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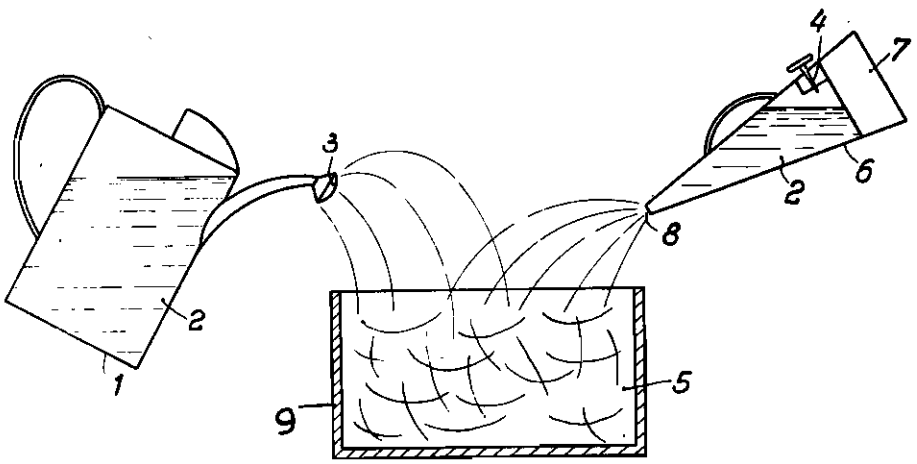

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LIGHT METAL FIRE EXTINGUISHING

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This invention relates to a method of preventing and extinguishing light metal-fires and to fire extinguishers which may be used in connection with said method.

It is an object of the invention to provide methods and means by which any light metal-fires, produced, for instance, by machining of light metal, more particularly, magnesium, parts or by self-ignition thereof under action of water or the like or by any other cause can be extinguished safely and quickly, or prevented, respectively.

A special object of the invention is to avoid any detrimental effects produced by the extinguishing and to prevent any re-ignition of the light metal.

As is well known, fires of light metal are very difficult to be extinguished. Usually, sand or the like is used for this purpose, but high precision machines, such as turning lathes and the like are spoiled and rendered inoperative by such use of sand. Moreover, it cannot be prevented that the fire remains alive for a certain period of time so that re-ignition occurs very often on removal of the sand. Similar results were experienced where other known fire extinguishing materials were used. For example, on removal of the sand from the light metal parts, glowing nests are found under the sand.

We have now found that light metal-fires can be extinguished very quickly and without any detrimental effects by covering the burning light metal parts with oil, more particularly with oil of a high flash point. Although oil on its part is also a combustible material, it was found to produce a sudden extinguishing effect upon burning light metal parts, without the formation of a blazing flame. Our invention, therefore, comprises broadly the use of oil as a fire extinguisher for light metal.

By way of example, ordinary waste oil of the kind drawn off from a motor has been poured over burning light metal scrap; the fire was entinguished immediately, without any fiery tongues or blazing flames being formed. After a certain time, the light metal scrap was spread out and found to be cold and free from burning or glowing nests or portions, respectively, and re-ignition of the light metal is effectively prevented.

We prefer the use of oils or oil mixtures derived from distillates of a high flash point, whereby the oil is prevented from taking fire in the extinguishing operation. However, even where relatively easily combustible oil of a low flash point is used, the said extinguishing effect is obtained with respect to the light metal fire.

Indeed, it may occur in this case that the oil itself catches fire, but such oil-fire can be easily extinguished. Care must be taken, however, that the oil is not removed from the light metal parts which have just been extinguished and are still hot, since the light metal tends to catch fire again. On the other hand, where fire extinguishing materials like carbon tetrachloride or methyl bromide are used to extinguish the burning oil-fire, the oil coating is removed from the light metal by action of such materials and the light metal might catch fire again if it is not yet cooled down sufficiently. Therefore, a certain period of time should elapse before such oil extinguishing materials are applied or before the oil is removed from the light metal.

It will be understood that the admissible flash point of the oil depends on the special use of the same, more particularly on the extension of the fire to be extinguished and the size of the burning parts, and the flash point should be as high as possible with large scale fire or pieces, while oil of a lower flash point may be used to extinguish small pieces.

Our novel light metal-fire extinguishing method is very useful, the more so as certain quantities of oil are always available in factories where light metal-fires may occur. Also, the usual fire extinguishing agents for oil-fire are available in such works, so that where oil-fire should occur in special cases, it can be easily extinguished with the available extinguishers. Furthermore, when entering into the interior of any machines or apparatus in the extinguishing operation, the oil does not spoil the machines like sand or other chemical extinguishers, but it merely adds to the lubricant used in the respective machine. For this reason, also, our light metal-fire extinguisher may be used as a protective liquid in the machining of light metal parts so as to prevent ignition thereof and, when used for this purpose, it will act as a lubricant reducing friction and as a cooling agent at the same time.

We contemplate also the use of additions to the oil which serve to enhance its flash point and/or tend to prevent its ignition or exert an extinguishing effect with respect to the oil. Additions enhancing the flash point of the oil are, for example, tricresyl phosphate and pyranol (see Holde, "Kohlenwasserstofföle und Fette," page 263). On the other hand, known oil extinguishing agents, such as, chlorinated hydro-carbons, carbon tetrachloride, methyl bromide and

the like may be used as additions to exert an extinguishing effect with respect to the oil, but not more than 5 percent and preferably only 2 to 3 percent of such agents should be added.

It is also contemplated that the oil used in the light metal-fire extinguishing may be blended with diluents which are inert with respect to the light metal, in order to reduce the expenses of the extinguishing agent. Various substances which are soluble in oil or vice versa or miscible therewith may be used for this purpose, provided that the respective substances per se are inert with respect to the light metal ignition or become inert when combined with the respective oil. Typical examples of suitable diluents are tar oil or creosote, pyranol and tricresyl phosphate.

Furthermore, we have found that sulfur is a very useful addition which is inert with respect to the light metal ignition or rather even enhances the inert properties of the extinguishers. It appears that sulfur when added to oil not only enhances the flash point but also acts as an extinguishing agent. This may be explained in this manner that sulfur dioxide is formed in the combustion which has a favourable effect and decays or suffocates the flame.

We add the sulfur to the oil by dissolving it therein. As is known, about 2 percent by weight of sulfur are usually soluble in oil which quantity is normally sufficient for the present purpose, but the percentage of sulfur may be increased by the use of so called auxiliary solvents, i. e., solvents or mixtures of solvents in which both sulfur and oil are soluble.

Solvents of this kind are known in the art for dissolving various substances and therefore, it will not be necessary to specify such substances.

Another way to dissolve larger quantities of sulfur in the oil would be to use an oil which has a particularly high dissolving capacity for sulfur. Especially, components of mineral oil which are rich in aromatics are very suitable for this purpose. For example, more than 2 percent and up to 7 percent sulfur can be dissolved in a component of mineral oil which is rich in aromatics and has a specific weight of 980 grs per liter. The said oil is characterised by the fact that it tends to form resin at low temperatures, under action of monohydrate.

The said sulfur-containing oils may be used in this form but we have found that in general it is advantageous to use also additions of chlorinated hydrocarbons, such as, carbon tetrachloride or methyl bromide which may be applied in comparatively small percentages of about 2 to 3 percent and not more than 5 percent.

It will be understood that since practically any kind of oil and more particularly waste oil can be used in our novel fire extinguishing method, our novel fire extinguishing agent may be produced at very low expenses. According to a very important feature of the invention the said substance may also be used for preventing the ignition of light metal when it is machined, for instance, in the form of a liquid which is continuously applied in the boring or other cutting operation. Especially in the latter case great percentages of any of the above mentioned diluents may be added to the oil for economic and other reasons.

Our novel fire extinguishing agent may be applied upon the burning light metal parts or chips in any suitable manner which renders it possible to spread or spray or pour the oil over the burning light metal parts and to cover the same with oil. Any known apparatus or devices may be used for this purpose and by way of example, two devices are illustrated diagrammatically in the drawing.

Referring to the drawing, an ordinary watering can **1** is filled with our novel fire extinguishing agent **2** which is discharged through its mouth piece **3** and spread over the fire occurred in a scrap box **9** filled with light metal chips **5**. In the same figure there is also shown a fire extinguisher of conventional design, comprising a casing **6** and, comprised therein, a chamber **7** for a suitable compressed gas, and a second chamber for oil **2**, if desired with suitable additions of the kind above referred to. The oil is sprayed unto the fire by opening a valve **4** between the two chambers and allowing the gas to force the oil through the mouth piece **8** which may also be filled with a valve, if desired.

We wish to make it clear that while various substances other than those above mentioned provided that they are miscible with, or soluble in, oil may be added thereto in order to produce the above mentioned effects, aqueous emulsions of oil with or without additions of gas producing substances and silicates are not suitable liquids for our novel method since said aqueous emulsions cause explosion phenomena in the fire extinguishing process and tend to permit or even to cause re-ignition of the light metal due to the presence of water in the emulsion.

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