

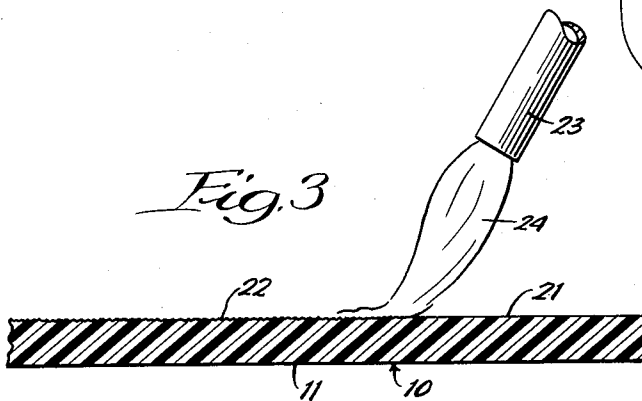
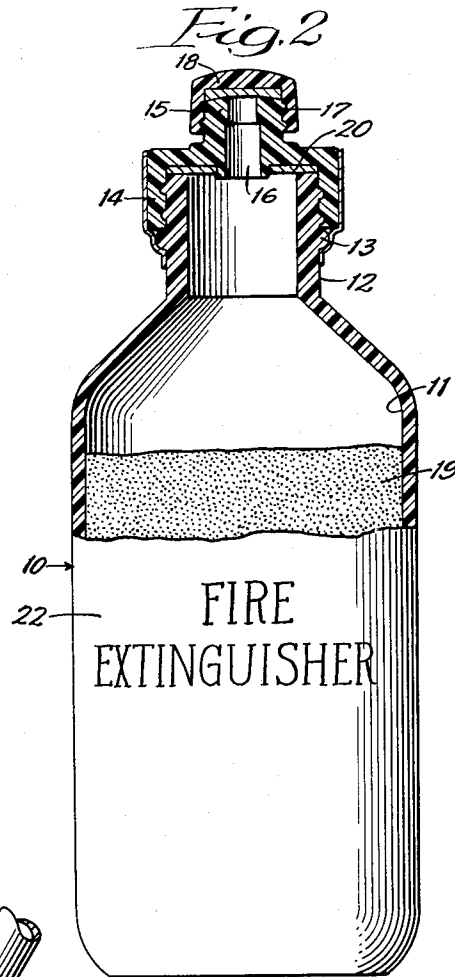
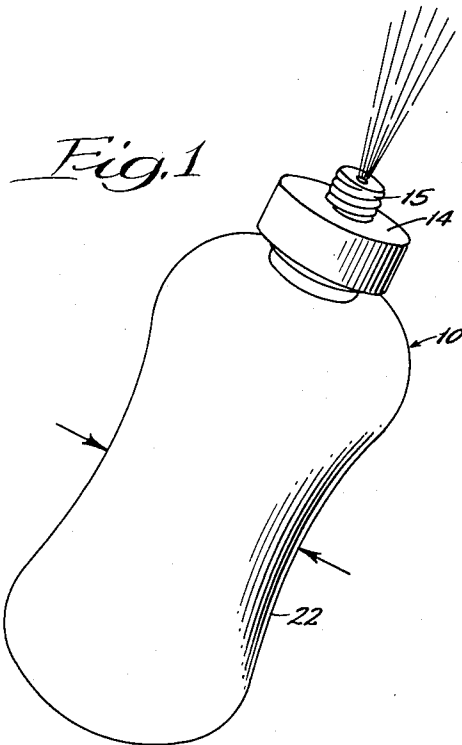
Jan. 17, 1956

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2,731,093

FIRE EXTINGUISHER DEVICE

Filed June 20, 1955



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2,731,093

FIRE EXTINGUISHER DEVICE

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Application June 20, 1955, Serial No. 516,487

2 Claims. (Cl. 169—35)

This invention relates to a fire extinguisher device. The invention is particularly useful in the dispensing of powder material effective in the quenching of fires.

This application is a continuation-in-part of my co-pending application, Serial No. 398,733, now abandoned, for Fire Extinguisher Device.

It has heretofore been suggested that powder material be employed in the quenching of fires, and such powder compositions are well known. Most of the compositions consist of sodium bicarbonate in combination with tricalcium phosphate, etc. Sometimes magnesium stearate is added. The powder compositions present a difficulty in that they tend to cake or lump, and also tend to cling to a container in which they are packaged. A compressed gas container for discharging the powder upon a fire source is of value in that the powder can be thus dislodged by gaseous pressure, but the apparatus employed is expensive, and the use of the high compression necessary for the gas renders the device dangerous.

A further difficulty arises from the fact that the dry powder employed for the extinguishing of fires becomes affected by vapors passing into the container, and for this reason or other reasons, there is a tendency for the material to become packed within a container after a period of time so that it is extremely difficult to dislodge the material and discharge it effectively upon a fire.

An object of the present invention is to provide an inexpensive container which may be manipulated to break up the powder and discharge it effectively, while at the same time providing on the interior of the container an extremely smooth surface which is repellent to the powder and allows it to flow readily therefrom. Another object is to provide in such a structure an exterior treated surface which renders the same impervious to the transmission of vapor, while at the same time making the structure more resilient and effective as a means for dispensing the powder. A still further object is to provide a dispensing device in which a plastic container has an interior untreated surface which is normally repellent to the powder employed and having an outer surface which is toughened and made resilient by treatment and is sealed against vapor transmission. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown, in an illustrative embodiment, by the accompanying drawing, in which—

Figure 1 is a perspective view of a container employed in the practice of my invention and shown with the central portion compressed for the discharge of powder; Fig. 2, a broken vertical sectional view, showing the upper portion of the container in section; and Fig. 3, a broken sectional view on an enlarged scale of a portion of the side wall of the container and illustrating the treatment thereof along the exterior surface.

I have discovered that an effective fire extinguishing device can be produced through the use of a particular plastic material having certain peculiar features. A container formed of polyethylene has on its inner surface, which is untreated, a very smooth finish which is charac-

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terized by the fact that it is repellent to most materials. Such a surface will not receive printing or decorative material. It is also repellent to powder and other granular material. The inner surface of the bottle, therefore, forms an ideal surface for receiving the fire extinguishing powder because there is no tendency for the powder to seat or cake within the container. The powder remains free-flowing, even though it may sit within the container for periods of a year or more. The exterior of the container, however, is treated, as by the application of a flame thereto to render the molecules on the outer surface of the bottle more unsaturated. The application of flame to the outer surface of the bottle changes the characteristic of the molecules, rendering them highly unsaturated and producing a novel effect on the container which is highly effective in making it a dispensing container. The flame treatment, in the first place, roughens the outer surface so that it has a "drag" when the fingers are drawn along the surface, and it thus allows the container to be held in the hand while dispensing the powder. In the second place, the treatment toughens the outer surface of the bottle and renders it more resilient, thus rendering the bottle highly effective as a pumping device. In the third place, the treatment decreases the vapor transmission through the bottle so that the vapor materials which might have an adverse effect upon the chemicals inside of the bottle, are not permitted to pass through.

In the illustration given, 10 designates a bottle formed of polyethylene having a very smooth interior surface 11, which is normally repellent to a powder. The bottle is provided at its top with a neck 12 having threads 13. The threads 13 of the bottle neck are engaged by a closure 14 having a threaded skirt engaging the threads 13 or neck 12 and providing at its upper end a nozzle 15 having a dispensing passage 16 extending therethrough. The nozzle 15 is provided exteriorly with threads 17 engaged by an interiorly-threaded cap 18.

In the operation of the structure, the closure 14 is removed and powder, indicated by the numeral 19, is introduced into the container to about the point indicated in Fig. 2. The closure 14, which is preferably formed of plastic, is screwed tightly to form a seal with the bottle neck 12, and then cap 18, which is also preferably formed of plastic, is tightly screwed in position to form a tight seal of the passage 16. A sealing gasket 20 may be employed between the closure 14 and the top of the bottle neck 12, to further render the closure vapor-tight.

In addition to the gasket 20, a similar gasket or sealing material is employed on the outside of the closure 14 to seal the space between the closure and the neck of the bottle therebelow, and for this purpose a plastic strip may be used. It is extremely important that the container be sealed against the ingress of moisture-containing air, because of the hygroscopic character of the bicarbonate of soda. Any moisture would cause lumping or caking of the material and would interfere with the effective operation of the extinguisher at the time of the fire emergency.

Another factor of importance is the size of the orifice through which the powder is ejected. If the powder is ejected in a heavy fluid body, it is found that it is ineffective in extinguishing the fire. The material is effective only when it is pumped through the orifice and discharged as a cloud. In the form of a dust or cloud, the powder is highly effective in the extinguishing of fire and in order to achieve the dust cloud discharge, I find that critical orifice limits are necessary. The preferred orifice diameter is $\frac{3}{16}$ of an inch, and the effective range of diameters is between $\frac{5}{32}$ and $\frac{3}{16}$ of an inch.

The exterior wall of the container, as indicated by the numeral 21, is then treated by flame contact to change the character of the exterior surface. The treated exterior

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surface 22 is somewhat roughened after the contact with the flame, so that the surface now presents a "drag" in engagement with the fingers and enables the operator to firmly hold the container when it is being pumped for the discharge of the powder. Further, the modified surface 22 is found to seal the container against the inflow of vapor and the bottle wall is further toughened and rendered more resilient. The filled container may, in the sealed condition described, be placed away in an automobile compartment, in the kitchen, or in the shop, and allowed to stand for long periods of time. Should a fire occur, the operator will remove the cap 18 and then rapidly compress and relax the bottle 10 to discharge powder through the outlet passage 16. The degree of flexing is illustrated in Fig. 1. In this operation, the highly flexible, resilient walls of the container churn the powder 19 within the container and discharge the upper portion thereof through the outlet 16 and upon the fire which is to be extinguished. After the fire has been extinguished, the cap 18 may be again tightly sealed in position, as illustrated in Fig. 2, and the fire extinguisher may be placed away on a shelf for later use.

In Fig. 3, there is shown a gas burner 23, from which a flame 24 extends downwardly into contact with the outer wall surface 22 of bottle 10. Direct contact of the flame with the bottle surface brings about the change in character described, resulting in the surface molecules of the polyethylene body becoming highly unsaturated and obtaining the roughened characteristic and the characteristic of greater resilience heretofore described. While I prefer to use the flame treatment, it will be understood that other methods of treating the exterior surface of the bottle may be employed. It is found that an electric corona discharge is also effective in producing an unsaturation of the molecules of the outer surface of the polyethylene bottle, and such method, or equivalent methods, may be used in place of the flame treatment.

The polyethylene package described is believed to be unique in that the inner surfaces of the bottle, where the polyethylene molecules are highly saturated, are smooth and repellent to particulate matter, so that there is no tendency for the powder material to lump or cake or seat within the container. The outer surfaces of the bottle, on the other hand, are roughened by reason of the flame treatment, and form a tough, resilient body for the pumping action which is necessary for the dispensing of the powder. The roughened surface can be readily grasped in bringing about the rapid pumping action shown in Fig. 1.

The powder employed in the polyethylene bottle package may be of any suitable type or material. I prefer to use a mixture of sodium bicarbonate and tricalcium phosphate. There is a further advantage in adding magnesium stearate. I prefer to use sodium bicarbonate in the proportion of 97 to 100%, the tricalcium phosphate in the proportion of 0 to 1½%, and the magnesium stearate in the proportion of 0 to 1½%. The tricalcium phosphate is useful in promoting free flowing of the powder and inhibiting moisture, while the magnesium stearate is useful in inhibiting moisture.

The following specific compositions have been found useful:

1.		
	Percent	
Sodium bicarbonate.....	99	
Tricalcium phosphate.....	½ of 1	
Magnesium stearate.....	½ of 1	

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2.

	Percent
Sodium bicarbonate.....	99
Tricalcium phosphate.....	1

3.

	Percent
Sodium bicarbonate.....	100

I have found that all of the powder compositions now employed for the extinguishing of fires may be effectively dispensed in the package container described.

While, in the foregoing specification, I have set forth a specific structure in considerable detail for the purpose of illustrating my invention, it will be understood that such details of structure may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. A fire extinguisher package, comprising a polyethylene bottle equipped with a threaded neck, an interiorly-threaded closure engaging said neck, a sealing member forming an airtight seal about said closure, said closure having a discharge passage extending there-through and communicating with the interior of said bottle, a second closure for said discharge passage, said discharge passage having a diameter of about ¾ of an inch, said bottle having an inner polyethylene surface formed by saturated polyethylene molecules and having an outer surface consisting substantially of highly unsaturated polyethylene molecules which roughen the surface and produce a drag against the fingers when the bottle is manually grasped, and a body of hygroscopic fire-extinguishing powder consisting principally of sodium bicarbonate within said chamber, said bottle, when the discharge passage in said closure is open, being manipulatable by rapid squeezing for the dispensing of the powder in the form of a cloud from the bottle.

2. A fire extinguisher package, comprising a polyethylene bottle equipped with a threaded neck, an internally-threaded closure engaging said neck and secured thereagainst, a sealing member providing an airtight seal between said closure and neck, said closure having a discharge passage therethrough, means for closing said discharge passage, said bottle having an inner polyethylene surface formed by saturated polyethylene molecules and having an outer surface consisting substantially of highly unsaturated polyethylene molecules which roughen the surface and produce a drag against the fingers when the bottle is manually grasped, and a body of hygroscopic fire-extinguishing powder within the bottle and consisting principally of sodium bicarbonate, said discharge passage in said closure having a diameter between about ¾ and ¾ of an inch, whereby when said bottle is manipulated by rapid squeezing, the powder is discharged in the form of a cloud of dust.

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