PUBLISHED
APRIL 27, 1943.
BY A. P. C.

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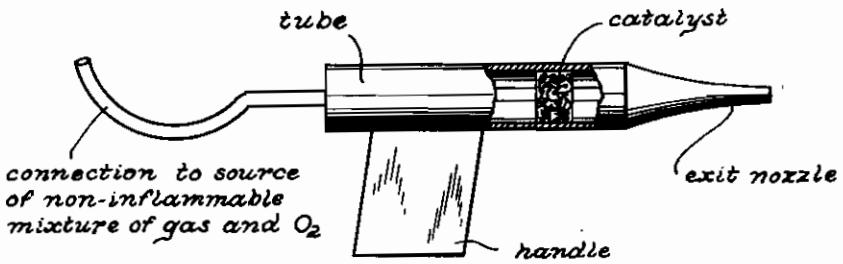
Filed June 19, 1940

Serial No.
341,238



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ALIEN PROPERTY CUSTODIAN

WELDING BURNER FOR THERMOPLASTIC MATERIALS

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Application filed June 19, 1940

The present invention relates to a process for uniting or consolidating pieces of thermoplastic materials by welding and to a welding burner for the purpose in question.

The term "thermoplastic materials" comprises various materials occuring in nature or prepared by synthesis which are non-plastic at ordinary temperature and are capable of being converted into a plastic sticky or fluid state in the heat. Pieces of such materials are capable of being united or consolidated by contacting the same with a stream of hot gas the temperature of which is above the softening point of the materials to be welded. Such materials are, for instance, polyvinyl compounds such as polystyrol, polyvinylchloride, products of the mixed polymerization of vinylchloride and vinylacetate or acrylic acid alkyl esters, furthermore, cellulose nitrate or cellulose acetate and also the so-called condensation superpolymers such as linear polyamides (for instance those prepared from adipic acid and 1.4-tetramethylenediamine) or linear polyurethanes. The welding of such materials has been effected up to the present by means of an apparatus (shortly called "burner") which consists of a metallic coil provided with an exit nozzle, the coil being heated from outside by gas flames or electrically, a gas stream being passed through the heated coil and then contacted with the materials to be welded. Such burners suffer from the disadvantage of being very complicated and of being handled only with difficulty. Such inconveniences are due to the fact that the metallic coil makes the burner heavy whereas the user is disturbed by the various conduits for the gas stream and for the heating devices. All such conduits must be directly connected with the burner as the heating coil must be arranged near the exit nozzle for the gas stream.

It is the object of our present invention to do away with these disadvantages and to develop a burner for thermoplastic materials which can be easily handled and which allows one to control the temperature of the gas stream in a simple and convenient manner. Other objects will be apparent from the following description and claims.

Our new burner comprises in its simplest form a tube provided with an exit nozzle and a catalyst which is capable of effecting reaction between oxygen and a combustible gas, this catalyst being arranged near the exit nozzle, and preferably with a handle. The welding by means of such burners is effected in the following manner: An oxygen containing gas such as oxygen itself or air is mixed with a combustible gas in such a proportion that the mixture is uninflammable. This gas mixture is passed through the said burner, the oxygen reacting with the combustible gas when coming into contact with the catalyst so that the gas stream leaves the exit nozzle in a hot state without burning. The hot gases are then contacted with the thermoplastic materials to be welded. Burners of the character described can be easily handled as they are light in weight and as they require only a single feed pipe, viz. for the mixture of the oxygen containing gas and for the combustible gas. As a matter of fact, our new burners may also be provided with two separate feed pipes, one for the oxygen and the other one for the combustible gas, the lighter weight per se of such burners representing a distinct advantage over the state of the art.

The catalyst may consist for instance of platinum or palladium and also of nickel, particularly in a finely divided state. Palladium wool has proved to be particularly suitable for the purpose in question. On starting the burner the catalyst may be heated for a moment, for instance, by contacting the tube with a gas flame from the outside in order to bring about or to accelerate its becoming effective. Such a preheating can also be effected by means of a wire which may be wound round or otherwise be contacted with the catalyst and which may be heated in any convenient manner. The preheating, if any, is stopped as soon as the catalyst has become sufficiently effective. The oxygen containing gas is preferably air, though other mixtures or pure oxygen are by no means excluded. As combustible gas there may be employed, for instance hydrogen, carbon monoxide, acetylene or mixtures containing such gases such as lighting gas.

An outstanding feature of our new burners is to be seen in the fact that the temperature of the gas stream which is leaving the exit nozzle can be regulated in a most simple manner by regulating the proportion of the oxygen and the combustible gas, always provided, however, that the mixture does not become inflammable. The burner may be provided with a device for measuring the temperature, for instance, with a thermostate which may be connected, for instance, by means of an electrical contact, with the valve for regulating the proportion of the oxygen and the combustible gas. In this manner the desired temperature can be maintained automatically. In a similar manner the preheating device can be switched out automatically.

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