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POWDERED POLYTHENE

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6 Claims. (Cl. 260—94)

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This invention relates to a new and improved process for the production of polythene powder. In particular, it relates to the production of polythene powder suitable for use in conjunction with a flame-gun for coating surfaces with a covering of polythene. Throughout this specification the term "polythene" refers to polymers of ethylene which are solid at room temperature.

The type of powder most suitable for spraying through a flame-gun consists of particles which are roughly spherical and which will pass through a 36 B. S. S. sieve and yet be retained on a 200 B. S. S. sieve. It should be appreciated that these limits are by no means critical.

Owing to the tough and rubbery nature of polythene, it has not hitherto been possible to comminute it to a finely divided powder of this type by any of the conventional methods. For example, the product obtained by passing any commercial grade of polythene through a Bridge Banbury mixer is fibrous in structure and consists essentially of long fibrous particles and is completely unsuitable for use in conjunction with a flame-gun.

According to the present invention we have now found that soft grades of polythene, as hereinafter defined, may be converted to a powdered state suitable for use in conjunction with a flame-gun by a process which comprises the steps of treating the said polythene with a quantity of a lower aliphatic alcohol at least sufficient to cause it to become brittle, mechanically disintegrating it whilst avoiding any substantial evaporation of the alcohol and thereafter evaporaing off the alcohol.

By "treating the polythene with alcohol" we mean covering the surface of the polythene with a layer of alcohol. For this reason it is preferred to use polythene in the form of flakes or chips, for example, polythene cut in a cutter. A sufficient amount of alcohol to cause all the polythene to become brittle is generally 7½% of the weight of polythene; preferably at least 10% should be used in practice. If too small an amount of alcohol is used the yield of polythene which will pass a 36 mesh sieve after a given disintegrating treatment is low and the material produced has an undesirably high surface area which results in the powder produced having a tendency to catch fire when passed through a flame gun. If it is attempted to work this process with other than soft grades of polythene, the yields and quality of powder produced deteriorates with increasing hardness of the polythene. On these considerations we limit the present invention to the treatment of soft grades of polythene, i. e., to polythenes having a melt viscosity at 190° C. less than 6,700 poises.

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Suitable machines for mechanically disintegrating the embrittled polythene are enclosed machines, for example, those sold under the trade name of Banbury mixers. Machines through which pass large volumes of air when they are in operation are not suitable for disintegrating the brittle polythene.

By "lower aliphatic alcohol" as used in this specification we mean any aliphatic alcohol having less than 6 carbon atoms per molecule. The preferred alcohols are methanol and ethanol.

Our invention is illustrated but in no way limited by the following example in which all parts given are by weight.

Example

100 parts of polythene having a melt viscosity of 330 poises at 190° C. were mixed with 10 parts of methylated spirits and the mixture fed into a "Bridge Banbury mixer" and mechanically disintegrated for 30 minutes. Cold water was circulated through the casing and rotor of the mixer to prevent any appreciable rise of temperature in the polythene. The product was spread in layers ½" deep on stainless steel trays and the trays placed in an oven at 30° C. through which a rapid stream of air was circulated. After the powder had become dry it was sieved through a 36 B. S. S. sieve. Approximately 50% of the powder passed through the sieve and was found to be excellent for use in a flame-gun of the type described in British Patent Number 538,203.

The powder which did not pass through the sieve was reprocessed as described above when a further 50% of the quantity reprocessed was produced in a form suitable for use with a flame-gun.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. A process for embrittling polythene, having initially a melt viscosity of about 330 poises at 190° C., which comprises admixing about 100 parts by weight of the said polythene with about 10 parts by weight of methylated spirits, thereafter mechanically distintegrating the resultant mixture in an enclosed space, and drying the resultant product.

2. A process whereby soft grades of polythene, having a melt viscosity at 190° C. of less than 6,700 poises, may be converted to a powdered

state suitable for use in conjunction with a flame gun, which comprises the steps of covering the surface of the said polythene with an aliphatic monohydric alcohol having less than 6 carbon atoms per molecule and thereafter mechanically disintegrating the resultant mixture in an enclosed space and drying the resulting product, the amount of said alcohol being sufficient to cause the said polythene to become brittle, said quantity being at least 7½% of the weight of the said polythene.

3. A process whereby soft grades of polythene having a melt viscosity at 190° C. of less than 6,700 poises may be converted to a powdered state suitable for use in conjunction with a flame gun which comprises the steps of covering the surface of the said polythene in the form of flakes with an aliphatic monohydric alcohol having from 1 to 2 carbon atoms per molecule, inclusive, and thereafter mechanically disintegrating the resultant mixture in an enclosed space and drying the resulting product, the amount of the said alcohol being sufficient to cause the said polythene to become brittle, said quantity being at least 7½% of the weight of the said polythene.

4. A process whereby soft grades of polythene having a melt viscosity at 190° C. of less than 6,700 poises may be converted to a powdered state suitable for use in conjunction with a flame gun which comprises the steps of covering the surface of the said polythene in the form of chips with an aliphatic monohydric alcohol having from 1 to 2 carbon atoms per molecule, inclusive, and thereafter mechanically disintegrating the resultant mixture in an enclosed space and drying the resulting product, the amount of the said alcohol being sufficient to cause the said polythene to become brittle, said quantity being at least 7½% of the weight of the said polythene.

5. A process whereby soft grades of polythene having a melt viscosity at 190° C. of less than 6,700 poises may be converted to a powdered state suitable for use in conjunction with a flame gun which comprises wetting the surface of the said polythene with methanol and thereafter mechanically disintegrating the resultant mixture in an enclosed space and drying the resulting product, the amount of methanol being about 7½% to 10% of the weight of the said polythene.

6. A process whereby soft grades of polythene having a melt viscosity at 190° C. of less than 6,700 poises may be converted to a powdered state suitable for use in conjunction with a flame gun which comprises wetting the surface of the said polythene with ethanol and thereafter mechanically disintegrating the resultant mixture in an enclosed space and drying the resulting product, the amount of ethanol being about 7½% to 10% of the weight of the said polythene.

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