

AUSTRALIA
PATENTS ACT 1990

659252 Section 29

PATENT REQUEST: STANDARD PATENT

We, being the person identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow.

Applicant: Thermore (Far East) Ltd

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Kowloon, Hong Kong

Nominated Person: Thermore (Far East) Ltd

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Invention Title: "METHOD FOR MAKING A CLOTH ARTICLE WADDING
AND AN IMPROVED STABILIZED FIBER WADDING
THEREBY"

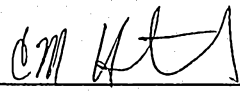
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BASIC CONVENTION APPLICATION(S) DETAILS			
Application Number	Country	Country Code	Date of Application
MI92A-01978	Italy	IT	11/08/1992

DATED this 3rd day of March, 1995.

THERMORE (FAR EAST) LTD
By its Patent Attorneys
R K MADDERN & ASSOCIATES


C M HUSTWICK

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AUSTRALIA
PATENTS ACT 1990

NOTICE OF ENTITLEMENT

We THERMORE (FAR EAST) LTD
of New East Ocean Centre, 9, Science Museum Road, Kowloon,
Hong Kong

being the applicant in respect of Application No. ,
state the following:-

1. The person nominated for the grant of the patent:
has entitlement from the actual inventors. The applicant
is the assignee of the actual inventors.
2. The person nominated for the grant of the patent:
is the applicant of the basic application listed on the
patent request form.

The basic application listed on the request form:
is the first application made in a Convention country in
respect of the invention.

DATED this 3rd day of December 1992.

THERMORE (FAR EAST) LTD
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WADDING THEREBY
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- (57) Claim

1. A method for making a wadding for cloth articles, characterized in that said method comprises the step of providing a synthetic fiber lap, spraying or coating on said lap a thermoplastic resin, heating said thermoplastic resin and synthetic fibers of said lap and subjecting said lap to one or more hot calendering steps, so as to provide a set thickness wadding web.

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

659252

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Invention title: "METHOD FOR MAKING A CLOTH ARTICLE WADDING
AND AN IMPROVED STABILIZED FIBER WADDING
THEREBY"

The following statement is a full description of this
invention, including the best method of performing it known to
us.

BACKGROUND OF THE INVENTION

The present invention relates to a method for making a cloth article wadding and an improved stabilized fiber wadding made thereby, which wadding has been specifically designed for making wadded cloth articles and quilts.

As is known, for making sports and winter cloth articles there are at present used wadding materials the texture of which is improved by means of needling processing operations which, on the other hand, are very expensive and which, moreover, do not provide the made cloth articles with a sufficient compactness and do not prevent fibers from projecting from the fabrics.

Moreover, the made cloth articles, because of the bulkiness of prior wadding materials are rather anti-aesthetic.

In addition, after having been subjected to a needling processing operation, prior wadding materials do not provide a high thermal insulation property with a reasonable thickness.

Because of the above mentioned reasons, prior wadding materials, even if subjected to the above mentioned needling operations, have not been broadly

used in the field of sports and winter cloth articles, boots, quilts and the like.

SUMMARY OF THE INVENTION

Accordingly, a main object of the present invention is to provide such a method for making cloth article wadding materials which provides a wadding having a comparatively reduced weight, a good mechanical strength against repeated washing operations and wear, within comparatively small thickness values.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a cloth article wadding which is provided with high indeformability features, even if it is subjected to strong mechanical stresses or repeated washing operations, either of the water or dry type.

Another object of the present invention is to provide such a cloth article wadding material which includes stabilized surface fibers not susceptible to project from the fabric to which the wadding is applied.

Yet another object of the present invention is to provide such an improved wadding for cloth articles which has very good thermal insulation properties.

In particular, the method according to the present invention comprises the step of providing, by using carding machines, a lap obtained by mixing polyester and/or synthetic and/or natural fibers with thermo-melting glues. The lap may, for example, include any of the following combinations of fibres:

- (i) polyester fibers,
- (ii) synthetic fibers,
- (iii) natural fibers,
- (iv) polyester and synthetic fibers,
- (v) polyester and natural fibers,
- (vi) synthetic and natural fibers, and
- (vii) polyester, synthetic and natural fibers.

The glues, as subjected to a hot calendering step and as suitably thermo-melted, will provide a very good and resilient structural film or mesh, which is obtained on one or more surfaces of the lap, also due to the surface thermo-melting effect of the synthetic fibers forming the thus obtained wadding.

In particular, the subject method provides the step of applying, on one or more surfaces of the lap, a film or a grid construction comprising a plurality of thermo-meltable adhesive granules, preferably of the so-called hot-melt type, which are provided for association with the fibers.

These adhesive films or granules can form grids exclusively on the outer layers of the lap, or also on the intermediate and/or innermost layers thereof.

The method according to the present invention further comprises the step of subjecting the thus processed lap to a hot calendering step, which hot



calendering step is performed between the suitably heated rollers of a calendering machine.

The above mentioned calendering rollers must be brought to an operation temperature from 80°C to 250°C.

The calendering step can be preceded by a fiber pre-heating step, said fibers being preferably made of a polyester material, or comprising other suitable synthetic fibers, so collected or gathered as to form the mentioned lap.

The above mentioned hot calendering step will provide a thermo-setting of the outer synthetic fibers of the lap, so as to prevent the fibers from projecting from the fabric.

Thus, a wadding material will be obtained which will have a much or more great thickness, depending on the duration of the hot calendering step, and depending on the pressure and temperature of the calendering rollers.

In this connection it should be also apparent that the thickness of the made wadding will also depend on the applied hot-melt resin and on the amount of the applied resin.

Obviously, the thickness of the starting lap

will change within a desired thickness value range, and the variation thereof can also be minimum, depending on the amount of the applied hot-melt substances or thermo-meltable materials, which are applied preferably by spraying, coating or the like, and the thickness will be also imposed by the processing temperature of the calendering rollers.

For obtaining the desired temperature, the calendering rollers will be provided with heating electric resistances, or they will be supplied with heating oils or other heating suitable liquids, the temperature of which will be controlled within a very accurate temperature range.

Alternatively, instead of applying a resin to polyester fibers, it is also possible to use polyester or other resin fibers coated by a thin film made of PVC or other thermoplastic materials, susceptible to melt at a temperature less than 150°C.

Accordingly, by causing a synthetic fiber lap to pass between the two heated rollers of a calendering machine, the fibers of said lap being coated by a thermomeltable resin mixture, a thermoinsulating material layer will be obtained, which will have a reduced thickness, and will be moreover provided,

on its two major surfaces, with a film or a perspiring grid structure, preventing the fibers from exiting the fabric.

5 The subject cloth article wadding has a high size stability, as well as a high structural stability, and provides a thermoinsulating material layer having a great strength against wear, mechanical stresses and repeated washing operations, both of the dry and of the water type.

10 The above mentioned and yet other objects of the present invention are achieved by subjecting to a spraying, coating or mixing step, by means of suitable thermoplastic resins, a synthetic fibre lap, by heating the above mentioned thermoplastic resins and synthetic fibers forming said lap, and
15 subjecting the thus processed lap to one or more hot calendering steps, so as to obtain a wadding having a set thickness.

20 These and other features of the method for making improved wadding materials to be used in the cloth article field, as well as of the reduced thickness wadding materials obtained by said method will become more apparent hereinafter from the following detailed disclosure of some preferred embodi-

ments thereof, which are illustrated, by way of an indicative, but not limitative, example, in the figures of the accompanying drawings wherein:

Figure 1 is a schematic side elevation view of a system for spraying thermomelttable resins and a calendering machine including top and bottom heated calendering rollers;

Figure 2 is an enlarged side view illustrating a lap of synthetic fibers subjected to a resin applying step and a calendering step, to reduce the thickness of the lap and provide a set reduced thickness wadding including stabilized fibers; and

Figure 3 illustrates a further variation for making a wadding material, obtained by calendering, at a reduced pressure, and accordingly, without substantially reducing its thickness, but also provided with stabilized outer fibers.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the number references of the figures of the accompanying drawings, the method for making a cloth article wadding, and the improved cloth article wadding obtained thereby, provides the step of making, by means of carding machines,

a lap 1, which is specifically made by mixing polyester and/or synthetic and/or natural fibers, as well as thermoformable resins or glues.

5 These glues or resins, in particular, are preferably sprayed by means of suitable spraying devices 4 and 5.

10 These spraying devices, preferably, are included in a continuous system, schematically illustrated in Figure 1, in which there is also shown a lap 1, preliminarily rolled-up, which is supplied from a roller 1 and is entrained between a pair of rollers or cylinders 2 and 3, suitably driven by a driving motor.

15 The lap 1 of synthetic fibers, as above disclosed, passes through a plurality of sprayers 4 and 5 or, alternatively, of coating rollers, which spray or coat on the lap polyester or synthetic and/or natural fibers suitable thermomelttable or hot-melt glues or resins.

20 The latter, which are of thermoplastic nature, are preferably caused to pass through a pre-heating and/or drying oven, comprising an oven tunnel or thermal diffusing devices 15 and 16, which subject the fibers to a pre-heating step, the fibers

being then caused to pass between the heated calendering rollers 6, 7, 8, 9, 10 and 11, the number of which can be selected depending on requirements and some of which can be suitably refrigerated.

5 Under the effect of one or more calendering operations, the thermomelttable glue or resin sprayed or coated synthetic material lap will assume a small thickness, as shown in Figure 2.

10 These glues and film, upon calendering, are suitably thermo-melted and will provide a very good film or grid, of perspiring and resilient nature, which will be formed on one or more surfaces of the wadding material, originated from the lap, and so as to prevent the fibers from exiting the fabric.

15 More specifically, the method according to the invention further provides a step of applying, on one or more surfaces of the lap, an adhesive thermomelttable film or granules, preferably of the hot-melt type.

20 These film or granules of adhesive material can impregnate either only the outer layers of the lap, or also the middle layers thereof.

 The subject method provides the further step of subjecting the thus formed lap to a hot ca-

lendering processing operation, by using the rollers of a calendering machine, said rollers being suitably heated to a set temperature.

The mentioned calendering rollers must be brought to an operation temperature from 80 to 250°C. It is also possible to use and stabilizing refrigerated rollers.

The above mentioned calendering operation can be preceded by a heating step for heating the polyester or other plastic material fibers, which latter step is performed in a portion of a heating tunnel or oven, shown in Figure 1, and including diffusing devices 15 and 16.

The above mentioned hot calendering step will cause the outer fibers of the lap to be thermoset.

Thus, a thermoinsulating wadding will be obtained which will have a small thickness as required.

In particular, the thickness will depend on the duration of the hot calendering processing, on the pressure and temperature of the calendering apparatus, as well as on the operating temperature of the pre-heating and/or drying oven, as indicated at

the reference numbers 15 and 16.

Also the hot-melt resin processing will affect the thickness of the obtained wadding.

As it should be apparent, the starting
5 thickness of the lap 1 will vary depending on the amount of hot-melt resin sprayed or coated, and depending on the temperature and pressure of the calendering rollers.

In particular, these rollers will be provided
10 with heating electrical resistances, or are heated by heat conductive oils or other liquids, the temperature of which will be controlled with a very high precision.

Alternatively, instead of processing by re-
15 sins the polyester fibers, it is also possible to use polyester fibers coated by a thin film made of PVC or other thermoplastic materials, having preferably a melting point less than 150°C.

Accordingly, by causing a lap 1 comprising
20 synthetic fibers coated by a thermomelttable glue mixture, to pass between two heated calendering rollers, a thermoinsulating material web will be obtained, having a small thickness, and being moreover provided, on the two major surfaces thereof, with a per-

spiring film or grid structure.

The latter will have a high size and structural stability, and will provide the thermoinsulating material web with a great resistance against wear, mechanical and washing stresses and so on.

In fact, a lot of outer synthetic fibers will be partially thermo-melted and firmly glued to one another, so as to prevent the single fibers forming the lap from disengaging from one another and projecting from the web.

In other words, the above disclosed hot calendering method allows the synthetic fibers to be firmly coupled to one another, in particular by a simple thermomelting of said fibers.

Thus, a fibrous material web will be obtained having very good properties and the fibers of which can not be frayed under outer stresses even of a comparatively great strength.

In this connection it should be apparent that the partial and surface thermomelting of the synthetic fibers, which form a set thickness lap, can occur either on a single surface or on the two outer surfaces of the wadding web.

Accordingly, the top and bottom calendering

rollers will be heated with the same temperature or different temperatures, so as to obtain, on the two main outer opposite surfaces of the web, a suitably different thermomelting.

5 If the wadding must be provided with a greater softness, then exclusively the top roller or bottom roller of the calendering apparatus can be heated, so as to reduce the web thickness in a very small degree.

10 As a further stabilization of the fibers must be obtained, it will be possible to spray on the lap preferably acrylic or polyurethane or vinyl resins, both in emulsion and in a solvent.

15 In particular, if an emulsion is used, then the latter will be an aqueous emulsion, whereas if a solution resin is used, then it is possible to use as solvents esters, ketones, dimethylformamides, aromatic hydrocarbons and the like.

20 As stated, the above mentioned resin layer is applied on the wadding lap 1 either by means of coating, spraying or by a transfer process.

 The acrylic resins are most suitable for a spraying application, whereas the vinyl resins are most suitable for a coating application upon drying,

which drying step is performed in an oven 15 and 16.

Thereinbelow there are illustrated, by way of a merely indicative example, some possible solutions of resins which are suitable for use in the present invention

ACRYLIC RESINS:

paraloid BZ2	ppm 60 (Rohm & Haas)
cellulose acetobutyrate	ppm 90 (Bayer)
toluene	ppm 200
ethylacetate	ppm 100
isobutylacetate	ppm 100
solid contents (total)	30%
viscosity	5-10,000 cP

If required, the solid contents and viscosity must be brought to values suitable for the application system.

VINYLIC RESINS:

Paraloid A30	ppm 100 (Rohm & Haas)
Vinylite VyHH	ppm 85 (Union Carbide)
cellulose acetobutyrate	ppm 5 (Bayer)
toluene	ppm 50
methylethylketone	ppm 150
ethylacetate	ppm 20
isobutylacetate	ppm 20

solid contents (total) 33%

viscosity 5-10,000 cP

POLYURETHANE RESINS

polyurethane resin ppm 35 (Larithane Ms 132)

5 (polyester, aromatic) (Larim S.P.A.)

dimethyl formamide ppm 64

solid contents (total) 39%

viscosity 80-120,000 cP

10 The wadding material is then calendered,
under the roller pairs 6, 7, 8, 9, 10 and 11, in or-
der to improve the aspect of the wadding web, at a
temperature of 80-250°C and with a calendering speed
of about 30 m/min.

15 Then, the subject improved wadding material
will be further subjected to one or more further
calendering processing steps, at like or increasing
temperatures, depending on the final thickness to
be obtained.

20 While the invention has been disclosed and
illustrated with reference to a preferred embodiment
thereof, it should be apparent that the disclosed
embodiments are susceptible to several modifications
and variations, all of which will come within the
spirit and scope of the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method for making a wadding for cloth articles, characterized in that said method comprises the step of providing a synthetic fiber lap, spraying or coating on said lap a thermoplastic resin, heating said thermoplastic resin and synthetic fibers of said lap and subjecting said lap to one or more hot calendering steps, so as to provide a set thickness wadding web.

2. A method for making a wadding web according to Claim 1, characterized in that said method comprises the step of forming, by a carding operation, a lap including polyester and/or synthetic and/or natural fibers on which are sprayed thermo-melting glue resinous materials.

3. A method according to Claim 1, characterized in that spraying means are applied to a continuously operating system, in which a rolled up lap is un-wound from a roller and is entrained between a pair of driven cylinders, driven by a driving motor, and wherein the un-wound lap is caused to pass through a plurality of spraying means or coated rollers which spray or coat thermo-meltable or hot melt glues on polyester or synthetic or natural fibers.

4. A method for making a cloth article wadding material, according to Claim 1, characterized in that said thermo-meltable resins are caused to pass through a pre-heating and/or drying oven, comprising an oven tunnel and thermal diffusing devices, adapted to pre-heat said fibers, which latter are caused to pass through a plurality of calendering rollers including hot rollers and refrigerated rollers.



5. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of performing one or more calendering operations, so as to cause said lap, as preliminarily sprayed, coated or mixed with a thermo-meltable glue, to assume a thin set thickness, whereas said glues and fibers, under a calendering operation, are thermo-molten so as to provide a resilient and perspiring film or grid arrangement formed on one or more surfaces of said wadding material obtained from said lap and so as to prevent the fibers from projecting from said wadding material.

6. A method for making a cloth article wadd-



ing, according to Claim 1, characterized in that
 said method comprises the step of applying, on at
 least a surface of said lap, a thermomeltable adhe-
 5 sive film or granules, preferably of the hot-melt
 type.

7. A method for making a cloth article wadd-
 ing material, according to Claim 6, characterized
 in that said adhesive film or granules impregnate
 outer layers of said lap as well as intermediate
 5 layers thereof.

8. A method for making a cloth article wadd-
 ing material, according to Claim 1, characterized
 in that said method comprises the step of subject-
 ing said lap to a hot calendering processing by using
 5 heated calendering rollers.

9. A method for making a cloth article wadd-
 ing material, according to Claim 8, characterized
 in that said calendering rollers are ^{brought} ~~brought~~ to an
 operating temperature from 80°C to 250°C.

10. A method for making a cloth article wadd-
 ing material, according to Claim 1, characterized
 in that said method comprises the step of process-
 ing said lap by stabilizing refrigerated calen-



5 dering rollers.

11. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises, before said calendering step, the step of heating said polyester or other thermoplastic material fibers, said heating step being performed in a heating tunnel or oven portion arranged downstream of a plurality of spraying or coating apparatus.

12. A method for making a cloth article wadding material, according to Claim 11, characterized in that said hot calendering step causes the outer fibers of said lap to be thermoset.

13. A method for making a cloth article wadding material, according to Claim 4, characterized in that said method comprises the step of making thin thickness wadding materials, the thickness of said materials depending on the duration of the hot calendering step, on the pressure and temperature of the calendering rollers, as well as on the operating temperature of said pre-heating and/or drying oven.

14. A method for making a cloth article



wadding material, according to Claim 1, characterized in that said lap has a starting thickness which depends on the amount of the sprayed or added thermomeltable substances and on the temperature and pressure of said calendering rollers.

15. A method for making a cloth article wadding material, according to Claim 1, characterized in that said calendering rollers comprise heating electrical resistances or are supplied with heating oils or other heating liquids, the temperature of which is controlled by thermostatic means.

16. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of using polyester or other plastic material fibers, coated by a thin film of PVC or other thermoplastic materials melting at a temperature less than 150°C.

17. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of causing a lap, comprising synthetic fibers added with a thermomeltable glue mixture, to pass through two heated cylinders or rollers of a calendering apparatus, so

as to provide on said lap a thermoinsulating material layer of a set thickness.

18. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of thermomelting and glueing, by means of a calendering apparatus, a plurality of outer synthetic fibers so as to prevent the fibers in said lap from disengaging from one another and projecting from the lap.

19. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of partially surface thermomelting the synthetic fibers forming said lap, either on an outer surface or the two outer surfaces of said lap, by means of top and bottom calendering rollers heated to the same temperature or different temperatures, so as to provide on said two outer surfaces a suitably different thermomelting.

20. A method for making a cloth article wadding material, according to Claim 1, characterized in that if a greater softness wadding material is to be made, then said method comprises the step of heating only the top roller or only the bottom

roller of the calendering apparatus, so as to reduce, according to a minimum degree, the thickness of said lap.

21. A method for making a cloth article wadding material, according to Claim 1, characterized in that, as a greatly stabilized lap must be formed, then said method comprises the step of spraying on the outer surface of said lap emulsion or solvent acrylic resins or polyurethane resins or polyvinyl resins.

22. A method for making a cloth article wadding material, according to Claim 1, characterized in that, as in said method there are used emulsion resins, then said emulsion resins are aqueous phase emulsion resins, whereas as in said method there are used solution resins, then as a solvent material for said solution resins there are used esters, ketones, dimethylformamides, aromatic hydrocarbons and the like.

23. A method for making a cloth article wadding material, according to Claim 1, characterized in that said resin layer is applied on said wadding lap by means of a coating, a spraying, or a transfer step.

24. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of applying acrylic resins by means of a spraying operation, applying vinyl resin by means of a coating operation, said applying steps being performed after an oven drying step.

25. A method for making a cloth article wadding material, according to Claim 1, characterized in that said method comprises the step of using acrylic resin having the following formulation:

ACRYLIC RESINS:

paraloid BZ2	ppm 60 (Rohm & Haas)
cellulose acetobutyrate	ppm 90 (Bayer)
toluene	ppm 200
ethylacetate	ppm 100
isobutylacetate	ppm 100
solid contents (total)	30%
viscosity	5-10,000 cP

26. A method according to Claim 1, characterized in that said method comprises the step of using vinyl resins having the following formulation:

5 VINYLIC RESINS:

Paraloid A30	ppm 100 (Rohm & Haas)
Vynlite VyHH	ppm 85 (Union Carbide)
cellulose acetobutyrate	ppm 5 (Bayer)
toluene	ppm 50
10 methylethylketone	ppm 150
ethylacetate	ppm 20
isobutylacetate	ppm 20
solid contents (total)	33%
viscosity	5-10,000 cP

27. A method according to Claim 1, characterized in that said method comprises the step of using polyurethane resins having the following formulation:

5 POLYURETHANE RESINS

polyurethane resin	ppm 35 (Larithane Ms 132)
(polyester, aromatic)	(Larim S.P.A.)
dimethyl formamide	ppm 64
solid contents (total)	39%
10 viscosity	80-120,000 cP

28. A method, according to Claim 1, characterized in that said wadding material is calendered by heated roller pairs and at least a refrigerated roller, said heated roller pairs including rollers

having a temperature from 80 to 200°C, the calendering step being performed with a calendering speed of about 30 m/minute.

29. A method, according to Claim 1, characterized in that said wadding material is subjected to one or more calendering operations, at like or increasing temperatures, depending on the thickness reduction to be obtained.

30. A method, according to Claim 1, characterized in that said method provides a wadding web including a lap of thermomelttable synthetic fibers, surface coated by a thermoplastic material film.

31. An improved cloth article wadding, obtained by a method according to Claim 1, characterized in that said wadding material comprises a thermoplastic fiber lap having, on at least one of the two outer surfaces thereof, an air permeable film and/or grid arrangement, said film including individual fibers which are directly thermo-molten to one another, said fibers or yarns being mutually connected by thermomelttable resins adapted to stabilize said fibers and prevent said fibers from projecting from said lap.

32. A method according to any one of Claims 1 to 30, substantially as described herein.

33. An improved cloth article wadding according to Claim 31, substantially as described herein.

Dated this 3rd day of March, 1995.

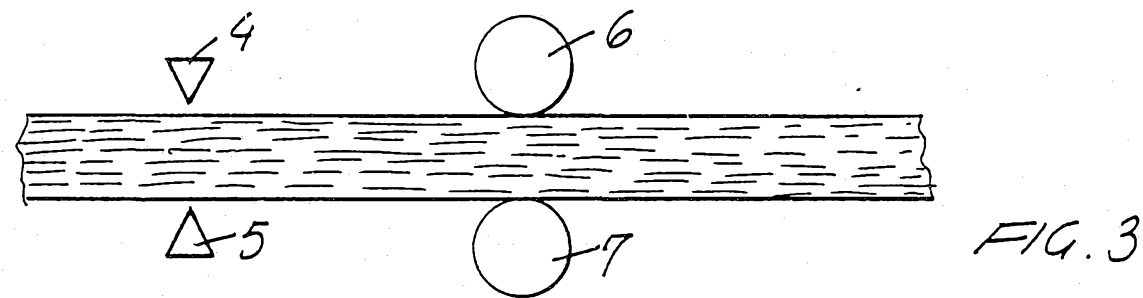
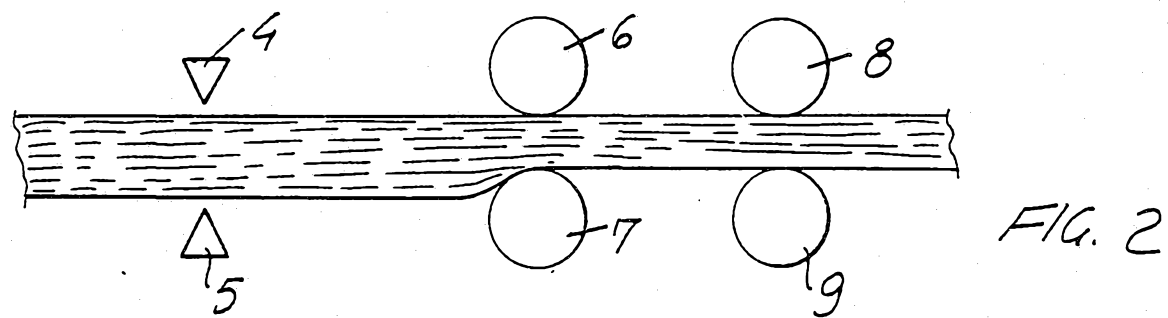
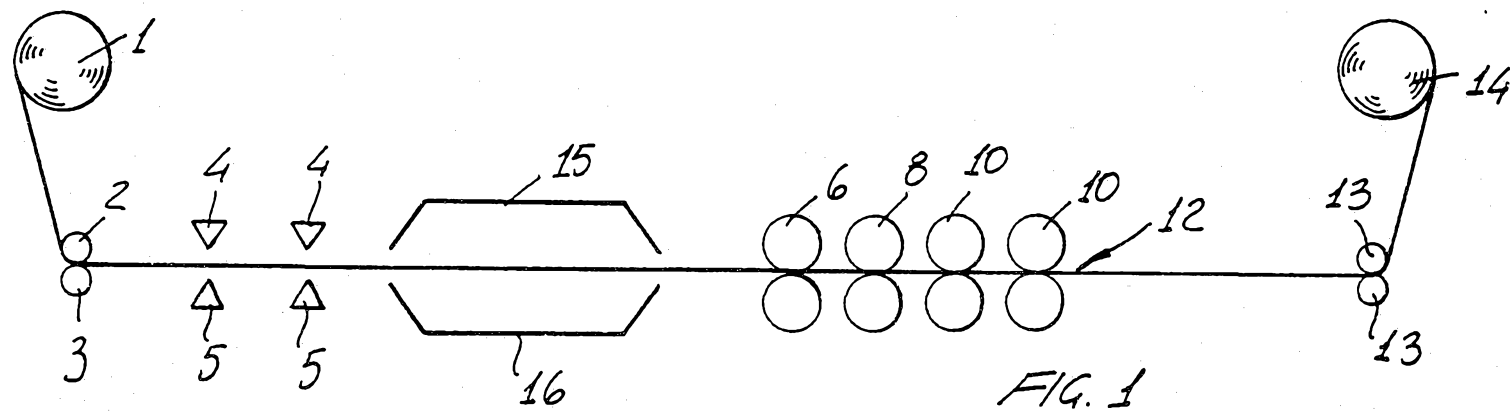
THERMORE (FAR EAST) LTD
By its Patent Attorneys
R. K. MADDERN & ASSOCIATES



A handwritten signature in dark ink, appearing to be "C. M. Hunter".

ABSTRACT

A method for making a wadding for cloth articles, characterized in that said method comprises the step of providing a synthetic fiber lap (1), spraying or coating on said lap (1) a thermoplastic resin, heating said thermoplastic resin and synthetic fibers of said lap and subjecting said lap to one or more hot calendering steps, so as to provide a set thickness wadding web.



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