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N. DRISCH ET AL

2,586,795

PNEUMATIC TIRE

Filed May 29, 1948

Fig. 1.

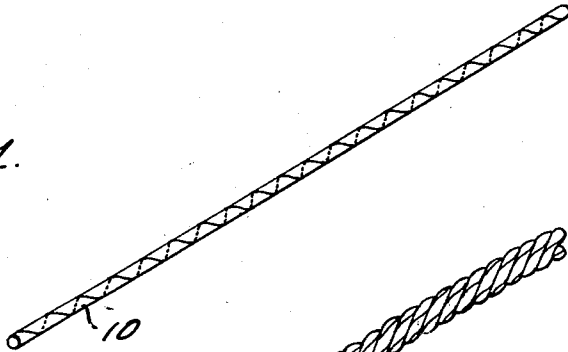


Fig. 2.

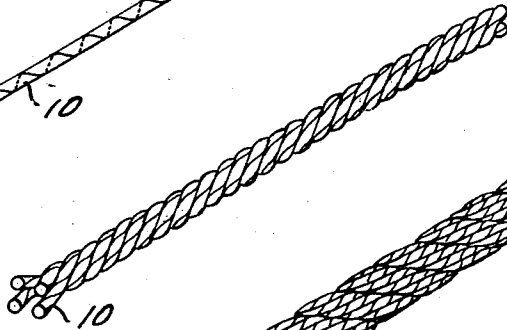


Fig. 3.

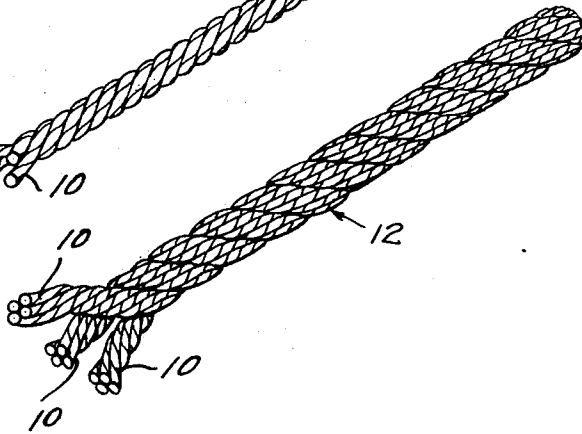
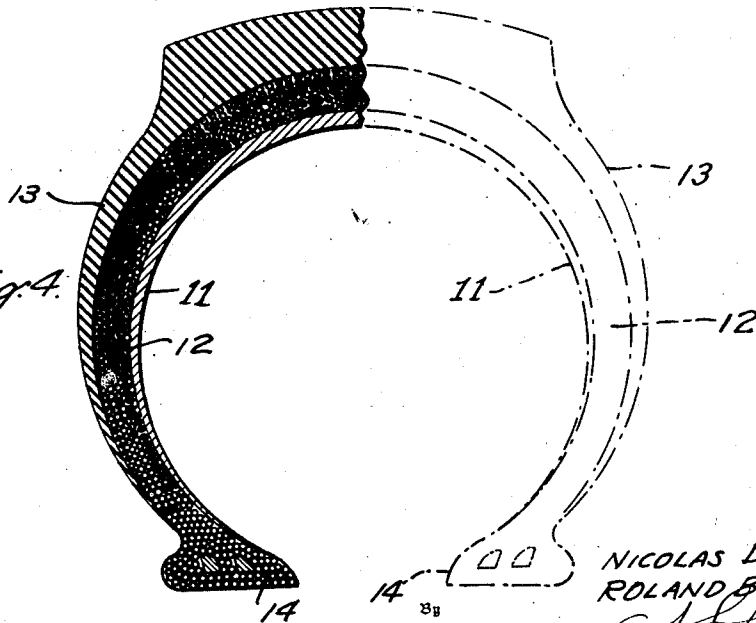


Fig. 4.



Inventors
NICOLAS DRISCH
ROLAND BREPSON
Heek
Attorney

UNITED STATES PATENT OFFICE

2,586,795

PNEUMATIC TIRE

Nicolas Drisch and Roland Brepson, Paris, France, assignors, by mesne assignments, to Textile and Chemical Research Company Limited, St. Peter, Port of Guernsey, Channel Islands, a corporation of Great Britain

Application May 29, 1948, Serial No. 30,155
In Great Britain May 11, 1948

1 Claim. (Cl. 152—359)

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This invention relates to the production of pneumatic tires.

In the production of pneumatic tires it is customary to reinforce the tire with a fabric material. Various textile materials have been suggested for the purpose, e. g. cotton, high tenacity viscose filaments and nylon, but few materials possess to a sufficiently high degree the qualities of tenacity and extensibility which are necessary for the purpose.

In our co-pending application Serial No. 30,153, filed on even date herewith, now abandoned and replaced by application Serial No. 173,924, filed July 14, 1950, we have described the production of viscose rayon materials of very high quality by a process which comprises extruding into a bath of sulphuric acid at normal room temperature a viscose prepared from cellulose containing less than 25% by weight of molecular chains with a degree of polymerisation below 500 and less than 4% by weight of molecular chains with a degree of polymerisation below 250, said viscose being prepared via alkali-cellulose of which the mean degree of polymerisation after ripening is greater than 450, which viscose has a degree of xanthogenation (γ) (as hereinafter defined) between 40 and 50, the concentration of sulphuric acid in the said bath being defined by the formula:

Percentage concentration by weight of sulphuric acid = $1.26\gamma + 8 \pm 3$

thereafter subjecting the extruded filaments to a stretching operation to increase their length by 150 to 280% while they are still wet from the spinning bath, washing the filaments and allowing them to relax, and then winding and twisting the filaments thus obtained. Further, in our co-pending application Serial No. 30,154, also filed on even date herewith, now abandoned and replaced by application Serial No. 173,924 above mentioned, we have described a preferred procedure in which the viscose employed has a γ -value between 44 and 47, the percentage concentration of the sulphuric acid by weight is $1.26\gamma + 8 \pm 2$ and the degree of stretching is from 200 to 250%.

The filaments so produced have, in the air-dry condition, a tenacity greater than 4.8 gm./denier and an elongation at breaking point greater than 8%.

The degree of xanthogenation of the cellulose, represented by the symbol γ , is the number of hydroxyl groups substituted by —CSS— groups per 100 glucose units (i. e. $C_6H_{10}O_5$ units).

According to the present invention pneumatic

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tires contain such high quality viscose rayon as reinforcing material. The material may be used in the customary manner in which cotton and nylon materials have been employed and by reason of its high tenacity and extensibility it enables strong, hard wearing tires to be produced.

The following example serves to illustrate the invention but it is not to be regarded as limiting it in any way:

In the drawing Figs. 1, 2 and 3 are enlarged perspective views of an artificial thread, strand and cord respectively embodying the invention; and

Fig. 4 is a transverse section through a tire casing containing a cord fabric made from cords prepared in accordance with the invention.

As a specific example 300 denier yarn 10 is twisted 180 turns per metre in left direction as shown in Fig. 1 and 4 ends of this yarn are assembled in a strand with a right hand twist of 200 to 500 turns per metre as shown in Fig. 2.

Three strands of the assemblies thus obtained are twisted 260 to 460 turns per metre in left direction to form a cord as shown in Fig. 3. The cord thus obtained is used for reinforcing pneumatic tires for which it is very suitable owing to the very high resistance of the yarn to fatigue and to flexing.

The tube casing shown in Fig. 4 comprises an inner fabric 11, artificial fiber cords 12 of the type shown in Fig. 3 disposed thereover and covered by a rubber tread 13. The casing includes the usual bead 14.

In the following table the present yarn is compared with a regular high tenacity viscose rayon cord as used for reinforcing tires.

Table

	Cord produced according to the Example.	Normal high tenacity viscose rayon cord
Denier.....	4,100	4,050
Tenacity (gm./denier).....	3.3	2.5
Elongation at break..... per cent	15.8	17.2
Elongation at halfbreaking load..... do.....	9.2	10
Vibration fatigue resistance (hours)	22.5	24

Vibration fatigue resistance is the number of hours to breakage under loading and unloading.

We claim:

A pneumatic tire containing as reinforcing textile material cords of viscose rayon filaments the said cords having a tenacity of at least 3 gm./denier and a vibration fatigue resistance greater than 22 and the said filaments having in

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the air-dry condition a tenacity greater than 4.8 gm./denier, and an elongation at breaking point of at least 8%, said filaments being obtained by extruding into a bath of sulphuric acid at normal room temperature a viscose prepared from cellulose containing less than 25% by weight of molecular chains with a degree of polymerization below 500 and less than 4% by weight of molecular chains with a degree of polymerization below 250, said viscose being prepared via alkali-cellulose of which the mean degree of polymerization after ripening is greater than 450, which viscose has a degree of xanthogenation (γ) between 40 and 50, the concentration of sulphuric acid in the said bath being defined by the formula:

Percentage concentration by weight of sulphuric acid = $1.26\gamma + 8 \pm 3$

thereafter subjecting the extruded filaments to a stretching operation to increase their length by 150 to 280% while they are still wet from the

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spinning bath, washing the filaments in a more dilute acid bath and allowing them to relax while still in the acid condition, and then winding and twisting the filaments thus obtained.

NICOLAS DRISCH.
ROLAND BREPSON.

REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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2,235,082	Parker	Mar. 18, 1941

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