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MAY 11, 1943. JOINING PARTS MADE OF THERMOPLASTIC MATERIAL 269,395

BY A. P. C. Filed April 22, 1939

Fig.1

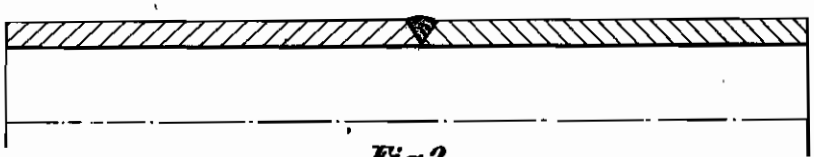


Fig.2

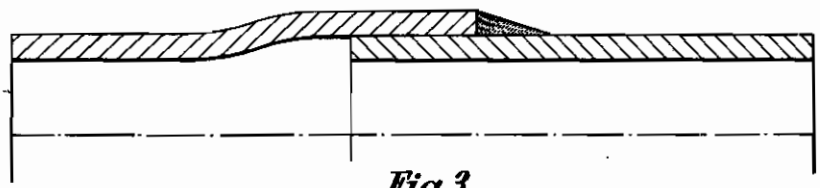


Fig.3

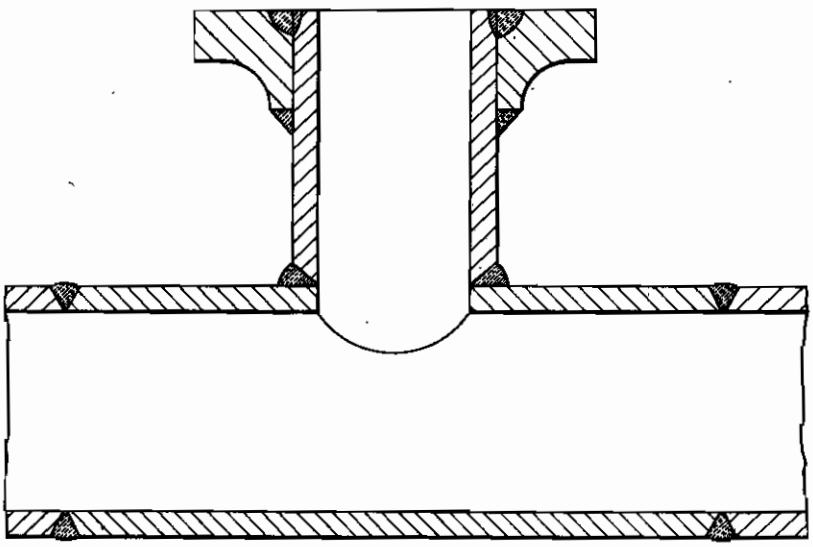
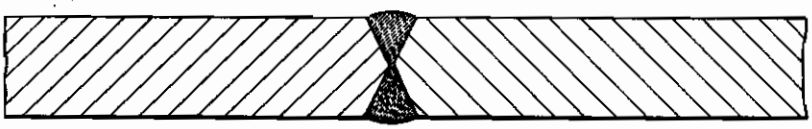


Fig.4



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ALIEN PROPERTY CUSTODIAN

JOINING PARTS MADE OF THERMOPLASTIC MATERIAL

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Structural parts consisting of thermoplastic materials, for instance pipes, bars, plates and the like made from polyvinyl compounds, including polyacryl compounds and mixed polymerisates have hitherto been joined by screwing and/or cementing, if necessary by application of a hasp. In many cases screwing requires special measures for securing tightness. For cementing, solutions of similar plastic materials in volatile solvents are used as adhesives; in this case a considerable time is necessary for drying. There is not known a satisfactory butt-joint for these structural parts, such as is often desired for building purposes.

This invention is based on the observation that it is possible to produce an excellent joint of structural parts made from such plastic materials, by heating the parts at the places where they are to be joined until these places are at the melting point and then pressing the parts lightly together or spreading the material at the said places by slightly rubbing it, so that the heated ends of, for instance, the pipes flow into one another. It is still better to produce such a joint by using additional material having a constitution the same as that of the body to be joined, as in the case of autogenous or electric welding. For welding it is especially useful to give the additional material, for example, the form of a rod of solder, softening agents such as phthalic acid esters, triaryl phosphates and so on being added, if desired, to the plastic material in a proportion of 10 to 30 per cent. This additional material as well as the preferably chamfered edges of the parts to be joined are heated to the melting point whereby the materials flow into one another, an intimate unstrained connection being thus produced without application of pressure. The edges to be united are heated so rapidly that the effect of the heat penetrates only to a depth of some millimeters and without decomposing the plastic material. The softening agent added to the additional material evaporates to a large extent during the welding process, or distributes itself and penetrates into the heated edge of the weld. The joints made by this process possess to a high degree the same mechanical and chemical properties as those of the structural material, and the joints are ready for use immediately after cooling.

Heating can be effected by means of a flame or by means of other sources of heat, for example by means of a moderately heated soldering iron. It is preferable, however, to apply heat by means of a hot air jet blown over the edges to be joined and, if necessary over the additional material. In the accompanying drawing there are shown diagrammatic views of joints made by the process of the invention, connecting parts made of plastic material.

Fig. 1 represents two pipe-ends joined together,
Fig. 2 represents a welded socket joint,
Fig. 3 represents a tee-pipe with welded flange,
Fig. 4 represents two bars welded together.

This process is of special value for joining structural parts made of polyvinyl chloride; its application for joining pipes of this material, which is distinguished by its chemical and physical properties, is explained in the following example with reference to Fig. 1.

Two parts of a pipe made from polyvinyl chloride are chamfered slightly at the ends to be joined, as represented in Fig. 1. An air current is then blown on the ends brought into contact with each other and, at the same time, polyvinyl chloride heated up to the melting point is run into the notch thus formed; depending upon the purpose to be fulfilled by the pipe the process is performed without softening agent or with addition of for example 10 to 30 per cent. of tricresyl phosphate. The still ductile material is then spread by slightly rubbing if necessary by means of a suitable preheated device; after cooling, the joint has at least the same stability as the pipes themselves. This fact is the more astonishing, as according to the statements of literature polyvinyl chloride decomposes at its melting point (130° C.).

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