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(71) Applicant: **TBA Industrial Products Limited**
20, St. Mary's Parsonage
Manchester M3 2NL(GB)

(72) Inventor: **Munro, Alexander**
20 Marton Drive
Atherton Greater Manchester(GB)

(72) Inventor: **Entwistle, Lester**
26 Carr Common Road
Hindley Green Wigan(GB)

(74) Representative: **Crux, John Anthony et al,**
20 St. Mary's Parsonage
Manchester M3 2NL(GB)

(54) **Improved glass fibre roving.**

(57) Continuous multifilament glass fibre roving is rendered coherent and catenary-free by passing it through an air treatment zone without positive overfeed so that there is no bulking thereof.

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Croydon Printing Company Ltd.

This invention relates to the processing of continuous glass filaments and in particular it is concerned with the preparation of rovings from strands comprised of such filaments for conversion into fabrics by weaving and for use in the reinforcement of plastics, especially by the pultrusion process.

A well-known problem in the preparation of such rovings is the phenomenon sometimes known as "catenary". This is the lateral separation of individual strands from an untwisted roving made up of a bundle of such strands. It is caused by variations in tension present in the individual reel packages which are unwound and assembled side-by-side together to form the roving. "Catenary" gives rise to problems in further processing and in the final conversion of the roving; various methods are known for minimising its effect. These methods include sizing treatments and twisting processes, both of which give the desired cohesion, but at the expense of processing properties or the use of an extra process step, respectively.

According to the present invention, a method of producing a coherent, essentially catenary - free untwisted continuous multifilament glass fibre roving comprises the steps of withdrawing individual continuous multifilament glass fibre strands from each of a plurality of creel packages, assembling them

side-by-side to form a single roving, passing said roving through an air treatment zone without positive overfeed so that there is no bulking thereof, and thereafter winding the treated roving into a package.

Air treatment zone in this particular context means a confined passageway into which air is introduced under pressure. It has been found that relatively small air pressures and volume throughputs are highly effective to produce an essentially catenary-free strand, even with strand linear densities of from 3000 to 9000 tex and at strand throughputs in the range 150-300 metres/minute. Air pressures of the order of 400 to 600 KN/metre^2 and air volume throughputs of 0.5 to 1.5 cubic metres/minute are effective for present purposes; this is much less than would be used in conventional air jet texturing processes. The present process has some similarity to the so-called co-mingling process, but the latter has hitherto been used for moderate texturing (bulking) of relatively fine manmade fibre yarns, in conjunction with heating to "set" the bulk developed. A degree of positive overfeed is used to ensure that such bulking is achieved.

By contrast, the present process when applied to a very much coarser glass fibre roving in the complete absence of positive overfeed results in a roving which is not bulked, but essentially free from catenary. If the throughput is reduced towards 150 metres/minute, the May product exhibit an apparent bulk. This bulk is only apparent, in the sense that on applying moderate tension to the roving, it exhibits minimal or even zero extensibility, coupled with practically no change in its catenary properties. This type of product has been found to be valuable for use as a plastics reinforcement, particularly in pultrusion processes.

At roving throughputs of the order of 300 metres/minute the product is catenary-free and useful as a weaving grade roving.

A particularly advantageous aspect of the invention lies in the fact that both of the two specific roving products just described can be made by incorporating the air treatment zone into the normal creel-to-package winding operation, without introducing any separate extra processing step. Conventional bulking apparatus is not needed for this.

A typical air treatment zone for present pruposes comprises a V-shaped trough with a hinged lid clampable in sealing relation thereto. A trough about 2.5 cm long and about 0.5 cm deep has been found satisfactory, the airflow being introduced half way along the trough through an aperture about 0.25 cm in diameter, in the bottom of the V. Obviously, the precise geometry of the air treatment zone may be varied and some experimentation may be necessary in order to arrive at the optimum conditions for a particular roving and throughput. In particular, the degree of tangling and the amount of apparent bulk (if any) developed can be varied within sensibly wide limits whilst still achieving the desired catenary-free characteristic.

CLAIMS:

1. A method of producing a coherent, essentially catenary-free untwisted continuous multifilament glass fibre roving, the method being characterised by the steps of withdrawing individual continuous multifilament glass fibre strands from each of a plurality of creel packages, assembling them side-by-side to form a single roving, passing said roving through an air treatment zone without positive overfeed so that there is no bulking thereof, and thereafter winding the treated roving into a package.

2. The method of claim 1 characterised in that the roving is passed at a rate of from 150 to 300 metres/minute through an air treatment zone constituted by a confined passageway into which air is introduced at 0.5 to 1.5 cubic metres/minute, under a pressure of from 400 to 600 KN/metre^2.

3. The method of claim 1 or claim 2 characterised in that the roving has a linear density of from 300 to 9000 tex.

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EUROPEAN SEARCH REPORT

Application number
EP 81 30 2646

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
	FR - A - 845 475 (SOCIETA ANONIMA VETRERIA ITALIANA BALZARETTI-MODIGLIANI) *page 2, lines 98-104; page 3, lines 1-7; figure 2 * --	
A	FR - A - 1 253 580 (ALLMANNA SVENSKA ELEKTRISKA)	
A	GB - A - 1 065 781 (PITTSBURGH PLATE GLASS CO.)	
A	US - A - 2 780 909 (OWENS CORNING FIBERGLAS)	
A	US - A - 4 020 623 (PPG INDUSTRIES)	

CLASSIFICATION OF THE APPLICATION (Int. Cl.³)

D 02 G 3/18

TECHNICAL FIELDS SEARCHED (Int. Cl.³)

D 02 G
D 07 B

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24-09-1981	DEPRUN