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GASEOUS FUEL MIXTURES

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1 Claim. (Cl. 48—197)

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This invention relates to gaseous fuel mixtures and more particularly to such fuel mixtures that have a high calorific value and a low ignition point.

Fuel mixtures of this type are in demand for use in metallurgical and other industrial operations in which an intense local heat is required, as for instance in cutting metals, hardening and annealing, scarfing, melting and welding metals and the working of lead, hard glass and silica. For these purposes, the oxy-acetylene and oxy-hydrogen flames have been widely used but both are comparatively expensive, and in the case of acetylene, because of high carbon content and critical nature of the flame, unless great precautions in use are observed, it is liable to be dangerous and costly and work may be spoiled.

It is an object of the present invention to provide a cheap gas mixture by raising the calorific value and lowering the ignition point of the ordinary fuel gas, such as coal gas and natural (petroleum) gas supplied for general public use which will be referred to hereinafter as "city gas."

The gas mixture may be made in the first instance and compressed in cylinders and used direct from the cylinders to the burner. Alternatively, the supplementary gaseous material required to raise the calorific value and lower the ignition point of the city gas may be obtained from material compressed in cylinders and supplied from the cylinder to the city gas in pipe lines by means of suitable flow meters.

Various proposals with the above object in view have been made hitherto including the addition of ethyl ether to give a vapour content of the city gas from 2.5 to 5% by volume. There are, however, difficulties involved in making a gas mixture as above described, from, for example, ordinary city gas by making additions to raise the calorific value and lower the ignition point and produce a gas which is comparable for the purposes above described with acetylene. Suitable materials for addition are necessarily of an easily condensable character, such as the higher hydrocarbons and gas mixtures supplied in the usual city mains consist mainly of the more permanent gases, of which hydrogen, carbon monoxide and methane are examples. When substances are added with a view to increase the calorific value and lower the ignition point, in many cases such substances condense under pressure in the cylinders, and when the cylinder is opened to supply a burner, direct or through factory pipe lines, imperfect diffusion of the constituent gases may

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occur and a homogeneous gas such as acetylene will not be supplied to the burner. Moreover, when the rapidly moving stream of gas meets the oxygen supply there may be also imperfect diffusion with consequent deleterious effects upon the intensity of the flame and its resulting temperature.

It has now been found possible by proper selection of the added material and the proportions in which it is used to produce a gas mixture which, whether used from cylinder or formed in the pipe line by introducing compressed material from a cylinder, will give a homogeneous mixture at the point at which ignition occurs and which may be used with oxygen in the same way as acetylene and produce comparable results and in some respects even improved results.

According to the present invention a gaseous fuel mixture consists in city gas, propane and petroleum ether in the proportions of the said ingredients being as follows when the city gas is coal gas:

City gas at 70° F. and atmospheric pressure	cu. ft.	600–1,000
Propane	lbs.	5–9
Petroleum ether	lb.	1

and when the city gas is natural gas, half the proportions of propane and petroleum ether.

The petroleum ether referred to is the petroleum fraction having a boiling point range from approximately 40° C. to 60° C. at atmospheric pressure, such, for example, as benzin.

Other petroleum ethers with higher boiling points may be used in the proportions stated, provided means are employed to vaporize the material sufficiently for proper diffusion with the city gas before ignition occurs.

The propane above referred to is not necessarily the chemically pure propane, but may also be the propane fraction obtained in the refining of crude oil and containing butane with traces of other hydrocarbons, such as propylene, pentane and hexane.

The addition of propane with small amounts of petroleum ether results in a constant flow of gases in the proportions hereinbefore stated and also results in a constant and dependable intensity of the flame without precipitation. The propane and petroleum ether may be mixed for convenience in a single cylinder and introduced into the gas supply therefrom prior to burning with oxygen, a measuring or proportioning device of the usual type being used to control the proportions admixed. Alternatively, the propane

and petroleum ether may be separately introduced into the city gas in the proportions required. The additional material added to the city gas enables it to be used in like manner to acetylene for the purposes hereinbefore enumerated and it has been ascertained that lesser proportions than those given above are ineffective, while larger proportions than the maximum specified above provide no additional advantages.

Although a certain specific embodiment of the invention has been shown and 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:

A gaseous fuel mixture having a high calorific value and a low ignition point, which mixture consists of city gas as herein defined, propane and petroleum ether, said petroleum ether being a petroleum fraction boiling over the range of 40° C. to 60° C., said mixture being in the proportion of 5–9 lbs. of propane and 1 lb. of petroleum ether for every 100–600 cubic feet at 70° F. and atmospheric pressure of the city gas.

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