

[54] **COATED REINFORCED PAPER AND
PROCESS FOR PREPARING SAME**

[72] Inventor: **Gianfranco Zilio**, Milan, Italy
[73] Assignee: **Montecatini Edison S.p.A.**, Milan, Italy
[22] Filed: **Mar. 18, 1970**
[21] Appl. No.: **20,846**

[30] **Foreign Application Priority Data**

Mar. 20, 1969 Italy.....14323 A/69

[52] U.S. Cl.....162/103, 162/104, 162/108,
162/124

[51] Int. Cl.....B32b 5/20, D21d 3/00

[58] Field of Search.....162/103, 104, 108, 124

[56]

References Cited

UNITED STATES PATENTS

3,129,466	4/1964	L'Hommedieu	162/108 X
2,148,490	2/1939	Millsbaugh	162/104
100,436	3/1870	Newton	162/108

Primary Examiner—Howard R. Caine

Attorney—P. Q. Peake and Stevens, Davis, Miller & Mosher

[57]

ABSTRACT

Coated reinforced papers having excellent mechanical and other characteristics are obtained by coating a net-like support obtained from a longitudinally oriented film of polypropylene consisting essentially of isotactic polypropylene with a composition formed of cellulosic or other fibers, mineral and/or organic fillers and/or pigments, and binders.

8 Claims, No Drawings

COATED REINFORCED PAPER AND PROCESS FOR PREPARING SAME

THE PRIOR ART

It is known to reinforce paper by coating it with compositions based on mineral pigments and binders, or by mixing the mineral pigments and binders with the cellulosic fibers before the paper is formed.

In general, the mineral pigments used include kaolin, titanium dioxide, talc, zinc sulphide, lithopone, calcium and magnesium oxides and carbonates, barium sulphate, and the like.

Binders used include, in general, natural, animal or vegetable glues or synthetic glues, in particular casein, gelatines and the like.

In order to obtain coated papers having particularly glossy surfaces, waxes and soaps, such as, for instance, carnauba wax, paraffins and the like, have been included in the coatings.

It is also known to prepare papers, wholly or partially, from synthetic fibers. For instance, in patents and patent applications originating with our group there are described papers and fibrous paper-like structures consisting of cellulosic fibers reinforced by very short fibers of a propylene polymer having a fine count.

THE PRESENT INVENTION

One object of this invention was to provide a new coated paper adapted to a variety of uses, and having excellent resistance to stresses of different kinds, such as to tearing, wetting, bursting and so on.

This and other objects of the invention are accomplished by this invention in accordance with which a composition consisting of cellulosic and/or other fibers, mineral and/or organic fillers, and binders is coated onto a support comprising a special fibrous polypropylenic material which is net-like and obtained from a longitudinally oriented film of polypropylene consisting essentially of isotactic macromolecules and having, preferably, a melt index comprised between 0.5 and 20.

The supports can be prepared by starting with a polypropylene film, which may be a blown film, orienting it in the longitudinal direction, and then converting it to a net-like structure. One preferred method for effecting the conversion consists in cutting up the oriented film, by means of rollers fitted with staggered pins. The rollers can be of the type specified in the published Japanese Patent Application of M. Niwa No. 22,048/64, filed May 15, 1962. The cutting up of the oriented polypropylene film can also be effected by means of other processes and devices of a similar kind. The oriented polypropylene film may be of any desired thickness as long as it can be converted in a net-like structure; convenient thickness have been found to be comprised between 0.001 and 0.4 mm for many uses, and preferably between 0.01 and 0.25 mm.

In the net-like structures which are particularly suitable for use in practicing this invention, the meshes of the net have sides which measure from 0.1 to 3.0 cm.

As indicated, the coating applied to the net-like structures to obtain the reinforced paper of the invention is formed of a conventional composition which is a mixture of cellulosic and/or other fibers, with mineral and/or organic pigments or fillers, and binding agents.

The coating is applied to the net-like polypropylene support by conventional devices, followed by drying and calendering of the coated support.

The following examples are given to illustrate the invention and are not intended to be limiting.

EXAMPLE 1

A. Preparation of support

A support having a net-like structure was prepared by extruding polypropylene consisting essentially of isotactic polypropylene (melt index, 2; residual ash content, 0.001 percent; residue of extraction with n-heptane, 97 percent), to form a film, stretching the film in the longitudinal direction, and cutting up the film longitudinally by means of a roller

fitted with staggered pins, to produce a net the meshes of which have sides of 0.2 cm.

B. Preparation of the coating

A coating paste was prepared by mixing together:

sulphite cellulose	3 kg.
barium sulphate	2 kg.
casein	0.5 kg.
water	50 l.

C. Preparation of the paper

Using conventional equipment, the coating paste was applied to both faces of the polypropylene net.

Thereupon the coated support was dried and calandered (with a resting time on the calender of 5 seconds and a temperature of the calander rollers of 155°C).

D. Characteristics

weight (g./sq.m.)	100
longitudinal breaking load (kg./sq.mm.)	1.5
longitudinal elongation at break (%)	20
resistance to longitudinal tearing (g./25μ)	27
bursting pressure (kg./sq.cm.)	1.7

EXAMPLE 2

A. Preparation of the support

A support having a net-like structure was prepared by extruding polypropylene consisting essentially of isotactic polypropylene (melt index 2; residual ash content 0.001 percent; residue of extraction with n-heptane, 97 percent), to obtain a film, stretching the film longitudinally, and cutting up the stretched film in a longitudinal direction by means of a roller fitted with pins arranged in a staggered position, such as to produce a net the meshes of which have sides of 0.4 cm.

B. Preparation of the coating

A coating paste was prepared by mixing together:

sulphite cellulose	2.8 kg.
kaolin	2.2 kg.
gelatine	0.5 kg.
water	50 l.

C. Preparation of the coated paper

By means of conventional equipment the net-like polypropylene support was coated on its two faces with the coating paste. Thereupon the thus treated support was dried and then passed through the calander (resting time on the calander: 10 seconds; temperature of calandering rollers: 150°C).

D. Characteristics

The coated paper thus obtained had the following characteristics:

weight (g./sq.mt)	100
longitudinal breaking load (kg./mm. ²)	1.4
longitudinal elongation at break (%)	22
longitudinal tear resistance (g./25μ)	25
bursting pressure (kg./sq.cm.)	1.5

EXAMPLE 3

A. Preparation of the support

A support with a net-like structure was prepared by extruding polypropylene consisting essentially of isotactic polypropylene (melt index, 0.5; residual ash content, 0.001 percent; residue of extraction with n-heptane, 97 percent) to obtain a film, by then subjecting the film to a longitudinal stretching, and finally by cutting up the film in a longitudinal direction by means of rollers fitted with staggered pins such as to produce a net the meshes of which have sides of 0.25 cm.

B. Preparation of the coating

There was prepared a coating paste by admixing the following substances:

sulphite cellulose	3.1 kg.
lithopone	1.9 kg.
gelatine	0.5 kg.
water	50 l.

C. Preparation of the coated paper

The support, consisting of the polypropylene net-structure, was coated with the coating paste by means of a conveyor belt permitting application of the coating to both faces of the support. Thereafter, the treated support was dried and then passed through a calander with a resting time in the calander of 5 seconds, and temperature of the calander-rollers of 155° C.

D. Characteristics

The coated paper thus obtained showed the following characteristics:

weight (g./sq.m.)	100
longitudinal breaking load (kg./mm. ²)	1.8
longitudinal elongation at break (%)	18
longitudinal tearing resistance (g./25μ)	28
bursting pressure (kg./sq.cm.)	1.6

The coating applied to the polypropylene net may contain fibers different from cellulosic fibers, in whole or in part. Artificial or synthetic fibers can be used, including viscose fibers and fibers of propylene homopolymers and copolymers such as fibers of heteroblock copolymers the macromolecules of which are made up of blocks of propylene units and blocks of units of other monomers, particularly ethylene and/or butene-1.

Polypropylene consisting essentially of isotactic polypropylene, that is of polypropylene made up of macromolecules having substantially isotactic structure, is disclosed in Natta et al. U.S. Pat. No. 3,112,300.

As will be apparent, changes in details may be made in practicing this invention without departing from its spirit. Therefore, we intend to include in the scope of the appended claims all modifications which will be obvious to those skilled in the art from the description and working examples given herein.

What is claimed is:

1. Coated paper and similar fibrous structures consisting of a net obtained from a longitudinally oriented film of

polypropylene and a coating on the net formed of a mixture of cellulosic fibers, at least one member selected from the group consisting of organic and mineral fillers and pigments, and at least one binder.

2. Coated paper and similar fibrous structures according to claim 1, characterized in that the net is obtained from a film of polypropylene consisting essentially of isotactic polypropylene and having a melt index of from 0.5 to 20, the net having meshes the sides of which are of the same or different length of from 0.1 to 3.0 cm.

3. Coated paper and similar fibrous structures according to claim 2, and further characterized in that the net is obtained from a blown film of polypropylene.

4. Coated paper and similar fibrous structures according to claim 2, further characterized in that the coating contains natural, artificial and synthetic fibers.

5. Coated paper and similar fibrous structures according to claim 2, further characterized in that the binder in the coating is at least one member selected from the group consisting of natural, animal, vegetable and synthetic glues.

6. Coated paper and similar fibrous structures according to claim 5, further characterized in that the binder is at least one member selected from the group consisting of casein and gelatine.

7. A process for preparing coated paper and similar fibrous structures which comprises applying, to both faces of a supporting net obtained from a longitudinally oriented film of polypropylene consisting essentially of isotactic polypropylene, a coating consisting of cellulosic fibers, at least one member selected from the group consisting of mineral and organic fillers and pigments, and at least one binder, drying the coated net, and passing it through a heated calander.

8. The process according to claim 7, characterized in that the calander is maintained at a temperature of from about 150° C to about 155° C.

* * * * *

40

45

50

55

60

65

70

75