fire extinguisher can be prepared for use. According to a possible embodiment the tape comprises a tearing thread which is attached to the handle, which tearing thread will cut the tape when the handle is pulled.

[0025] According to a favourable embodiment, in the first state the telescopic tube is situated at least partially in the container.

[0026] Thus, a highly compact device is provided. Advantageously, the telescopic tube extends in the longitudinal direction of the container.

[0027] According to a favourable embodiment, the extinguishing agent is an extinguishing agent that comprises montmorillonite.

[0028] Such a fire extinguisher is highly effective for quenching burning fat. With the device according to the invention the extinguishing agent can be applied under the liquid surface of the burning fat, as a result of which the fire can be quenched effectively.

[0029] According to a favourable embodiment, the extinguishing agent which comprises montmorillonite contains granular bentonite.

[0030] This has proven to be particularly effective with fires of burning fats, such as burning frying fat. In such a case the extinguishing agent is advantageously applied under the liquid surface. At least 80% of the weight of the bentonite has a grain size between 0.5 and 4 mm.

[0031] Finally, the present invention relates to an extinguishing agent which comprises montmorillonite, wherein the extinguishing agent comprises

- 1) a mixture of a first salt which is a bicarbonate of formula $m\text{HCO}_3$ and a second salt which is a carbonate of formula $n\text{CO}_3$, with which the m and n have been selected from sodium, potassium and ammonium and M1 and alkali carbonate M2 in a ratio of $m\text{HCO}_3$ to $n\text{CO}_3$ between 0.5 and 2 parts by weight, and
- 2) the component that comprises montmorillonite;

with which the ratio of the mixture and the component that comprises montmorillonite is between 1:2 and 1:12 parts by weight.

[0032] Such an agent has proven to be especially ef-

fective for use in the fire extinguisher, since herewith also fires of burning fats that had been going on for some time could be quenched.

[0033] The bicarbonate is preferably sodium bicarbonate and the carbonate is preferably potassium carbonate.

[0034] The ratio of sodium bicarbonate and potassium carbonate is preferably between 0.75 and 1.4 parts by weight.

[0035] The weight ratio of the mixture and the component that comprises montmorillonite is between 1:3 and 1:10, such as 2:5.

[0036] The invention will now be illustrated with reference to the example section below, and with reference to the drawing wherein

Fig. 1A to Fig. 1C respectively show a first side view, a second side view and a cross-section of a fire extinguisher according to the invention; and

Fig. 2 shows a perspective view of the fire extinguisher of Fig. 1A in protracted state.

[0037] Fig. 1A to Fig. 1C respectively show a first side view, a second side view and a cross-section of a fire extinguisher 100 according to the invention.

[0038] The fire extinguisher 100 comprises a container 110, a handle 120 and a telescopic tube 130 applied in the container 110 which connects the handle 120 with the container 110.

[0039] The container 110 comprises a first end 111 and a second end 112, and a sidewall 113 extending therebetween. With the embodiment illustrated here the container 110 has the shape of a cylinder, though it may also have a different shape or cross-section, such as polygonal. The sidewall 113 is provided with a discharge opening 114 having the shape of a slit (Fig. 1B) for a dry, particulate extinguishing agent. With the embodiment illustrated here the discharge opening 114 is provided with a sealing 140 in the form of tape 140, which tape 140 comprises a tab 141 with which the tape can be easily gripped for removal thereof. Hereby the discharge opening 114 is exposed.

[0040] Fig. 1C shows that with the embodiment illustrated here the telescopic tube 130 is incorporated in the container 110 and more specifically, is attached to a bottom 115 of the container 110 which bottom 115 is situated at the second end 112.

[0041] In Fig. 1C the telescopic tube 130 is retracted, and the fire extinguisher 100 is in a first state.

[0042] Fig. 1A shows the fire extinguisher 100 in a retracted first state. Fig. 2 shows a perspective view of the fire extinguisher 100 of Fig. 1A in a second protracted state.

[0043] The sealing 140 is removed and with the discharge opening 114 oriented downwards a user can hold the handle 120 and disperse the extinguishing agent (here bentonite; not shown) from a distance to the seat of the fire onto the seat of the fire.

[0044] With the embodiment as illustrated the handle 120 also comprises an eye 221 as a result of which it is easy to bring the fire extinguisher 100 in the second state.

Experiments

General

[0045] Using a burner, a pan with 5 litres of rapeseed oil was heated to a temperature of over 300°C until the rapeseed oil caught fire spontaneously. Subsequently, extinguishing agent was dispersed onto the fire using the fire extinguisher according to the invention. It was studied how quickly the fire was quenched and whether the rapeseed oil could be ignited again after quenching.

Short burning time

[0046] When the fire had been going on for less than half a minute, it could be quenched with 500 g bentonite granulate. Reheating after 20 minutes resulted in re-ignition of the rapeseed oil.

Long burning time

[0047] When the fire had been going on for two minutes it could not be quenched using bentonite.

[0048] Upon repeating the last experiment, however, successful quenching was achieved with a mixture of 100 g sodium bicarbonate, 100 g potassium carbonate and 500 g bentonite. Additional heating after 20 minutes did not start re-ignition. This experiment was repeated, giving the same result. When potassium carbonate was omitted the result was comparable with the use of bentonite only.

Claims

1. A fire extinguisher (100) which comprises a container (110) provided with a particulate extinguishing agent;

characterized in that the container (110) comprises a first end (111) and a second end (112), and the fire extinguisher (100)

- comprises a sidewall (113) extending between the first end (111) and the second end (112) of the container (110), which sidewall (113) is provided with a discharge opening (114) for the particulate extinguishing agent, and

- comprises a handle (120) which is connected to the container (110) by means of a telescopic tube (130);

wherein the fire extinguisher (100)

- can be in a first state in which the handle (120) is retracted; and

- can be in a second state in which the handle (120) is protracted.

2. The fire extinguisher (100) according to claim 1, wherein the discharge opening (114) is a discharge opening (114) having the shape of a slit.

3. The fire extinguisher (100) according to claim 2, wherein the slit-shaped discharge opening (114) extends parallel to the telescopic tube (130).

4. The fire extinguisher (100) according to any of the preceding claims, wherein

- in the first state the handle (120) is situated relatively close to the first end (111), and the first end (111) is situated between the second end (112) and the handle (120); and

- in the second state the handle (120) is situated relatively far away from the first end (111).

5. The fire extinguisher (100) according to any of the preceding claims, wherein the particulate extinguishing agent comprises a granulate that will desintegrate under the influence of heat.

6. The fire extinguisher (100) according to any of the preceding claims, wherein in the first state the discharge opening (114) is sealed with a removable sealing (140).

7. The fire extinguisher (100) according to any of the preceding claims, wherein the seal has the form of a film provided with a tear section that is defined by means of perforations.

8. The fire extinguisher (100) according to any of the claims 6 or 7, wherein the sealing (140) is tape.

9. The fire extinguisher (100) according to any of the claims 6 to 8, wherein the sealing (140) is attached to the handle (120), and a transfer from the first state to the second state will also expose the discharge opening (114).

10. The fire extinguisher (100) according to any of the preceding claims, wherein in the first state the telescopic tube (130) is situated at least partially in the container (110).

11. The fire extinguisher (100) according to any of the preceding claims, wherein the extinguishing agent is an extinguishing agent that comprises montmorillonite.

12. The fire extinguisher (100) according to any of the preceding claims, wherein the extinguishing agent which comprises montmorillonite contains granular

bentonite.

13. An extinguishing agent which comprises montmorillonite,
characterized in that the extinguishing agent comprises 5

- 1) a mixture of a first salt which is a bicarbonate of formula $m\text{HCO}_3$ and a second salt which is a carbonate of formula $n\text{CO}_3$, with which the m and n have been selected from sodium, potassium and ammonium and M1 and alkali carbonate M2 in a ratio of $m\text{HCO}_3$ to $n\text{CO}_3$ between 0.5 and 2 parts by weight, and 10
2) the component that comprises montmorillonite; 15

with which the ratio of the mixture and the component that comprises montmorillonite is between 1:2 and 1:12 parts by weight. 20

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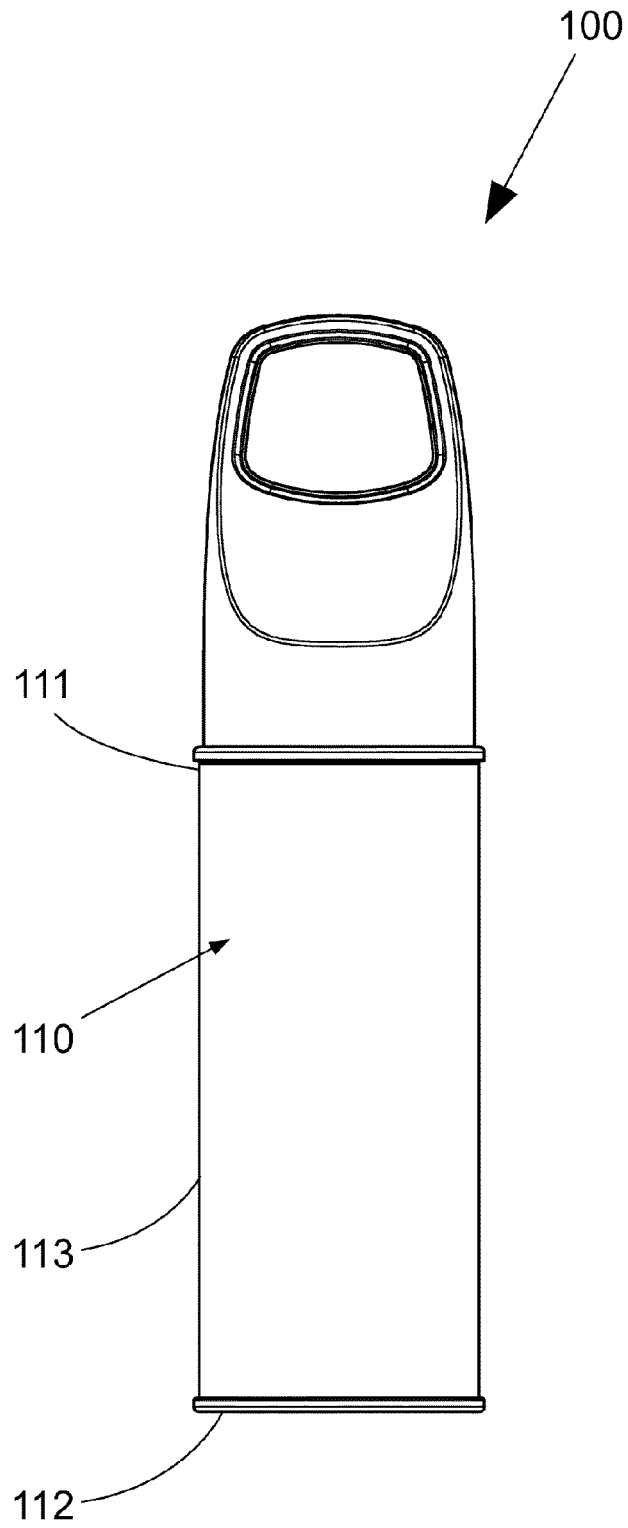


Fig. 1A

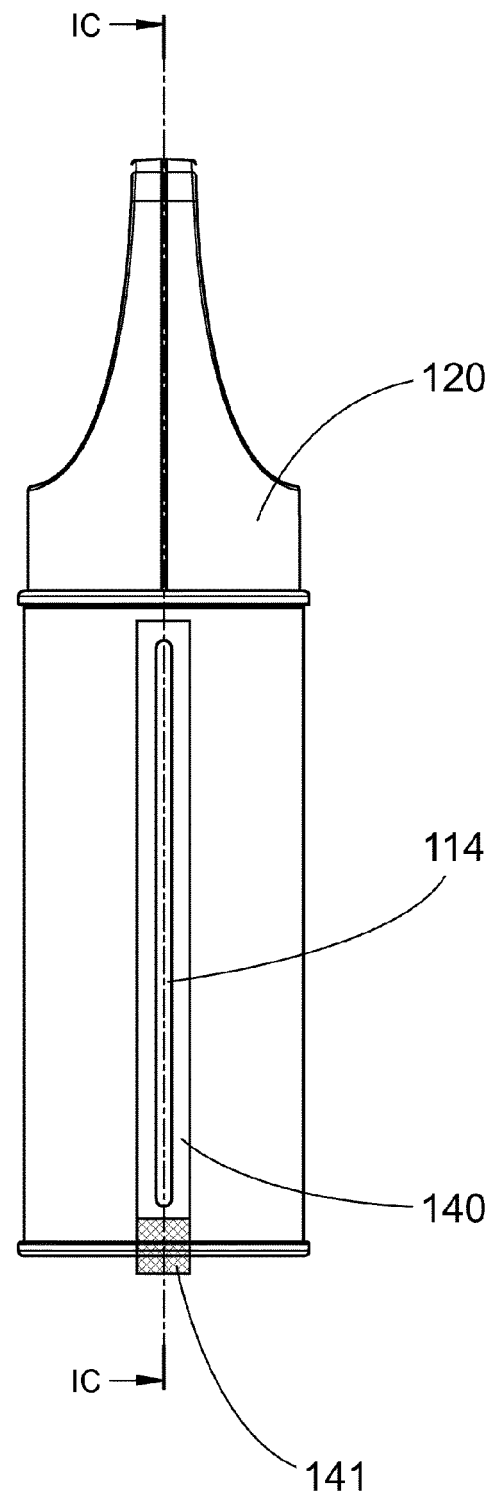


Fig. 1B

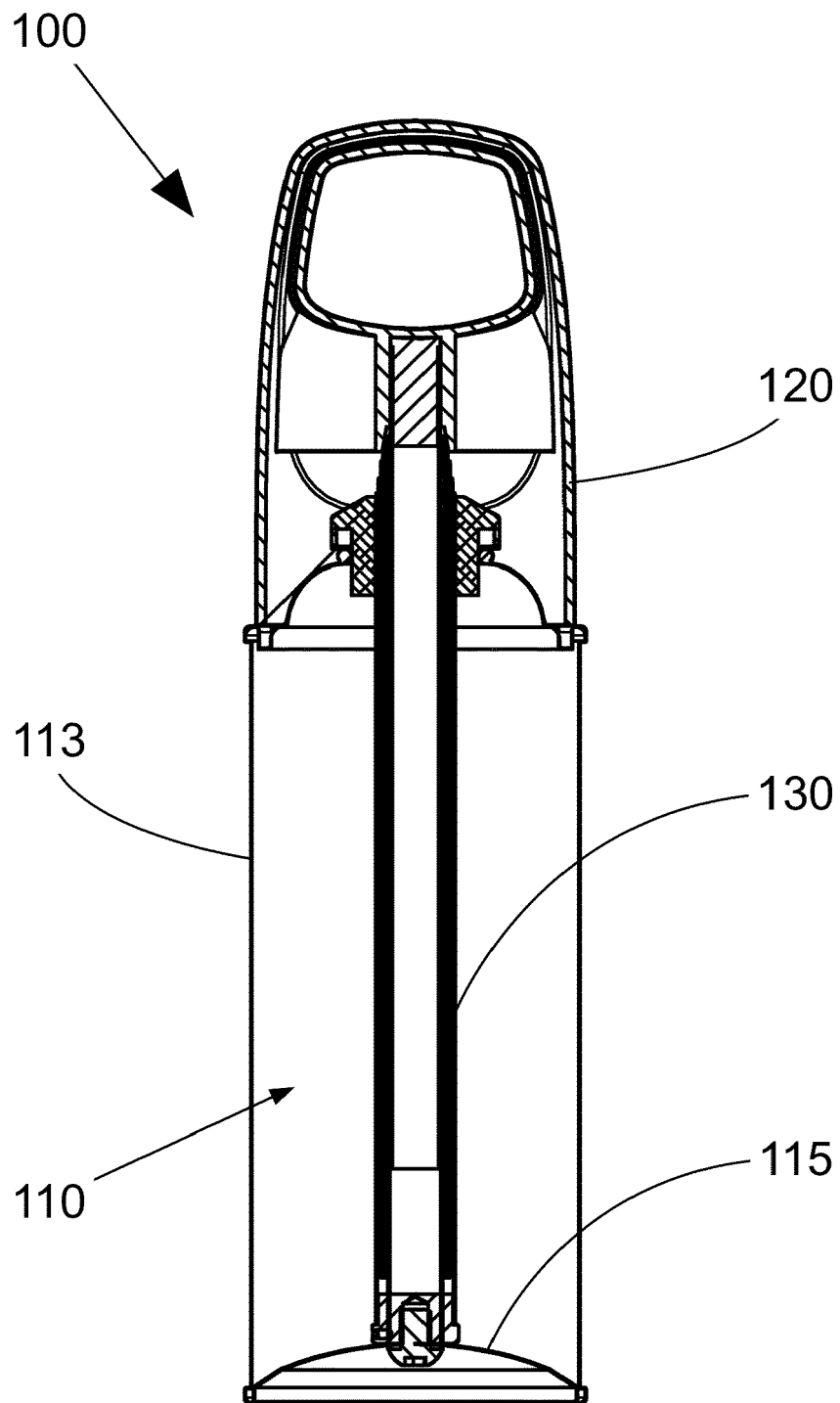


Fig. 1C

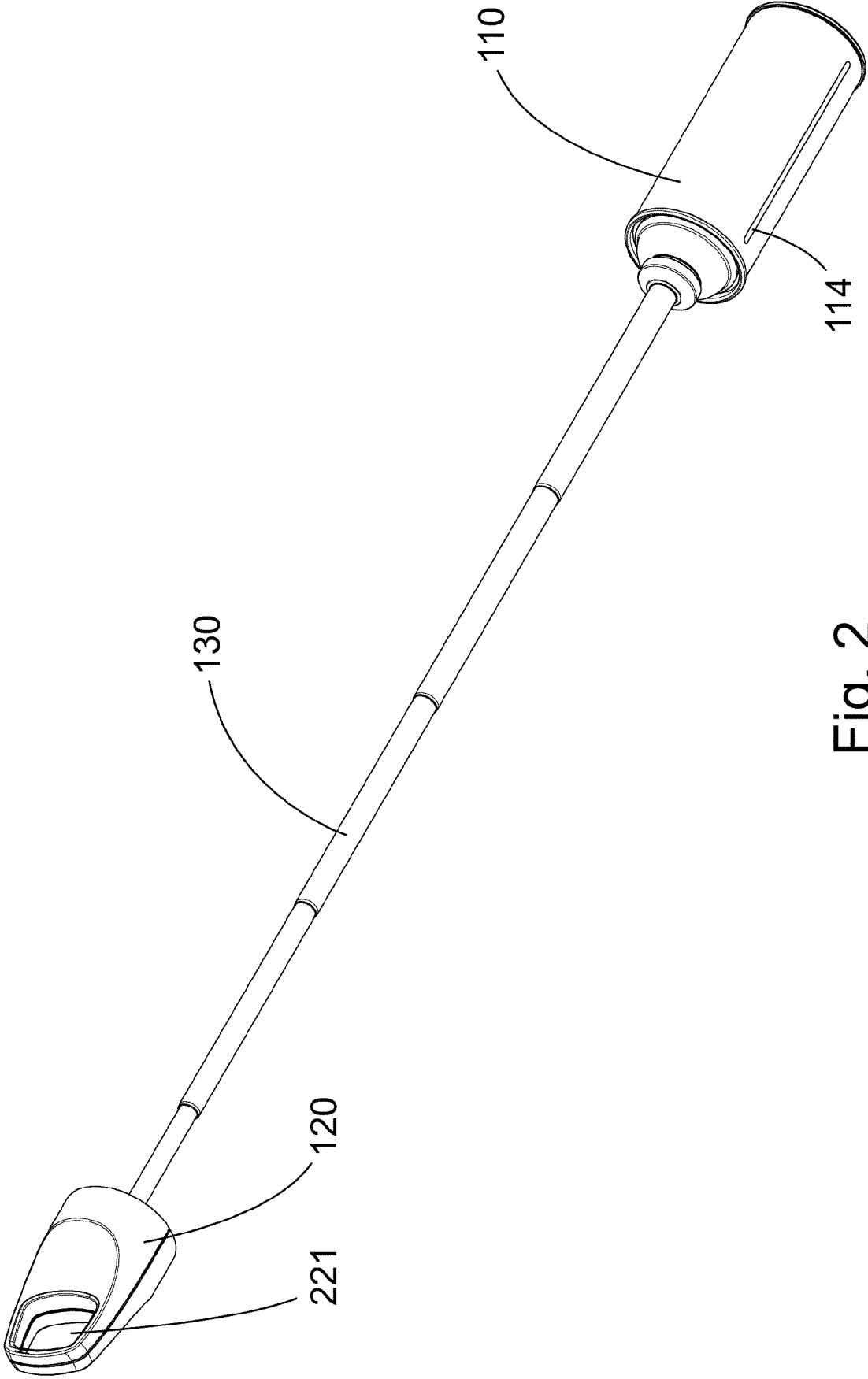


Fig. 2