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FREE FLOWING FIRE EXTINGUISHING COMPOSITIONS

Scott E. Allen, Verona, N. J., and David Levin, Philadelphia, Pa., assignors, by direct and mesne assignments, to C-O-Two Fire Equipment Company, Newark, N. J., a corporation of Delaware

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6 Claims. (Cl. 252—7)

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This invention relates to fire extinguishing compositions containing sodium bicarbonate which are adapted for expulsion from a fire extinguisher under gas pressure.

Sodium bicarbonate has long been used as a fire extinguishing medium because of its property of decomposing at relatively low temperatures as a result of which carbon dioxide is liberated to extinguish the fire. In order to effect free-flowing characteristics to the sodium bicarbonate for this purpose and to avoid its caking over long periods of time, it has been proposed to coat the sodium bicarbonate with moisture resisting agents such as metallic salts of fatty acids. While these water resisting agents protect the sodium bicarbonate from caking, such agents absorb small amounts of moisture if exposed to relatively high humidity. If the fire extinguishing powder were used as such, this slight moisture absorption would cause little inconvenience. However, fire extinguishing compositions are usually discharged under pressure conditions, and it has been found that, if the fire extinguishing compositions utilized under these conditions absorb as little as $\frac{1}{10}$% moisture, caking of the composition results which interferes materially with the proper discharge of the powder from the extinguisher under pressure.

In accordance with this invention, fire extinguishing compositions are provided which are free-flowing, which are moisture resistant and which, when employed in pressure fire extinguishers, under average humidity conditions do not cake. The fire extinguishing compositions of this invention contain 76 to 99%, and preferably 97 to 98% of powdered sodium bicarbonate, and ½ to 20%, and preferably 1 to 2%, of a natural finely powdered mica such as powdered muscovite or powdered isinglass. Desirably, the compositions of this invention also contain ½ to 3%, and preferably 1¼ to 2%, of a water insoluble metallic salt of a fatty acid. An amount of powdered mica in excess of 20% may be used and the amount of sodium bicarbonate correspondingly reduced, but it is preferred not to use an amount of mica in excess of 20% because the efficacy of the resulting composition as a fire extinguisher with such excess mica would be markedly reduced. For some specific conditions, however, it may be advantageous to use fire extinguishing compositions containing in excess of 20% of powdered mica, or again for some purposes, it may be satisfactory or advantageous to use mica within the limits of 1 to 20% together with some other material such as powdered porous silica.

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The compositions of this invention are conveniently produced by mixing the sodium bicarbonate with the water insoluble salt of the fatty acid and then mixing the resulting product with the mica, or alternately by mixing the sodium bicarbonate with the mica and then mixing the resulting product with the water insoluble salt of the fatty acid.

Desirably, 99% of the powdered sodium bicarbonate is capable of passing through a 100-mesh sieve, and preferably 99% of the powdered sodium bicarbonate is capable of passing through a 200-mesh sieve. It is preferred that 88 to 92% of the sodium bicarbonate be capable of passing through a 325-mesh sieve. The sodium bicarbonate may contain up to 10% of an inert, water insoluble, non-hygroscopic filler, such as clay, talc or ground calcium carbonate. Desirably, the water insoluble metallic salt of the fatty acid contains at least 12 carbon atoms, and preferably at least 18 carbon atoms, such as insoluble metallic stearates. Preferably 99% of the water insoluble salt of the fatty acid is capable of passing through a 200-mesh sieve. Preferably, the insoluble metallic salt, such as alkaline earth salts of fatty acids having at least 12 carbon atoms, should contain less than 1% of free fatty acid, less than 1% moisture and less than 1% of water soluble salts.

The mica imparts to the composition of this invention a free flowing character and, when the compositions are placed under pressure, prevents the particles of sodium bicarbonate or the water insoluble salts of the fatty acids from adhering to each other. Moreover, unlike many other materials, such as silica aerogel, mica adds little bulk to the composition. Again, unlike silica aerogel, which does not prevent caking under pressure when used in amounts in excess of about 5% of the composition, mica effectively prevents caking in any amounts in excess of ½%. Finally, mica is non-hygroscopic, and the compositions of this invention containing it do not lump or cake and functions admirably under high gas pressure.

Examples of the water insoluble metallic salts of fatty acids are aluminum, barium, calcium, lead, lithium, magnesium, zinc and other salts of lauric, myristic, palmitic, stearic and other associated or manufactured fatty acids.

A more comprehensive understanding of this invention is obtained by reference to the following examples:

Example 1

97 lbs. of pulverized sodium bicarbonate are

thoroughly mixed with 1½ lbs. of magnesium stearate and 1½ lbs. of powdered mica. The magnesium stearate used has a minimum melting point of 145° F. and contains less than 1% of free stearic acid, less than 1% of moisture and less than 1% of water soluble salts. The finished product is then discharged into suitable containers.

Example 2

The same procedure described in Example 1 is followed except that 98 lbs. of pulverized sodium bicarbonate, 1¼ lbs. of zinc stearate and ¾ lbs. of powdered mica are used instead of respectively the 97 lbs. of pulverized sodium carbonate, 1½ lbs. magnesium stearate and 1½ lbs. of powdered mica used in the product described in Example 1.

Example 3

The same procedure described in Example 1 is followed except that 97 lbs. of pulverized sodium bicarbonate, 1½ lbs. of aluminum stearate and 1½ lbs. of powdered mica are used instead of respectively the 97 lbs. of pulverized sodium bicarbonate, 1½ lbs. of magnesium stearate and 1½ lbs. of powdered mica employed in Example 1.

Example 4

The same procedure described in Example 1 is followed except that 79% of sodium bicarbonate, 1% of magnesium stearate and 20% of powdered mica are used instead of the proportions described in Example 1.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any equivalents of the features described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What is claimed is:

1. The improvements in sodium bicarbonate fire extinguishing compositions for expulsion in a finely-divided form and in a free-flowing condition from a fire extinguisher by a gas under pressure, which comprises a free-flowing mixture

of sodium bicarbonate in an amount from 76% to 99% of the mixture, by weight, substantially all of which will pass through a 200-mesh sieve, from ½% to 20% of finely powdered mica, from ½% to 3% of a finely-divided, water-insoluble metallic salt of a saturated fatty acid having from 12 to about 18 carbon atoms, the major portion of which will pass through a 200-mesh sieve, which mixture is characterized by having the properties of remaining in the fire extinguisher without lumping or caking, of not lumping or caking when initially subjected to gas pressure in the fire extinguisher, and of remaining in the fire extinguisher in a condition for free-flow discharge therefrom.

2. The improvement in the fire extinguishing composition of claim 1 in which the metallic salt of the fatty acid is a salt of stearic acid.

3. The improvement in the fire extinguishing composition of claim 1 in which the metallic salt of the fatty acid is magnesium stearate.

4. The improvement in the fire extinguishing composition of claim 1 in which the metallic salt of the fatty acid is present in an amount from about 1¼% to 2%.

5. The improvement in the fire extinguishing composition of claim 1 in which the mica is present in an amount from about ½% to 2%.

6. The improvement in the fire extinguishing composition of claim 1 in which the composition comprises about 97% of sodium bicarbonate, about 1½% of mica, and about 1½% of the metallic salt of the fatty acid.

SCOTT E. ALLEN.
DAVID LEVIN.

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