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FUEL GAS MIXTURE FOR METAL WORKING

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This invention is directed to a gaseous fuel designed more particularly, but in no wise limited to use with oxygen for welding and heating metals, preheating of metals in cutting operations, case-hardening of metals, metal spraying, lead burning, working of glass, and like purposes.

Various mixtures have been heretofore proposed for such purposes, particularly the mixture of propane, butane and/or propane with diethyl ether and benzine, and also other similar mixtures which while effective as compared with untreated gases, are nevertheless wanting in an ideal mixture tending to the most direct and effective results combined with economy in use, particularly in the oxygen content of the flame, the quantity of fuel gas consumed and the necessity for an intense flame temperature necessary to rapidly do the work for which it is intended.

One disadvantage of the mixtures incorporating benzine and diethyl ether resides in the fact that benzine has a higher boiling point than diethyl ether and consequently the two do not vaporize uniformly and some benzine is left in the supply cylinder after all of the diethyl ether is drawn off. This residue necessitates purging of the cylinders after each use prior to refilling the cylinder with proper mixtures.

The primary object of the present invention is the production of a gas for the designed purpose which in its definite and essentially critical proportions produces a greater flame temperature, and materially reduces the amount of time, oxygen and gas required for any particular work in comparison with previous mixtures or bare untreated gases.

Another object of the invention is to provide a gaseous fuel mixture that is uniformly discharged from the storage cylinder and does not leave a residue that necessitates purging of the cylinder after use.

The compounded mixture of the ingredients and in the range and proportions on the basis of a sixty pound mixture are as follows: a minimum of about 50 pounds of propane or propylene, or mixtures thereof, and traces of butane, with approximately 10 pounds of propylene oxide or a mixture of about one-half propylene oxide and one-half diethyl ether; and a maximum of about 55 pounds of propane or propylene, or mixtures thereof, and traces of butane, with approximately 5 pounds of propylene oxide or a mixture of about one-half propylene oxide and diethyl ether. The diethyl ether and propylene oxide have similar boiling points and both volatize simultaneously and enter the gas stream together.

The foregoing proportions are substantially 83% to 92% of the gaseous fuel, namely propane and/or propylene, with or without traces of butane, and substantially 17% to 8% of the volatile chemicals, namely propylene

oxide or a mixture thereof with diethyl ether. It has been found that the lower proportion of chemical produces a leaner mixture whereas the higher proportion provides a richer mixture and that less than 8% of the chemicals is not effective while more than 17% is no more effective or efficient.

It is understood that the proportions given are exact and definitely critical in each range, and cannot be materially varied without sacrificing the valuable and necessary characteristics of the mixture. A lesser proportion than stated has no beneficial effect and a larger proportion tends to decrease the effectiveness of the flame. This has been proven through a long series of laboratory and practical tests and uses, which tests clearly disclosed that any material variation from the critical proportions above mentioned sacrifice one or another of the valuable and highly important results.

The new gas mixture is consumed uniformly so that there is no residue and the purging operation after use of the cylinders is eliminated with the use of propylene oxide or the mixture of propylene oxide and diethyl ether.

The tests of the new fuel show that in use, the ignition point of the gas mixture is lowered, the flame is more intense, the flame temperature is substantially 200° F. higher than that produced by previous and conventional mixtures, there is less gas and oxygen required in the flame than in previous mixtures, and due to the lower gas and oxygen pressures required for an effective flame, the highly objectionable cupped tip can be discarded and a flush type tip used for brazing, heating, hardening and soldering since this new flame will not blow off the end of the tip when used for such purposes. Due to the higher flame temperature, the heating of the metal is about 15% faster than with prior mixtures.

The mixture, in liquid or gaseous form, may be effectively used in steel containers, pipelines, or other conventional methods of application.

This mixture readily lends itself to any and all uses for which a gas of this character may or can be used, bearing in mind always that the defined proportions in the particular ranges are critical and should not be changed if the desired results are to be obtained.

Although a certain specific embodiment of the invention has been described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claim.

That which is claimed as new is:

The method of generating a gaseous fuel for use in welding and cutting of metals, heating, hardening, and for like purposes comprising the mixing of a gaseous fuel selected from the group consisting of propane, propylene and mixtures thereof with possible traces of butane, with a volatile chemical selected from the group consisting of propylene oxide and a mixture of propylene oxide with diethyl ether in the following proportions by weight, substantially 83 to 92% gaseous fuel and substantially 17 to 8% chemical, whereby the ignition point of the gas mixture is lowered and the rate of flame propagation and the temperature of combustion of the gas is increased.

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