

UNITED STATES PATENT OFFICE

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PROCESS OF OBTAINING TORCH FLAME

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It is known that whatever be the alloy of two metallic parts to be joined by welding or brazing, it is necessary to employ a flux, and that it is, moreover, advantageous to utilize a method wherein the parts to be welded or brazed are prevented from coming into contact with air in order to avoid oxidation.

According to the invention, these two objects are attained by introducing into the flame of a torch complexes obtained by the chemical combination of propanetriol i. e. glycerine $C_3H_5O_3$ with alkali borates and boric esters.

Consequently, according to the invention, complexes are employed which are known as sodium glyceroborate and methyl, ethyl, propyl, butyl or amyl glyceroborates. It is expedient to dissolve these glyceroborates in alcohol or other combustible solvents, such as methanol. The alcohol complexes are decomposed in the flame of the torch. The alcohols, propanetriol included, are burnt without any residue, but the latter substance, when heated, presents at first a reducing action which is very advantageous to avoid oxidation of the metals, and contriutes thereafter by its complete combustion to increase the temperature of the torch flame. On the other hand, the oxidized compounds of boron resulting from decomposition of the complexes according to the invention act in the flame on the metals to be brazed or welded by dissolving the metallic oxides and thus producing the desired scouring action. According to the invention, the above liquid is introduced into the torch flame in any possible manner.

The liquid may be introduced into the current of combustible gas between the gas regulator and the nozzle of the torch, the gas current providing the dispersion of the liquid in the combustible gas. Said liquid may be sprayed by means of an atomizer placed in proximity to the flame so that the liquid will be volatilized and decomposed in the flame. The liquid may burn by means of a wick and the flame obtained in this manner will mingle with the flame of the torch. The invention is nowise restricted to the above methods of introducing the liquid or its vapors into the torch flame, but embraces any other method of effecting such introduction.

The process of the invention may be improved by adding to the alcohol an organic compound of an alkali metal soluble in alcohols particularly in methanol.

It has been recognized that by increasing the amount of alkali metal, such as sodium or lithium dispersed in the flame of the torch, the efficiency of the brazing or welding process is considerably improved. The compounds of alcohols and alkali metals may be, for instance, sodium ethylate C_2H_5ONa . Moreover and preferably the compounds of phenols and alkali metals may be employed, such as sodium phenate C_6H_5ONa , and more especially its derivative sodium orthoxybenzoate $OH-C_6H_4CO_2Na$. Lithium orthoxy-

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benzoate can also be employed. The alkali paroxybenzoates, such as that of potassium, as well as sodium and lithium benzoates play the same part.

All these substances which are soluble in alcohols are carried along in the flame of the torch. Combustion of the whole of the organic part of their molecule takes place, and finally an alkali oxide of sodium, potassium or lithium is formed, which combines with the boric oxides, e. g. B_2O_3 , obtained by decomposition of the boric esters, and combines with the oxides deposited on the parts to be brazed or welded, to form a boric or silico-boric glass (silicon deriving from impurities which are always present in the usual metals to be brazed or welded) which melts readily and reduces the superficial tension or the melted metal to be deposited, so that the latter can spread out and weld perfectly with the metallic parts to be brazed or welded.

The process is applicable not only to joining by brazing and welding, but also to dissolving oxides and impurities existing on metallic surfaces, and protecting them against the formation of oxides during any treatment of such surfaces which may comprise heating of the metal.

What I claim is:

1. The process of brazing and welding metal parts by means of a torch which comprises introducing into the torch operating gases a liquid constituted at least chiefly by dissolved glyceroborates, at least one of these being an alkali glyceroborate.

2. The process of brazing and welding metal parts by means of a torch which comprises introducing into the torch operating gases complexes formed by the chemical combination of glycerin with alkali borates and boric esters dissolved in an alcohol.

3. The process of brazing and welding metal parts by means of a torch which comprises introducing into the torch operating gases complexes formed by an alkyl glyceroborate and methylglyceroborate dissolved in methyl alcohol.

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