

POLY(TRIMETHYLENE ARYLATE)/POLYSTYRENE COMPOSITION AND
PROCESS FOR PREPARING

Abstract of the Invention

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A composition of poly(trimethylene arylate), especially poly(trimethylene terephthalate), and polystyrene that is useful in the production of shaped articles such as fibers, films, and molded structures. The invention is useful as a masterbatch, also known as a concentrate, composition for combining with a PTT diluent in the economical production of fiber spinning compositions.

We claim:

1. A composition comprising a poly (trimethylene arylate) and 15% to 40% by weight, on the basis of total polymer weight, polystyrene dispersed therewithin.

2. The composition of Claim 1 in the form of a solid wherein the polystyrene is in the form of particles having an average size of less than 500 nanometers.

3. The composition of Claim 1 wherein the poly (trimethylene arylate) is poly (trimethylene terephthalate).

4. The composition of Claim 1 wherein the polystyrene is at a concentration of 20 % to 30 % by weight.

5. The composition of Claim 1 wherein the polystyrene is a homopolymer.

6. The composition of Claim 2 wherein the polystyrene is polystyrene homopolymer at a concentration of 20 to 30%; and, the poly (trimethylene arylate) is poly (trimethylene terephthalate) comprising at least 98 mol-% of trimethylene terephthalate monomer units.

7. A process comprising combining poly (trimethylene arylate) and 15 % to 40% by weight on the basis of total polymer weight, of polystyrene, melting the poly (trimethylene arylate) and polystyrene, and melt blending the melted poly (trimethylene arylate) and polystyrene in a high shear melt mixer to provide a melt composition comprising a poly (trimethylene arylate) and a polystyrene dispersed therewithin.

8. The process of Claim 7 wherein the poly (trimethylene arylate) is poly (trimethylene terephthalate).

9. The process of Claim 7 wherein the polystyrene is at a concentration of 20 % to 30 % by weight.

10. The process of Claim 8 wherein the poly (trimethylene terephthalate) is characterized by an intrinsic viscosity in the range of 0.90 to 1.2 dl/g.

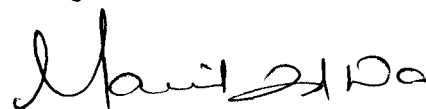
11. The process of Claim 7 wherein the polystyrene is polystyrene homopolymer.

12. The process of Claim 11 wherein the polystyrene homopolymer is characterized by a number average molecular weight in the range of 75,000 to 200,000 Da.

13. The process of Claim 7 wherein the polystyrene is polystyrene homopolymer at a concentration of 20 to 30% and is characterized by a number average molecular weight of 75,000 to 200,000 Da; the poly (trimethylene arylate) is poly (trimethylene terephthalate) comprising at least 98 mol-% of trimethylene terephthalate monomer units and whereof the intrinsic viscosity is in the range of 0.90 to 1.2 dl/g.

14. The process of Claim 7 wherein the process is a continuous process.

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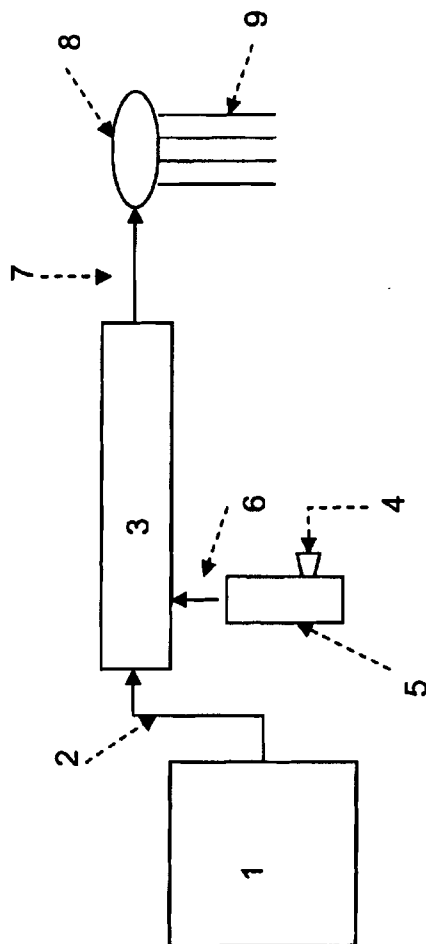


FIG. 1

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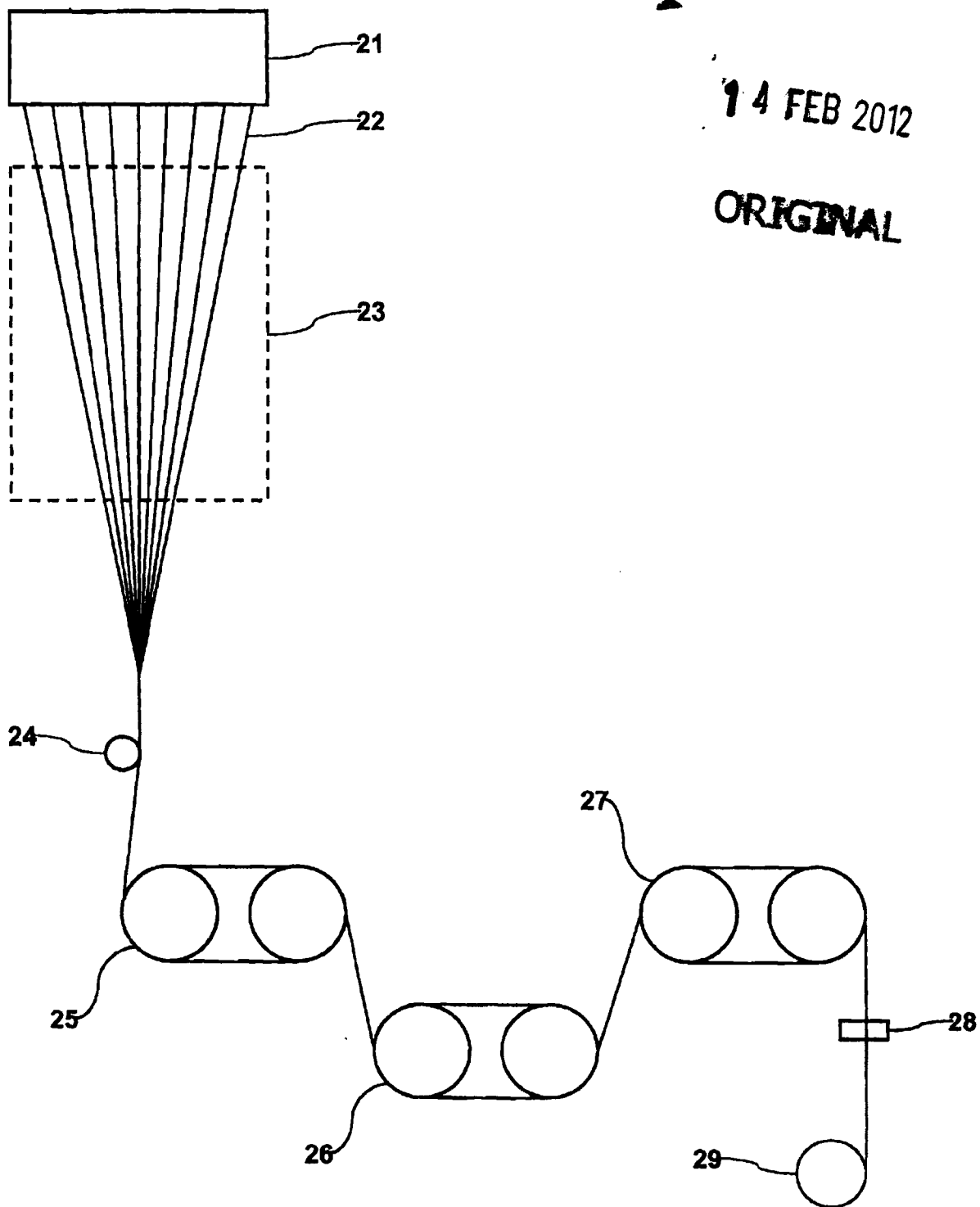


FIG. 2

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LEX ORBIS IP PRACTICE

The present application claims the benefit of US provisional patent application number 61/235399, filed August 20, 2009 which is herein incorporated by reference. Further, the present application is related to United States Patent provisional application number 61/235405, filed August 20, 2009, which is designated by Applicant as CL4791, entitled "Films of Poly(trimethylene arylate)/Polystyrene Blends", and to United States Patent provisional application number 61/235403, filed August 20, 2009, which is designated by Applicant as CL4697, entitled "Masterbatch Process for Producing Shaped Articles of Poly(trimethylene arylate)".

FIELD OF THE INVENTION

The present invention is directed to a polymer blend comprising poly(trimethylene arylate), especially poly(trimethylene terephthalate), and polystyrene, that is useful in the production of shaped articles such as fibers, films, and molded structures. The invention is also directed to the use of the masterbatch in the production of fibers, films and molded structures.

BACKGROUND OF THE INVENTION

Poly(trimethylene terephthalate), also known as poly(propylene terephthalate), or, less formally, as "3GT" polymer, is well known in the art. The properties and manufacturing thereof are described by Chuah in The Encyclopedia of Polymer Science, on-line, DOI 10.1002/0471440264.pst292.

J.C. Chang et al., US 6,923,925, describes a composition comprising poly(trimethylene dicarboxylate), especially poly(trimethylene arylate), most especially poly(trimethylene terephthalate) (PTT), with 0.01-10 % by weight of preferably high molecular weight polystyrene (PS) dispersed within the poly(trimethylene dicarboxylate), and having a PS

