

UNITED STATES PATENT OFFICE

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FIRE EXTINGUISHER

No Drawing.

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This invention relates to fire extinguishers or more particularly to charges for use in fire-extinguishing apparatus.

It is among the objects of the invention to provide a fire-extinguisher charge which has superior fire-extinguishing properties, and sufficient to meet the present requirements for such extinguishers; and this invention is in the nature of a discovery disclosing particular compounds which involve a certain group of elements, which compounds we have found to possess unusual or special advantages from the fire extinguishing standpoint.

The general advantages which result from these discoveries and the inventions involved, will be apparent from the following disclosure.

Portable fire extinguishers, as heretofore known, are of a variety of types some of which involve a pumping mechanism for expelling the fire extinguishing fluid, and generally known as the pump-type of extinguisher; and other types have some form of chemical charge of such characteristics that, when put into use, a chemical reaction will take place to produce gaseous pressure for expelling the fire-extinguishing fluid.

The inventions and discoveries which are herein set forth are applicable to a fire-extinguishing material adaptable for use in either of these types of apparatus; and aqueous solutions of such fire-extinguishing agents are not only particularly efficacious for wood fires, but are also highly effective for extinguishing gasoline and oil fires.

We have found that potassium lactate in a water solution is admirably adapted to fulfill the requirements of a fire-extinguisher fluid, and tests have demonstrated that in meeting the present day fire-extinguishing requirements, this potassium lactate has unusually efficacious qualities. The potassium lactate solution should be sufficiently concentrated to produce a relatively high potassium content to get the best extinguishing effects.

It has heretofore been suggested to use a potassium compound such as potassium carbonate; but no one heretofore has discovered wherein resided the particular extinguishing

characteristics of such compounds; nor the relationship of such compounds to other substances which might have similar extinguishing characteristics.

We have however discovered that the effectiveness of such a fire-extinguishing compound depends upon the metal constituent of that compound, and we have also discovered that this is a function of the periodic grouping of such metals. In detail therefore, we have discovered that those alkali metal elements which are contained in Group I of the periodic table of elements, namely lithium, sodium, potassium, rubidium and caesium, when combined with any radical, present a group of substances which prove upon test to have peculiarly advantageous fire-extinguishing properties.

We have still further discovered that the degree of effectiveness of the fire-extinguishing compound depends likewise upon the particular character of the radical above referred to.

For example, we have found that a compound composed of some alkali metal element of Group I referred to, combined with an organic radical, will constitute an excellent material for such a fire-extinguishing solution.

The particular organic radical which we have referred to above is the lactate such for example as potassium lactate wherein the potassium is one of the elements of Group I referred to, and the lactate is the organic radical referred to, being a member of the hydroxy-carboxylic or hydroxy-fatty acid series of the carboxylic acid class.

But we have also discovered that to serve the purposes desired as an extinguishing solution, any organic radical of the carboxylic acid class, or one containing a carboxyl group, could be substituted. Thus a radical of the mono-carboxylic acid subclass could be substituted, such for example as the formates, and the acetates as well as its homologues of the fatty acid series such as the stearates.

We have also discovered by these investigations, that radicals of other subclasses of this carboxylic acid class, for example the

dicarboxylic acids such as oxalic acid, have the common characteristic of fulfilling the desired extinguishing requirements. Likewise, radicals of the dihydroxy dicarboxylic acid subclass, such as the tartrates, when combined with an element of Group I of the periodic table form effective fire-extinguishing solutions.

It is also true, according to our discovery, that in addition to the subclasses mentioned, other subclasses of the carboxylic acid class likewise have the necessary characteristics to make when so combined with an element of Group I of the periodic table, an effective fire-extinguishing solution. For example, the citrate radical, which is a member of the oxytricarboxylic acid subclass, has such properties.

That is, these substances combined with such an element as potassium (as one instance of the Group I referred to,) all have excellent fire-extinguishing characteristics to an unusual degree, according to our discoveries. We have also discovered that in this group, for the extinguishing characteristics referred to, some of the metals of this group are superior to others; for example, those having heavier atomic weight have a general superiority over those having the lighter atomic weights. Specifically we have found that potassium, rubidium, and caesium when combined with a radical as referred to, and utilized as a fire-extinguishing solution, have relatively the more pronounced effect; whereas sodium and lithium compounds have a poorer effect.

It may be added that as to the second type of fire extinguisher above referred to, wherein a chemical reaction takes place in using the extinguisher, these compounds above referred to are particularly advantageous to use in conjunction with appropriate carbonate compounds for the necessary gasification. One instance of the use of such a substance as just referred to namely potassium carbonate, is disclosed in our copending application Serial No. 211,251, filed August 6, 1927.

We have mentioned above the particular advantage of elements in Group I referred to, and we have found that in addition to the organic radicals referred to, advantageous extinguishing characteristics can also be secured by combining the Group I element with special inorganic radicals such as the halogens. For example, using potassium as a selection of the Group I referred to, potassium chloride, potassium bromide, potassium iodide and potassium fluoride all possess the necessary extinguishing characteristics referred to. Also the oxygenated halogen compounds of these elements, such as potassium chlorate, have these high fire-extinguishing properties.

We have also discovered that potassium ni-

trate and potassium nitrite conform to the same requisites as extinguishing solutions.

We have also discovered that potassium hydroxide and potassium bicarbonate possess excellent fire-extinguishing qualities.

Or, if instead of selecting potassium from Group I as referred to, sodium be selected we have thus discovered that sodium lactate and sodium nitrate possess the requisite characteristics as the extinguishing solution.

In referring above to the superior or exceptional fire-extinguishing characteristics of these various substances, we have had more particularly in mind comparison with the present-day requirements and conditions which have to be met in the specified tests outlined by Underwriters' Laboratories.

While the materials and compositions herein described constitute preferred embodiments of our invention, it is to be understood that the invention is not limited to these precise materials and compositions, and that changes may be made without departing from the scope of our invention as defined in the appended claims.

What is claimed is as follows:

1. A fire-extinguishing medium comprising a solution containing an oxygenated compound of an alkali metal element of Group I of the periodic table combined with a halogen, and a carbonate.

2. A fire-extinguishing medium comprising a water solution containing a chlorate of an alkali metal having unusually efficacious fire-extinguishing qualities, and a carbonate.

3. A fire-extinguishing medium comprising a water solution containing potassium chlorate and a carbonate of potassium.

4. The method in the extinguishing of fire, which comprises projecting upon the fire a solution of an oxygenated compound of an alkali metal element of Group I of the periodic table combined with a halogen.

5. The method in the extinguishing of fire, which comprises projecting upon the fire a relatively concentrated water solution of an alkali metal compound containing oxygen and a halogen.

6. The method in the extinguishing of fire, which comprises projecting upon the fire a water solution of an alkali metal chlorate.

7. The method in the extinguishing of fire, which comprises projecting upon the fire a water solution containing in excess of 10% by weight of potassium chlorate.

In testimony whereof we hereto affix our signatures.

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