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# UNITED STATES PATENT OFFICE

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## FIRE EXTINGUISHER

No Drawing. Original application filed February 27, 1928, Serial No. 257,400. Divided and this application filed January 27, 1930. Serial No. 423,889.

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.

This is a division of our copending application Serial No. 257,400, filed February 27, 1928.

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

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.

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.

We have mentioned above the particular advantages of elements in group I referred to, and we have found that in addition to the chloride radical referred to, advantageous extinguishing characteristics can also be secured by combining the group I elements with other halogen radicals, such as bromide, iodide and fluoride. Also the oxygenated halogen compounds of the group I element, such as the chlorates, have these high fire-extinguishing properties. Other inorganic radicals, such as nitrate, nitrite, hydroxide, and the carbonates including the normal carbonate and the bicarbonate, when combined with a group I element and dissolved in a water solution conform to the same requisites as extinguishing solutions.

In addition, we have found that a com-

pound composed of an alkali metal element of group I referred to, combined with an organic radical, will constitute an excellent material for such a fire-extinguishing solution. Thus the carboxylic acid class of the organic compounds, such as the lactates, the formates, and the acetates as well as its homologues of the fatty acid series such as the stearates, when combined with a group I element, have these high fire-extinguishing properties. Other subclasses of the carboxylic acid class, such as the oxalic radical, and the citrate radical, form compounds with the elements of group I which provide effective fire-extinguishing solutions.

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, for example, with potassium carbonate.

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 of a compound of caesium containing a carbonate therein.

2. A fire-extinguishing medium comprising a solution of a halogen compound of caesium containing a carbonate therein.

3. A fire-extinguishing medium comprising a solution containing a compound of caesium and a carbonate of potassium.

4. A fire-extinguishing medium comprising a water solution of caesium chloride and potassium carbonate.

5. The method in the extinguishing of fire, which comprises projecting upon the fire a solution of a compound of caesium.

6. The method in the extinguishing of fire, which comprises projecting upon the fire a water solution of a compound of caesium.

7. The method in the extinguishing of fire, which comprises projecting upon the fire a relatively concentrated water solution of a soluble compound of caesium.

8. The method in the extinguishing of fire, which comprises projecting upon the fire a solution of a halogen compound of caesium.

9. The method in the extinguishing of fire, which comprises projecting upon the fire a water solution of caesium chloride.

10. The method in the extinguishing of fire, which comprises projecting upon the fire a water solution containing a caesium compound and a potassium compound.

In testimony whereof we hereto affix our signatures.

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