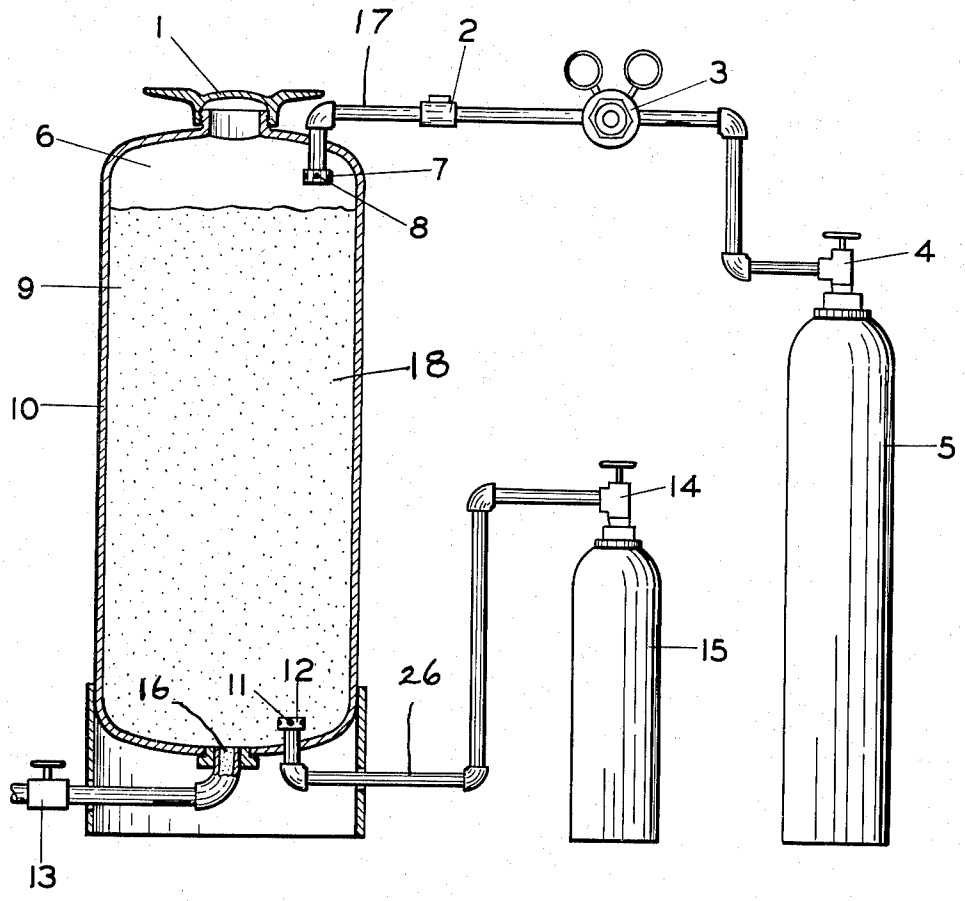
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APPARATUS AND METHOD FOR FLUIDIZING FIRE-EXTINGUISHING DRY CHEMICAL

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APPARATUS AND METHOD FOR FLUIDIZING FIRE-EXTINGUISHING DRY CHEMICAL

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This invention relates to dry chemical fire-extinguishing apparatus and method for fluidizing or aerating powdered dry chemical. More specifically, the invention relates to a storage container for powdered fire-extinguishing dry chemical provided with a gas inlet tube having a construction for rapidly fluidizing and pressurizing the stored dry chemical so that it may be effectively ejected in a stream from the storage container for fire-extinguishing purposes while the ratio of dry chemical to gas in the stream remains substantially unaltered.

Dry chemical fire extinguishers usually comprise a storage container for storing powdered dry chemical which is a composition containing essentially sodium bicarbonate, as disclosed in Patent 1,793,420, February 17, 1931. Since the powdered sodium bicarbonate absorbs moisture which will cause it to cake, it is necessary to store the dry chemical in a container which is sealed against entry of moisture therein. The storage container is connected to a suitable source of gas pressure, such as cylinders of compressed carbon dioxide, nitrogen, or air which when released within the storage chamber will fluidize or aerate the dry chemical and expel the fluidized powdered dry chemical under pressure through an outlet provided in the storage chamber which may be connected to a pipe or hose for conveying the stream of dry chemical to the location where a fire is to be extinguished.

When dry chemical type fire extinguishers were first developed, the need for aerating the dry chemical to fluidize it to promote free flowing was discovered. This need was fulfilled by introducing the expellant gas into the dry chemical container at or near the bottom of the container.

With the development of larger equipment, particularly equipment using dry chemical discharge lines of substantial length, it became necessary to introduce additional gas during the period when the extinguisher was being discharged. This and the above-mentioned fluidizing were accomplished by using a pressure regulator and introducing the gas through a gas tube with its outlet located at or near the bottom of the dry chemical container. This arrangement, now in common use, has several disadvantages. First, the pressurizing time is limited by the capacity of the regulator. In a piece of fire fighting equipment rapid actuation of the device is essential. Regulators having adequate capacity to feed gas into the dry chemical container during discharge of the extinguisher do not provide rapid pressurization of the extinguisher.

Second, in order to fluidize the dry chemical, the pressurizing gas must be introduced at or near the bottom of the dry chemical container. The dry chemical outlet from the container must also be located at or near the bottom of the container. During discharge of the extinguisher, the gas introduced through the gas tube to keep the pressure in the container at a suitable operating level alters the gas-to-dry chemical ratio of the discharging stream initially established during pressurization. This results in a high gas-to-dry chemical ratio, a more gassy stream, and a lower flow rate of dry chemical.

Compromise gas tubes have been worked out to strike a compromise on the two cited points. The present invention overcomes the cited problems and has other advantages that will be evident in further examination of the description of this device.

Further details and advantages of the invention will be apparent from the following specification and appended drawing, wherein

The figure is a diagrammatic arrangement, partly in section, illustrating the features of our invention.

Referring to the drawing, the device comprises essentially a dry chemical chamber **10** equipped with two gas tubes. One tube **26** is located at or near the bottom of the container **10** and is directly connected to a gas pressure source, such as gas cylinder **15**, controlled by valve **14**, without the usual intervening regulators. The gas pressure source is of such capacity that it will, when totally discharged, bring the extinguisher to a near its normal operating pressure. Tube **26** is connected to a nozzle positioned adjacent the bottom of the chamber **10**. The nozzle may have a single or a plurality of openings **11**. The other gas tube **17** is located at or near the top of the chamber **10** and is connected by a coupling **2** to a regulator **3** (or regulators) and a gas pressure source **5** controlled by valve **4** that may comprise one or more gas cylinders. Tube **17** is connected to a nozzle **7** positioned in the upper zone **6** of the chamber **10**. The nozzle **7** may be provided with a single or a plurality of openings **8**.

Actuation of the cylinder valve **14** on the gas cylinder **15** directly connected with the lower gas tube **16** causes the gas in the cylinder to discharge directly into the dry chemical chamber **10**. This causes very rapid pressurization of the chamber **10**, aerates or fluidizes the dry chemical **18** therein, and brings the extinguisher approximately to its normal operating pressure.

Immediately afterward, opening of the cylinder valve **4** on the cylinder **5** attached to the upper gas tube **17** places said cylinder in communication with the dry chemical chamber **10** through the pressure regulator **3**. When the extinguisher is then operated and dry chemical is expelled from the container through outlet **16**, controlled by valve **13**, additional gas will go through the pressure regulator and enter the container at or near the top of the container, thus keeping the pressure in the extinguisher at the operating pressure predetermined by the setting of the pressure regulator. Gas so introduced will not substantially disrupt the gas-to-dry chemical ratio and the resultant dry chemical fire-fighting stream will be dense and have a relatively higher flow rate of greater fire fighting capacity.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

We claim:

1. An apparatus for supplying gas-fluidized dry chemical at a substantially constant ratio of gas to dry chemical which comprises a chamber for storing dry chemical therein, an outlet in said chamber, a source of fluidizing gas pressure connected to the bottom of said chamber, and a second source of gas pressure connected to the upper portion of said chamber to maintain a substantially constant pressure in said chamber while the fluidized dry chemical is being discharged from said chamber at a substantially constant ratio of gas to dry chemical.

2. An apparatus for supplying gas-fluidized dry chemical at a substantially constant ratio of gas to dry chemical which comprises a chamber for storing dry chemical therein, an outlet in said chamber, a nozzle adjacent the bottom of said chamber, a source of fluidizing gas connected to said nozzle, and a second source of gas pressure

connected to the upper portion of said chamber to maintain a substantially constant pressure in said chamber while the fluidized dry chemical is being discharged from said chamber at a substantially constant ratio of gas to dry chemical.

3. An apparatus for supplying gas-fluidized dry chemical at a substantially constant ratio of gas to dry chemical which comprises a chamber for storing dry chemical therein, an outlet in said chamber, a source of gas pressure connected to the bottom of said chamber for fluidizing the dry chemical in said chamber and also connected to the upper portion of said chamber to maintain a substantially constant pressure in said chamber while the fluidized dry chemical is being discharged from said chamber at a substantially constant ratio of gas to dry chemical.

4. An apparatus for supplying gas-fluidized dry chemical at a substantially constant ratio of gas to dry chemical which comprises a chamber for storing dry chemical

therein, an outlet in said chamber for discharging gas fluidized dry chemical, a source of gas pressure to pressurize the tank to approximate operating pressure connected to discharge into the lower portion of said chamber to fluidize said dry chemical when the chamber is pressurized and a source of gas at regulated pressure connected to the upper portion of said chamber to maintain substantially constant operating pressure while dry chemical is being discharged.

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