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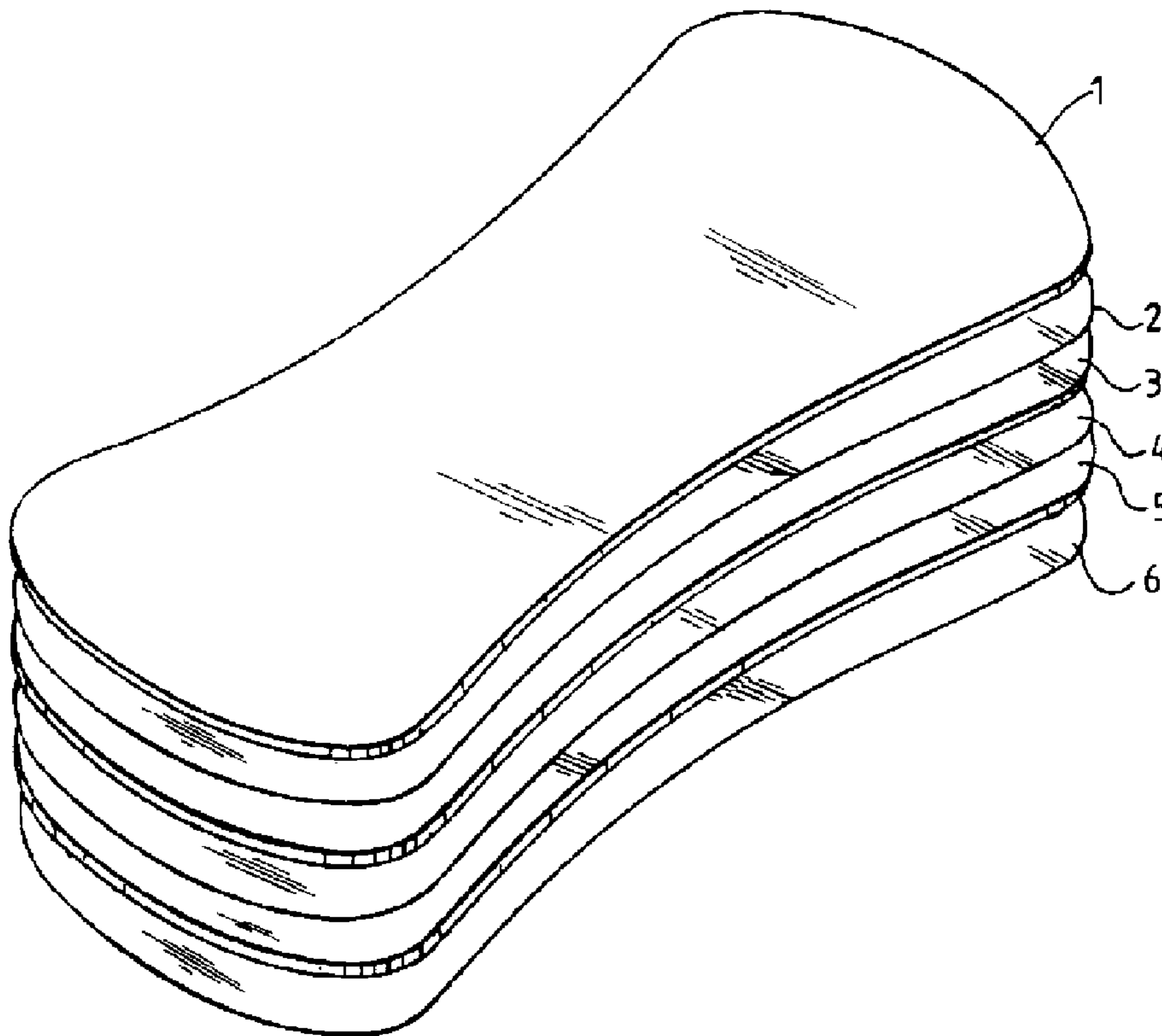
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(54) Titre : ARTICLE SANITAIRE ABSORBANT

(54) Title: ABSORBENT SANITARY ARTICLE



(57) Abrégé/Abstract:

A fluid absorbent sanitary article, such as a pantiliner, is provided for use with a panty garment. The liner is attachable to the panty crotch by means of adhesive. The liner is elastic in at least one direction, has a thickness of less than 2mm, and is flexible. The liner is composed of a layer of absorbent material joined by an adhesive connection face-to-face with a backsheet, and optionally by a further adhesive connection to a topsheet. At least one of the components of the pantiliner is elastic, any inelastic components being stretchable. Preferably, at least one of the adhesive connections is elastic. The liner has a low pad set.

ABSTRACTAbsorbent sanitary article

A fluid absorbent sanitary article, such as a pantiliner, is provided for use with a panty garment. The liner is attachable to the panty crotch by means of adhesive. The liner is elastic in at least one direction, has a thickness of less than 2mm, and is flexible. The liner is composed of a layer of absorbent material joined by an adhesive connection face-to-face with a backsheet, and optionally by a further adhesive connection to a topsheet. At least one of the components of the pantiliner is elastic, any inelastic components being stretchable. Preferably, at least one of the adhesive connections is elastic. The liner has a low pad set.

Absorbent Sanitary Article

This invention relates to an absorbent sanitary article. It is particularly concerned with pantiliners, and will be so described, though it has application to other sanitary articles, for example sanitary napkins, incontinence products, and so forth.

Pantiliners on the market tend to be less than ideal in terms of the comfort with which they are worn. One reason for this is that they tend to bunch as a result of the movements of the user's body. Not only does this result in the user experiencing discomfort, but it also means that the pantiliner absorbs less fluid than it would otherwise absorb, as a result of the pantiliner being in inadequate contact with the user.

It is an object of an aspect of the present invention to provide a pantiliner which overcomes, or at least reduces, the above problems, and which is suitable for use in absorbing light fluid flows which may occur between menstrual periods. Such fluid flows include both vaginal discharge and urine. The construction of the pantiliner is to be such that it is able to move with the panty in which it is held, acting, so to speak, as an extension of the panty itself.

An aspect of this invention is as follows:

A multi-layer, fluid-absorbent sanitary article for use with a panty garment having an interior crotch area, the article having means of attachment to said crotch area, the article being flexible, and elastic in at least one direction, the elasticity being such that in said at least one direction the loading force required to extend a sample of an elastic material used in a layer of the article 1 inch in width to 125% of an initial length is not more than 400g, and the residual stretch after the sample has been stretched three times to 125% of its initial length and relaxed after each stretch is not more than 15% of its initial length.

The said loading force is preferably not more than 250g, more preferably not more than 150g, and still more preferably not more than 100g, and is preferably at least 60g. The pad set is preferably not more than 12%, and preferably not more than 8%.

Preferably, the liner has a flexibility, as measured according to ASTM Standard D 1388-64, of not more than 5000 mg.cm, preferably not more than 3000 mg.cm, though the flexibility value is preferably at least 500 mg.cm. The pantiliner preferably has a thickness under a pressure of 20g/cm², of less than 2mm, and more preferably in the range of from 0.5 to 1.6 mm.

The pantiliner of the invention will normally be generally elongate in shape, preferably having the hourglass shape which has now become widely accepted for such articles. The pantiliner may have elasticity in only one direction, in which case that direction is preferably transverse to the length of the pantiliner,

or it may have elasticity in both the transverse and longitudinal directions.

There have been proposals in the prior art for pantiliners and catamenial articles which have elastic properties, and in this connection attention is directed to WO93/01785, US Patent 4166464, US Patent 4389211, EP-A-160517 and EP-A-450541. None, however, discloses the combination of properties which is set out above and which renders the article of the present invention so particularly suitable for its intended purpose.

The pantiliner of the present invention is preferably intended to absorb, in use, up to about 2g of fluid. For this level of discharge it is normally constructed to have an absorbent capacity of at least about 4 to 5 ml. This over- capacity is provided to take into account the fact that the fluid absorbed may all remain in the central region of the pantiliner, with the outer regions thereof remaining completely or substantially dry. This is likely to occur given the low flow rates and flow volumes which are involved.

The pantiliner according to the invention is made as a multilayer structure, at least one of these layers being fluid- absorbent. Each layer is adhered to the layer or layers immediately adjacent thereto. It has been found that since the article does not have to handle large fluid volumes it is unnecessary for the fluid-absorbent layer or layers to be completely enclosed between a topsheet and a backsheet, a

construction which is often conventionally adopted to prevent fluid leaking from the absorbent material through the edges thereof. In the case of the article of the present invention, fluid almost never reaches those edges, and it is therefore of no consequence if those edges are exposed to the outside.

Accordingly, it is possible for the pantiliner of the present invention to consist of a plurality of layers of identical or substantially identical size and shape positioned in alignment with one another. This is shown in Figure 1 of the accompanying drawings, which is an exploded isometric view, and in which there is shown a topsheet layer 1, adhesive 2, an absorbent core 3, adhesive 4, a backsheet 5, and adhesive 6. The nature and purpose of the various layers is discussed further below. The use of such a structure means that it is possible to produce a plurality of pantiliners by cutting them from overlaid sheets of the materials required, without the alignment problems which exist where a topsheet and a backsheet have to be arranged to form an envelope completely enclosing an absorbent core.

In order to provide the pantiliner with the necessary elastic properties, it is necessary in the case of a multilayer article for at least one of the layers to be elastic, though all the layers must be stretchable. It is found that the article as a whole has the necessary elastic properties even if some, but not all, of the layers are stretchable but not elastic.

In a further aspect thereof, the invention provides an elastic, fluid-absorbent liner for use with a panty garment, the liner having means of attachment to the interior of the garment in the crotch area thereof, the liner comprising a plurality of layers joined in face-to-face relationship with one another by means of at least one adhesive connection, the said adhesive connection or one of said adhesive connections, being provided by an elastic adhesive, whereby to provide, at least in part, the elasticity of the liner.

In another aspect, the invention provides a fluid-absorbent liner for use with a panty garment, which comprises a layer of absorbent material exposed to the exterior on one face thereof, and joined in face-to-face relationship on its opposite face, by means of an adhesive connection, with a backsheet of water-impermeable material.

In yet another aspect, the invention provides an elastic, fluid-absorbent sanitary article for use with a panty garment, the article having means of attachment to the interior of the garment in the crotch area thereof, the article comprising a plurality of layers joined in face-to-face relationship with one another by means of at least one adhesive connection, the said adhesive connection or one of said adhesive connections, being provided by an elastic adhesive, whereby to provide, at least in part, the elasticity of the article.

In still another aspect the invention provides a fluid-absorbent sanitary article for use with a panty garment, which comprises a layer of absorbent material exposed to the exterior on one face thereof, and joined in face-to-face relationship on its opposite face, by means of an adhesive connection, with a backsheet of water-impermeable material.

The invention also provides a fluid-absorbing sanitary article, wherein the layers thereof, and the connections therebetween, are such as to render it permeable to water vapour and other gases.

Additionally, the invention provides a fluid-absorbing sanitary article for use with a cotton panty garment, the article having means for removably attaching it to the interior of the panty garment in the crotch area thereof, wherein the stress-strain characteristics of the said article correspond to a substantial extent to those of the said crotch area.

In accordance with one embodiment of the present invention, there is provided an elastic, fluid-absorbent sanitary article for use with a panty garment having an interior crotch area, the article being elastic in at least one direction and having means of attachment to the crotch area, the article comprising a backsheet layer of water-impermeable material, and a layer of absorbent material having a first, exteriorly exposed, face thereof and a second face joined in face-to-face relationship by means of an adhesive connection provided by an elastic adhesive, with the backsheet layer.

In accordance with another embodiment of the present invention, there is provided an elastic, fluid-absorbent sanitary article for use with a panty garment having an

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interior crotch area, the article being elastic in at least one direction and having means of attachment to the crotch area, the article comprising a topsheet layer of water permeable material, a backsheet layer of water-impermeable material, and a layer of absorbent material sandwiched between the topsheet layer and the backsheet layer, the absorbent material being joined to the backsheet layer and topsheet layer by adhesive connections at least one of which is provided by an elastic adhesive.

The following Table 1 sets out the function of the layers in a multilayer construction which consists successively, as considered from the body side of the user outwards, of six layers.

TABLE 1

1. Topsheet	Dry feeling/skin friendly
2. Topsheet-to core adhesive	Material adhesion
3. Absorbent core	Absorbency

4. Core-to-backsheet adhesive Material
adhesion/optionally air & vapour permeability
5. Backsheet Liquid impermeability
/optionally air & vapour permeability
6. Backsheet-to-panty adhesive Intimate panty
bonding

A description will now be given of examples of materials which can be used for the above layers. It should be noted at this point, however, that constructions are possible which use fewer layers, or more layers, than those just recited, and the materials mentioned below may be suitable for the layers of such constructions.

Topsheet

For a topsheet which is stretchable but not elastic, one suitable material is a perforated or apertured film which has been ring-rolled to provide it with a degree of extensibility. One suitable film is described in US Patent 4463045, and suitable processes for ring-rolling such a film are described in US Patents 4107364, 4834741, 5143679, 5156793 and 5167897. Ring-rolling has the effect of producing corrugations in the topsheet, and the ring-rolled topsheet has an axis of stretching which is perpendicular to the direction of the fold lines. The fold lines can all run in a single direction (i.e. parallel to one another), or in more

than one direction (for example in two mutually parallel directions), and the sheet correspondingly has one or more axes along which it can be stretched.

Another possible material which can be ring-rolled to produce a stretchable topsheet is that described in EP-A-207904.

For a topsheet which is to be elastic rather than just stretchable, one possible material which can be used is that described in our copending Italian Patent Application IT 1,268,105. Further details of that material are given below in relation to Product 3.

Absorbent Core

For a core which is to be stretchable but not elastic, one material which can be used is a hydrophilic, stretchable non-woven material. One such material is an apertured, spunlaced material having a basis weight of 50 g/m² and consisting of 70% rayon, 30% polyethylene terephthalate (PET).

Another stretchable, substantially non-elastic material which can be used is a tissue paper consisting of conventionally CD (cross direction) creped tissue. For example, a wet laid tissue paper can be used that has been mechanically CD creped and has a weight of 47g/m². Such a creped tissue is available from

Aticarta, Rome, Italy. This material does have some elasticity when dry. However, it loses this when wet, and, furthermore the amount of elasticity is only small. Accordingly, it is not suitable as the sole elastic component in a construction according to the invention, all the other components being non-elastic.

The construction must include at least one other component which is significantly elastic, and which retains that elasticity even when wet.

For an absorbent core which is elastic, various materials can be used. One class of suitable cores consists of cores which include materials which are inherently elastic. For example, the core can be made of a fluff mixed with a net of elastic hot melt adhesive, or a spunlaced nonwoven with an undernet of elastic hot melt. The term "net" refers to a 3-dimensional structure made of interlocked fibres of elastic hot melt adhesive mixed with cellulose fibres during the formation of the core. The term "undernet" refers to a situation where the elastic hot melt is applied as a filament, e.g. in spiral pattern, on a substrate such as a spunlaced nonwoven. Both types of structures may be carried out with equipment known in the art. Thus, "nets", of elastic hot melt fibres can be made with melt blowing equipment, e.g. the Flexi-Melt™ apparatus by Nordson Corporation, Georgia, USA, and a "Spyro"™ type applicator such as the Nordson Series 6000™ by Nordson Corporation may be used to make "undernets".

A second class of suitable cores consists of cores which have been mechanically treated to make them elastic. For example, the core can be a tissue which has been creped in CD (cross direction) or MD (machine direction), or an absorbing web in which a large number of short slits have been formed.

Backsheet

This must be a hydrophobic material, since its function is to prevent body fluids, which are largely aqueous, reaching, and therefore soiling, the user's clothes.

For a stretchable but non-elastic backsheet, one material can be used is a hydrophobic, stretchable, spun laced, non-woven material having a basis weight of from about 30 to 40 g/m², formed of polyethylene terephthalate or polypropylene fibres. This material is breathable, i.e. permeable to water vapour and other gases.

For an elastic backsheet, one material which can be used is an elastic film sold under the trade mark EXX500 by Exxon Corporation. The material of this film is formed from an elastomeric base composition consisting of a styrene block copolymer. However, this material is not breathable. Another material which can be used for an elastic backsheet is a plastic film that has been subjected to a process that provides it with elastic-like properties without attaching elastic strands to the film, and may

for example comprise a formed film made in accordance with US Patents 4342314 (Radel et al) and 4463045 (Ahr et al).

Adhesive for topsheet/core and core/backsheet

These two adhesives may be the same as one another, though they may alternatively be different. A suitable elastomeric adhesive, which is a hot melt adhesive, is described in our copending Italian Application IT 1,268,104. Briefly, that application describes an elastomeric hot melt adhesive composition comprising at least one thermoplastic elastomer and at least one tackifying resin, the thermoplastic elastomer(s) being a styrene/butadiene/styrene (SBS) copolymer or a blend of styrene/butadiene/styrene with styrene/isoprene/styrene (SIS) in which SIS is present in an amount equal to or less than 50% by weight of the total block copolymer, the composition being characterised in that:

- (a) it is capable of bonding, when applied from the molten state, plastic and/or cellulosic materials with a 90° peel force not lower than 0.5 N/cm;
- (b) it has a tensile strength retention after 50 cycles of at least 40%;
- (c) it has a viscosity of 120,000 cps or less at 180°C and an applied shear of 80 sec⁻¹.

To adhere the topsheet to the core, the adhesive is applied in discrete areas only, so that the fluid entering the pantiliner through the topsheet is able to pass into the core. For example, the adhesive may be applied in lines at a rate of 0.06g/linear m. Other patterns in which the adhesive can be applied include free-window coating (i.e. coating only part of the surface, so as to leave at least one adhesive-free zone, or window, spaced from the outer edge of the topsheet and core), and full coating with a low enough basis weight (maximum 15 g/m²) that liquid still gets through to the core.

To adhere the core to the backsheet, a continuous layer of adhesive may be applied if desired, for example at a rate of 20g/m², though it may be applied only in discrete areas, if that is preferred, for example for reasons of economy.

Backsheet-to-panty adhesive

An adhesive used for this purpose is referred to for short as a PFA (panty fastening adhesive). One suitable PFA is that supplied under the trade name SAVARE LA 203 by Savarè of Milan, Italy. This adhesive is based on an SEBS (styrene-ethylene-butylene-styrene) copolymer and has a softening point of 65°C according to the method of ASTM E28-67.

The PFA is preferably applied in a pattern as defined in our copending Italian Patent Application

IT 1,268,620. Briefly, those applications describe adhesive patterns in which the adhesive is applied to at least one surface region adjacent the periphery of the article, and patterns in which the adhesive is stretchable and may be applied over the whole, or at least a major part of the surface of the article.

A number of embodiments of pantiliner according to the invention are described below. Before doing so, however, a description will be given of the way in which certain relevant parameters are measured. These are stretch, elasticity, wet through, flexibility and thickness. Details will also be given of the synthetic urine used in some of the tests.

Load

The details of this test are set out later in this specification.

Elasticity/Pad set

The details of this test are set out later in this specification.

Wet through

This test measures the amount of liquid (synthetic urine) which will pass through a product which is permeable to air and water vapour, but substantially impermeable to liquid, under certain conditions. The test is carried out as follows:

- (a) Place the product on a sheet of blotting paper (220 g/m²), add 2 ml of the liquid in the centre of the product at a flow rate of approximately 1 ml/10sec, and leave for 2 minutes.
- (b) Place on the product a 3000 g weight having a lower surface 100 x 50 mm, whereby to exert on the product a pressure of 60 g/cm² over the liquid acquisition zone thereof.
- (c) Keep the weight on the product for 15 seconds.
- (d) Remove the weight.
- (e) Ascertain whether any liquid has been absorbed by the blotting paper.
- (f) Repeat operations (b) to (e) nine times with a 15 second pause after each cycle.

Flexibility

This is measured by the test laid down in ASTM Standard D 1388-64 for measuring the stiffness of fabrics. For full details reference should be made to that Standard. In brief, however, what is done is to cause a strip of the material being tested to project over an edge of a platform, until the tip of the test specimen

is depressed under its own weight to the point where the line joining the tip to the edge of the platform makes an angle with the horizontal of 41.5° . The length of the projecting portion is taken as the overhang length O , and the bending length c is calculated as $O/2$. The flexural rigidity G is then calculated from this as:

$$G = Wxc^3 \text{ mg.cm}$$

This formula assumes that the weight is W in mg/cm^2 .

Thickness

The thickness of the pantiliners is measured under a pressure of 20 g/cm^2 (0.2845 psi).

Synthetic urine

The synthetic urine used was a solution in distilled water of the following salts (in weight %): Urea 2%, sodium chloride 0.9%, magnesium sulfate (heptahydrate) 0.11%, calcium chloride 0.06%.

Details will now be given of a number of embodiments of the invention. In so doing, the nomenclature of Table 1 above will be used to identify the various layers of the products. It will, however, be noted that in Product 10 there are two adjacent absorbent core layers, of the same materials as one another but in different basis weights, which together give the desired total basis weight (120 g/m^2) for the core.

All the embodiments were hourglass in shape and had a length of 153 mm, a maximum width of 67 mm and a minimum width of 51 mm with all layers being of the same size and shape, except in the case of Product 10. The structures of Product 2 is shown in exploded isometric view in Figure 1 of the accompanying drawings. In the case of Product 10, the Absorbent Core (1) was smaller in plan than the pad, having a length of 143 mm, a maximum width of 57 mm and a minimum width of 41 mm, but Absorbent Core (2) was the same size as the pad. The construction of Product 10 is shown in Figure 2a, which is a plan view, and Figure 2b, which is a cross-section taken on line A-A in Figure 2a. In this construction, both absorbent corers are hourglass in shape. A layer of continuous adhesive bonds the two together, and may also be sufficient to bond the composite core to the topsheet, though an optional discontinuous thin adhesive layer may be provided between Absorbent Core (1) and the topsheet. Absorbent Core (2) is bonded to the backsheet by lines of adhesive.

Product 1

Topsheet:	None	
Topsheet/core adhesive:	None	
Absorbent core:	Hydrophilic,	spunlaced,
nonwoven		material;
50g/m ² , 70% rayon, 30% PET		
	(stretchable)	

Core/backsheet adhesive: Hot-melt, elastomeric glue⁽¹⁾,
20 g/m²

(elastic)

Backsheet: Hydrophobic, spunlaced,
nonwoven material;
30g/m², 100% PET

(stretchable)

PFA: Holt-melt Savarè LA 203, 24
g/m²

Footnote (1): glue according to the patent application identified above under the heading "Adhesive for topsheet/core and core/backsheet".

As will be seen, Product 1 has no topsheet, and accordingly the term "absorbent core" is to be understood in this context as meaning simply an absorbent member, and is not to be understood as carrying an implication that the member concerned is sandwiched between other members. Despite the absence of a topsheet, the product appears to be acceptable to users, in view of the relatively low volume of fluid which the product is to handle. The absence of a topsheet has the result, which can be seen from the results which are set out below, of making the product highly flexible.

Product 2

Topsheet: Ring-rolled, apertured or
perforated film

(stretchable)

Topsheet/core adhesive: Hot-Melt glue lines, Savarè PM
17, 0.06 g/liner m.

(stretchable)

Absorbent core: Hydrophilic, spunlaced,
nonwoven material; 50 g/m², 70% Rayon 30% PET

(stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1);
20 g/m²

(elastic)

Backsheet: Hydrophobic, spunlaced,
nonwoven material; 30 g/m², 100% PET

(stretchable)

PFA: Hot-Melt Savarè LA203, 24 g/m²

Product 3

Topsheet: Hydrophilic Elastic Perforated
Coverstock, 62 g/m² (2)

(elastic)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
17, 5 g/m²

(stretchable)

Absorbent Core: Creped tissue, 47 g/m²

(stretchable)

Core/backsheet adhesive: Hot-Melt, coated glue, Savarè
PM 17, 20 g/m²

(stretchable)

Backsheet: Elastic film, EXX 500™ 38 g/m² (3)

(3)

(elastic)

PFA:

Hot-Melt Savarè LA203, 24 g/m²

Footnote (2): The material used was as described in our copending Italian Patent Application IT 1,268,105.

Briefly, that describes a covering structure for covering an absorbent body of an absorbent sanitary article, the said structure having perforations which extend therethrough and being elastic in at least one direction, the structure comprising:

(a) an upper layer intended to face outwardly of the absorbent body and comprising a non-woven fibrous material;

(b) an intermediate layer comprising an elastic film;
and

(c) a lower layer intended to face inwardly towards the absorbent body and comprising a non-woven fibrous material; the upper and lower layers being connected to the intermediate layer substantially only around the perimeters of the perforations.

Footnote (3): EXX500™ is available from Exxon Corporation.

Product 4

Topsheet:

Hydrophilic Elastic Perforated
Coverstock, 62 g/m² (2)
(elastic)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
17, 5 g/m²

(stretchable)

Absorbent Core: Hydrophilic, spunlaced,
nonwoven material, 50 g/m², 70% Rayon 30% PET

(stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1),
20 g/m²

(elastic)

Backsheet: Hydrophobic, spunlaced,
nonwoven material; 40 g/m², 100% PET

(stretchable)

PFA: Hot-Melt Savarè LA203, 24 g/m²

Product 5

Topsheet: Hydrophilic Elastic Perforated
Coverstock, 62 g/m² (2)

(elastic)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
17, 5 g/m²

(stretchable)

Absorbent Core: Hydrophilic, spunlaced,
nonwoven material, 50 g/m², 70% Rayon 30% PP

(polypropylene)

(stretchable)

Core/backsheet adhesive: Hot-Melt coated glue, Savarè PM
17, 20 g/m²

(stretchable)

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Backsheet: Elastic film, EXX 500 38 g/m²

(3)

(elastic)

PFA: Hot-Melt Savarè LA203, 24 g/m²

Product 6

Topsheet: Hydrophilic, spunlaced,
nonwoven material, 30 g/m², 70%
Rayon 30% PET

(stretchable)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
17, 5 g/m²

(stretchable)

Absorbent Core: Creped tissue, 47 g/m²

(stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1),
20 g/m²

(elastic)

Backsheet: Hydrophobic, spunlaced,
nonwoven material, 40 g/m², PET

(stretchable)

PFA: Hot-Melt Savarè LA203, 24 g/m²

Product 7

Topsheet: Ring-rolled, apertured or
perforated film

(stretchable)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
17, 10 g/m²

(stretchable)

Absorbent Core: Hydrophilic, spunlaced,
 nonwoven material, 70 g/m², 70% Rayon 30% PP
 (stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1),
 20 g/m²
 (elastic)

Backsheet: Hydrophobic, spunlaced,
 nonwoven material, 40 g/m², 100% PP
 (stretchable)

PFA: Hot-Melt Savarè LA203, 24 g/m²

Product 8

Topsheet: Hydrophilic Elastic Perforated
 Coverstock, 62 g/m² (2)
 (elastic)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
 17, 10g/m²
 (stretchable)

Absorbent Core: Hydrophilic, spunlaced,
 nonwoven material, 70g/m², 70% Rayon 30% PP
 (stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1),
 20g/m²
 (elastic)

Backsheet: Hydrophobic, spunlaced,
 nonwoven material, 40g/m², 100% PP
 (stretchable)

PFA: Hot-Melt Savarè LA203, 24g/m²

Product 9

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Topsheet: None

Topsheet/core adhesive: None

Absorbent Core: Hydrophilic, spunlaced,
nonwoven material, 70g/m^2 , 70% Rayon 30% PP
(stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1),
 20g/m^2
(elastic)

Backsheet: Hydrophobic, spunlaced,
nonwoven material, 40g/m^2 , 100% PP
(stretchable)

PFA: Hot-Melt Savarè LA203, 24g/m^2

Like Product 1, this has no topsheet, and the same
comments apply as regards this fact as are set out above
in relation to Product 1.

Product 10

Topsheet: Ring-rolled, apertured or
perforated film

(stretchable)

Topsheet/core adhesive: Hot-Melt coated glue, Savarè PM
17, 10g/m²

(stretchable)

Absorbent Core (1): Hydrophilic, spunlaced,
nonwoven material, 70g/m², 70% Rayon 30% PP

(stretchable)

Absorbent Core (2): Hydrophilic, spunlaced,
nonwoven material, 50g/m², 70% Rayon 30% PET

(stretchable)

Core/backsheet adhesive: Hot-Melt, elastomeric glue (1);
20g/m²

(elastic)

Backsheet: Hydrophobic, spunlaced,
nonwoven material, 40g/m², 100% PP

(stretchable)

PFA: Hot-Melt Savarè LA203, 24g/m²

Load and pad set tests

The elastic behaviour of some of the embodiments described above (Products 1, 2, 4, 7, 8, 9), a conventional pantiliner sold by Johnson & Johnson as "Carefree Normal*", and a cotton panty in which the product of the invention might be used, were investigated in a test described below. In this test, a sample of each product was subjected to three hysteresis

* = Trade-mark

cycles by means of a tensile tester designed to apply to each sample a load which, in each cycle, gradually increases and then gradually decreases.

Each product is first conditioned, by keeping it for at least 12 hours in a room at a temperature of $23^{\circ} \pm 2^{\circ} \text{C}$ and a relative humidity of $50 \pm 2\%$. A strip one inch (2.54 cm) wide was then cut from the product the length of the strip being either parallel to the length of the product (if it is desired to measure MD elastic behaviour) or perpendicular to the length of the product (if it is desired to measure CD elastic behaviour). In the test of which the results are given below it was CD elastic behaviour which was measured.

The sample is laid unrestrained on a table. The length of the part of the sample which will be tested is marked on the sample itself. The distance between the clamps of the tensile tester is set to the same length that has been previously marked on the specimen.

Each sample is clamped in the tensile tester in such a way as to enable the tester to apply a load lengthwise of the strip and to avoid slacks or tensions. The load cell must record increase as soon as the test starts. The following steps were then carried out:

1. Increase the load gradually from zero up to a value at which the length of that part of the sample which is under load is 125% of its initial length, continuously recording the load and corresponding length as this is being done.

2. Decrease the load gradually until the distance between the clamp returns to its starting point, continuously recording the load and corresponding length as this is being done.
3. Hold the sample for 30 seconds.
4. Repeat steps 1 to 3 two further times.

The results obtained are set out in Table 2 below, except for the Carefree Normal sample, which had too little elasticity for it to be capable of undergoing the test, for each of the three hysteresis cycles. In each case, the table records the peak load, i.e. the load in g/inch required to achieve 25% elongation, the percentage set, i.e. the percentage amount by which the length of the sample exceeded its original length at the end of the each cycle at a load of 0.05 N/inch. A value of 0.05 N, rather than zero is chosen, to avoid possible reading problems with the computer software via which measurements are made. The table also records the energy dissipated in the course of the cycle. This last value, measured in 10^{-3}J , is determined from the area within the hysteresis cycle.

Some of the results of Table 2, together with other properties of the samples, are set out in Table 3.

A number of points emerge from Table 2 and 3. Firstly, it will be seen that all the Products tested had a low value of pad set, (not more than 12% after three cycles, even in the worst case, and 6% in the best case), indicating that the Products will not lose their elasticity in use. Secondly, Products 1, 2, 7 and 9 are seen to be particularly advantageous in that the loads required to reach 25% are low, and are comparable to those required in the case of the cotton panty. Consequently, during use the pantiliner and panty will stretch to substantially the same extent as one another in response to any given force, and the pantiliner will therefore behave, for practical purposes, as though it were part of the panty itself.

Figures 3 to 9 are hysteresis cycles which show the elastic behaviour of the products referred to in Table 2. As can be seen, the amount of hysteresis is not great in the case of any of those according to the invention, indicating that the products will retain their elastic properties to a substantial extent during repeated stretching and relaxation. Figure 3 is a hysteresis cycle for the cotton panty. This can be seen to be broadly similar to Figures 4 to 9. There is no such cycle for the comparative article "Carefree Normal", since this is almost completely inelastic.

WE CLAIM:

1. An elastic, fluid-absorbent sanitary article for use with a panty garment having an interior crotch area, the article being elastic in at least one direction and having means of attachment to said crotch area, the article comprising a backsheet layer of water-impermeable material, and a layer of absorbent material having a first, exteriorly exposed, face thereof and a second face joined in face-to-face relationship by means of an adhesive connection provided by an elastic adhesive, with said backsheet layer.

2. An elastic, fluid-absorbent sanitary article for use with a panty garment having an interior crotch area, the article being elastic in at least one direction and having means of attachment to said crotch area, the article comprising a topsheet layer of water permeable material, a backsheet layer of water-impermeable material, and a layer of absorbent material sandwiched between the topsheet layer and the backsheet layer, the absorbent material being joined to the backsheet layer and topsheet layer by adhesive connections at least one of which is provided by an elastic adhesive.

3. An article according to claim 1 or 2, wherein the adhesive is an elastomeric hot melt adhesive.

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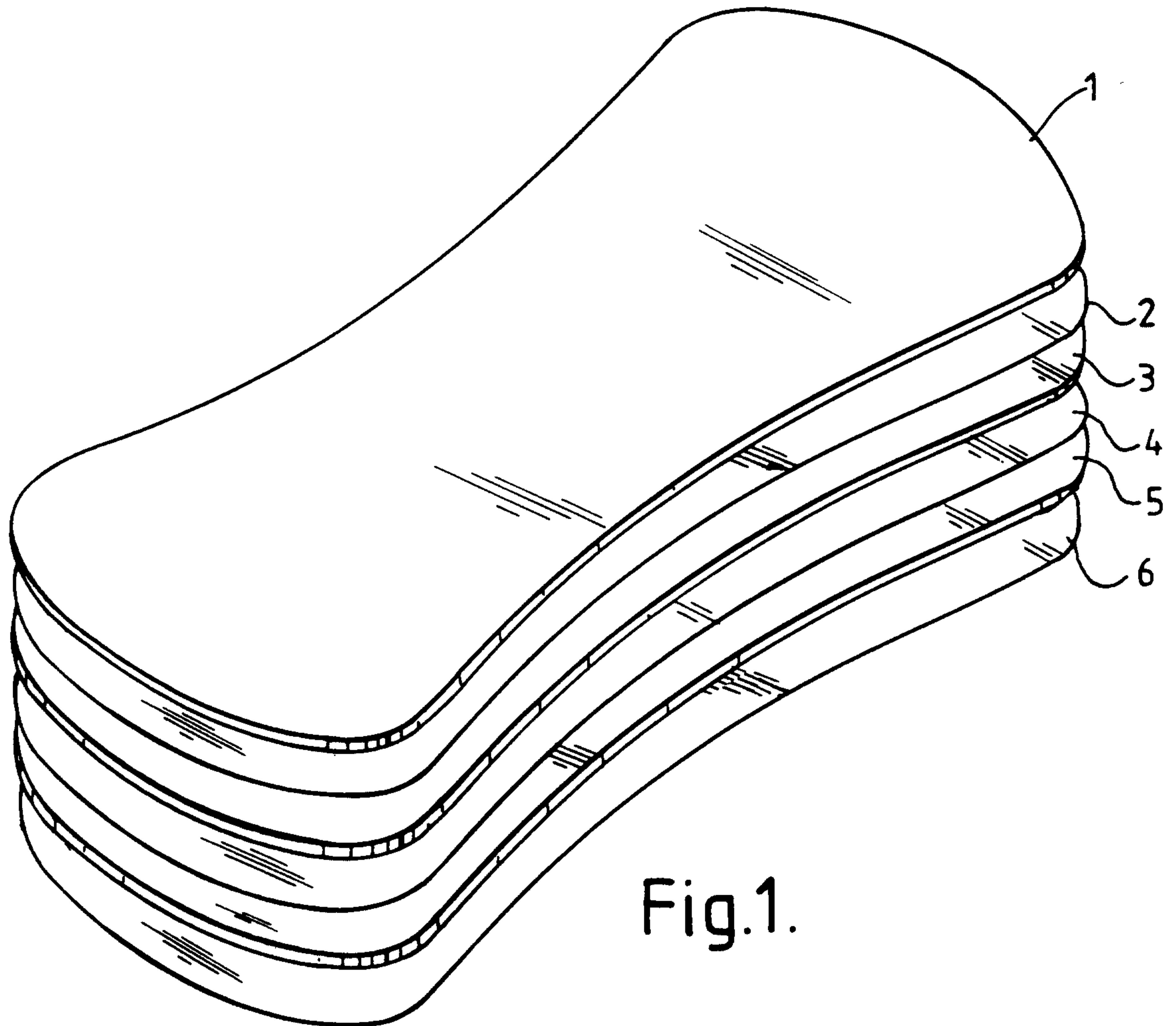


Fig.1.

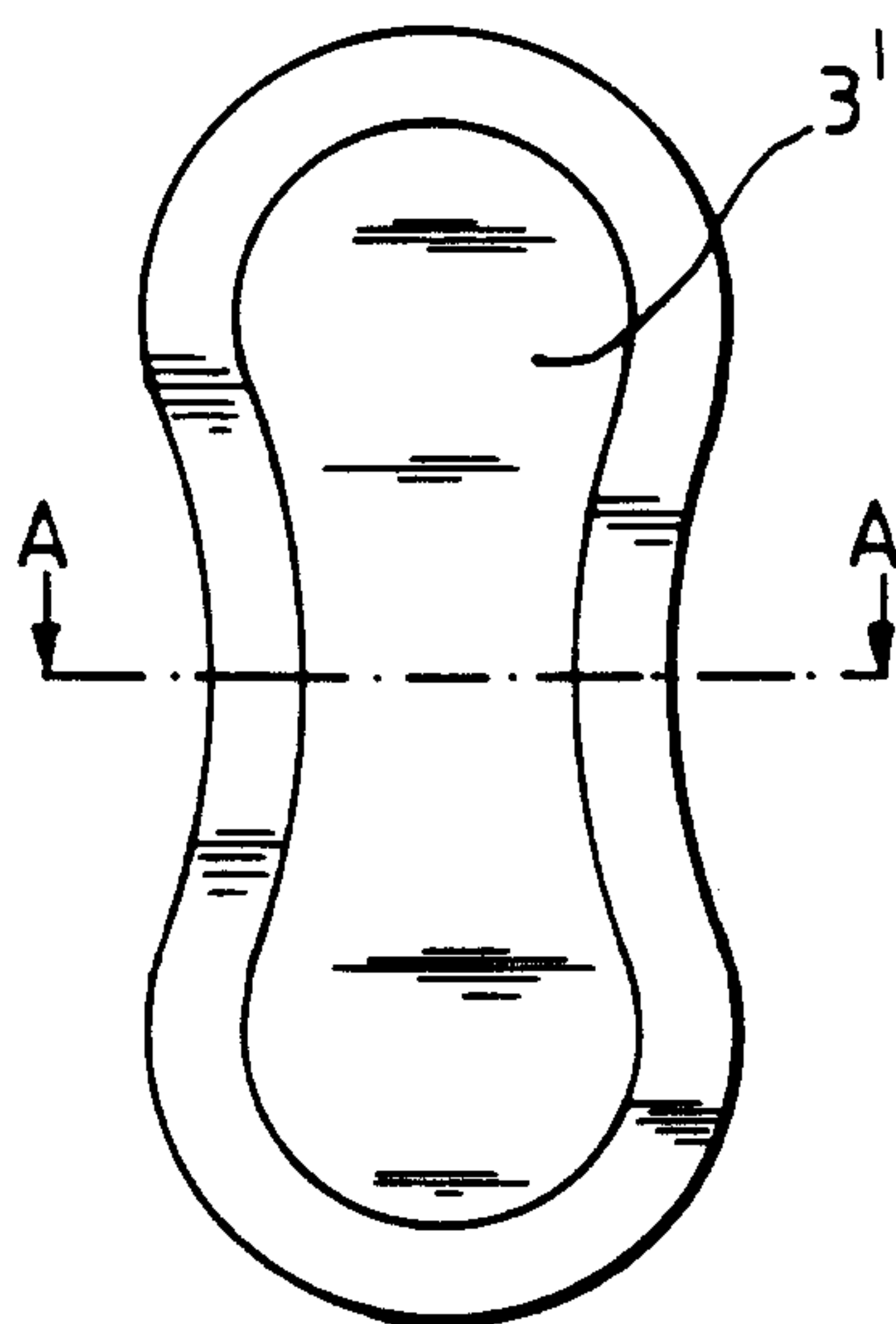


Fig.2a.

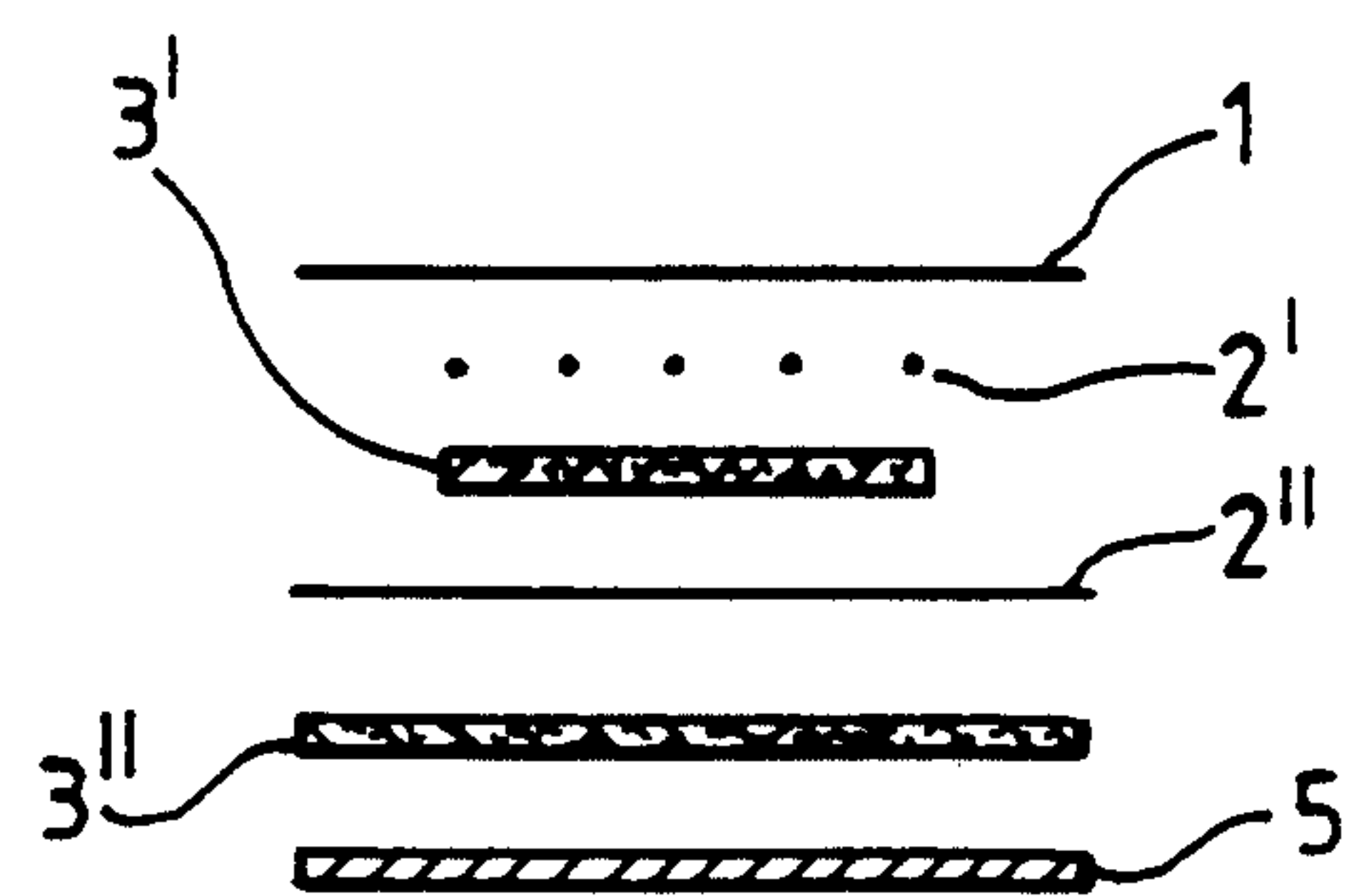


Fig.2b.

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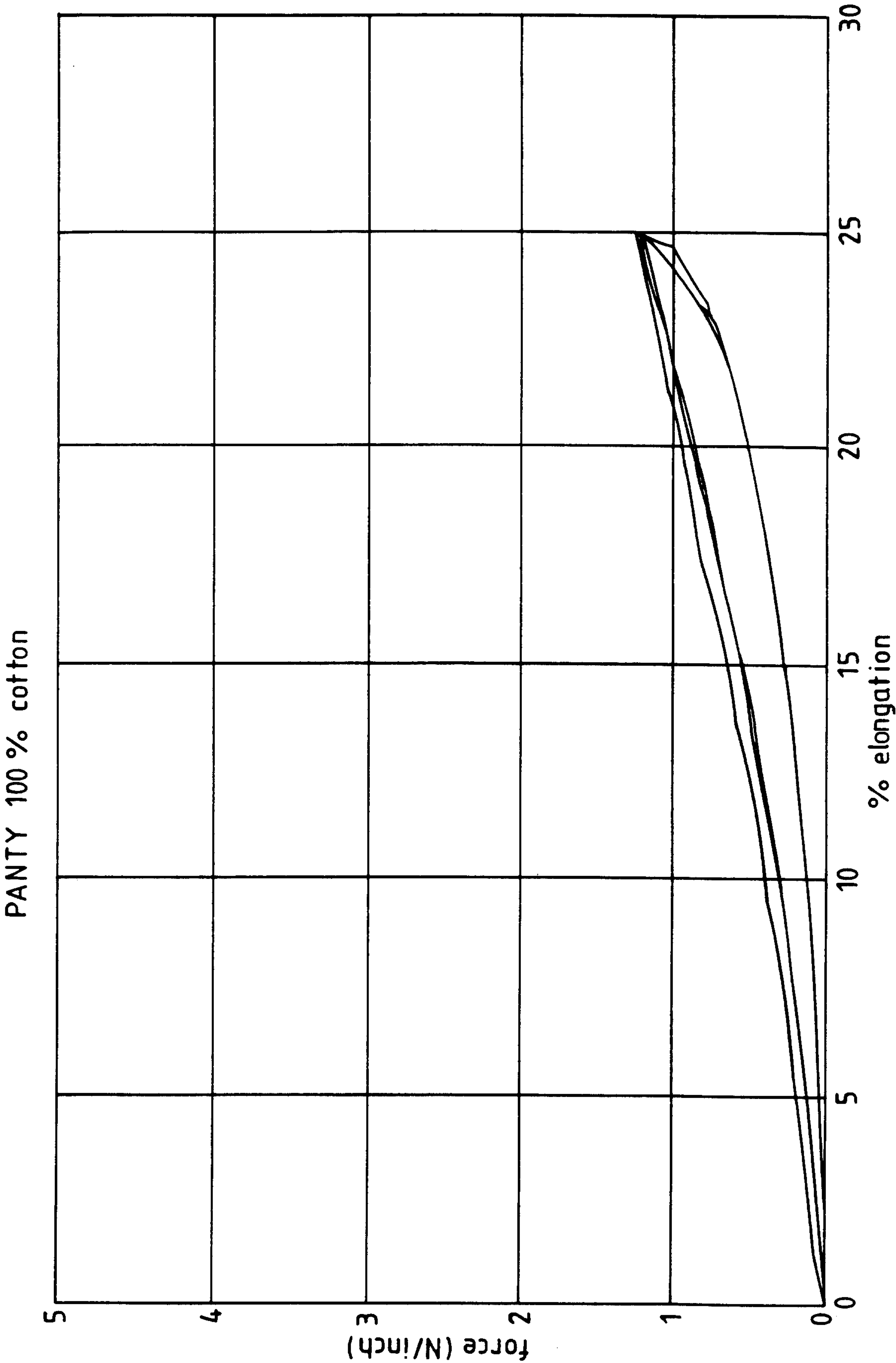


Fig.3.

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product # 1

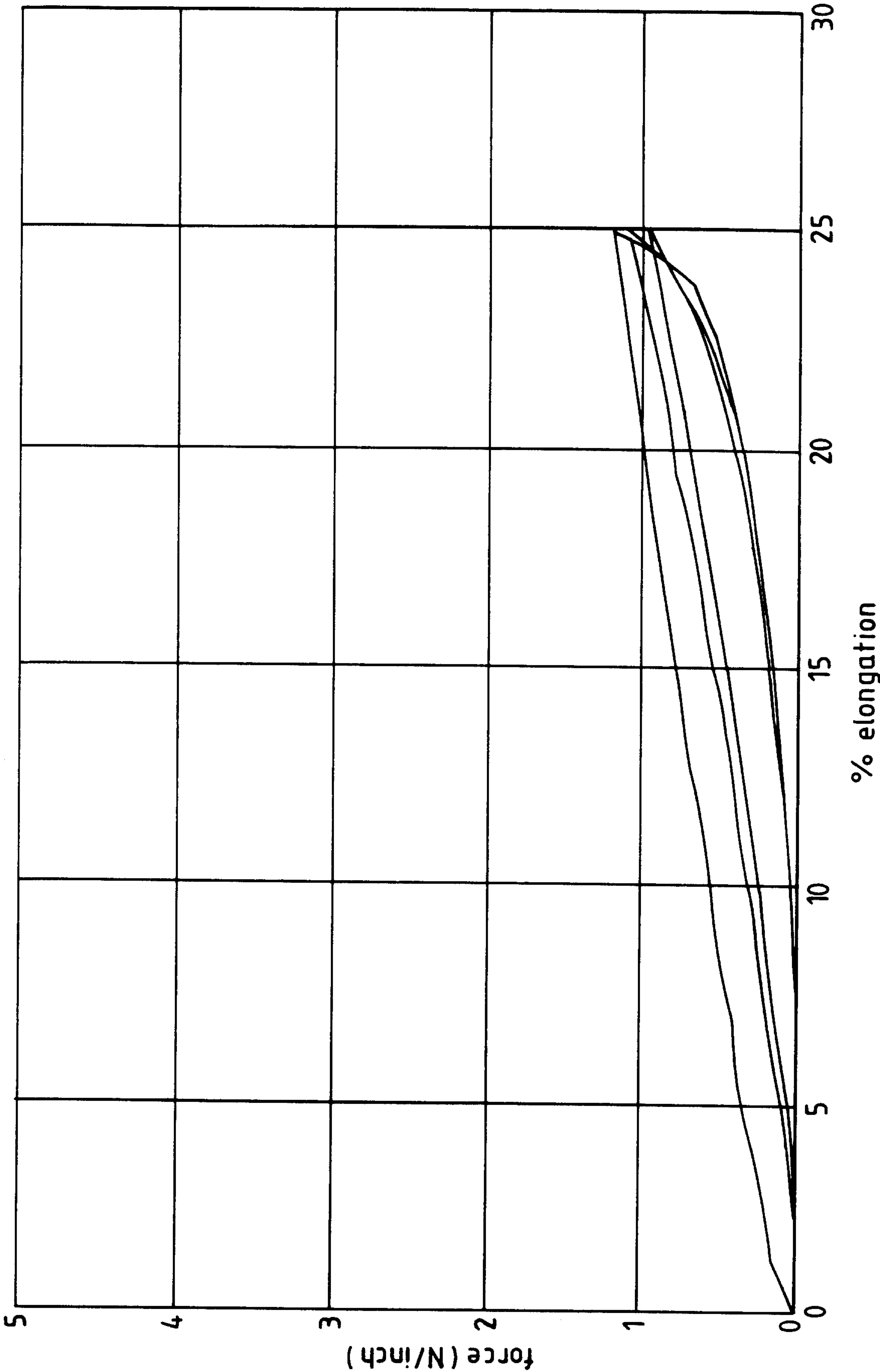


Fig.4.

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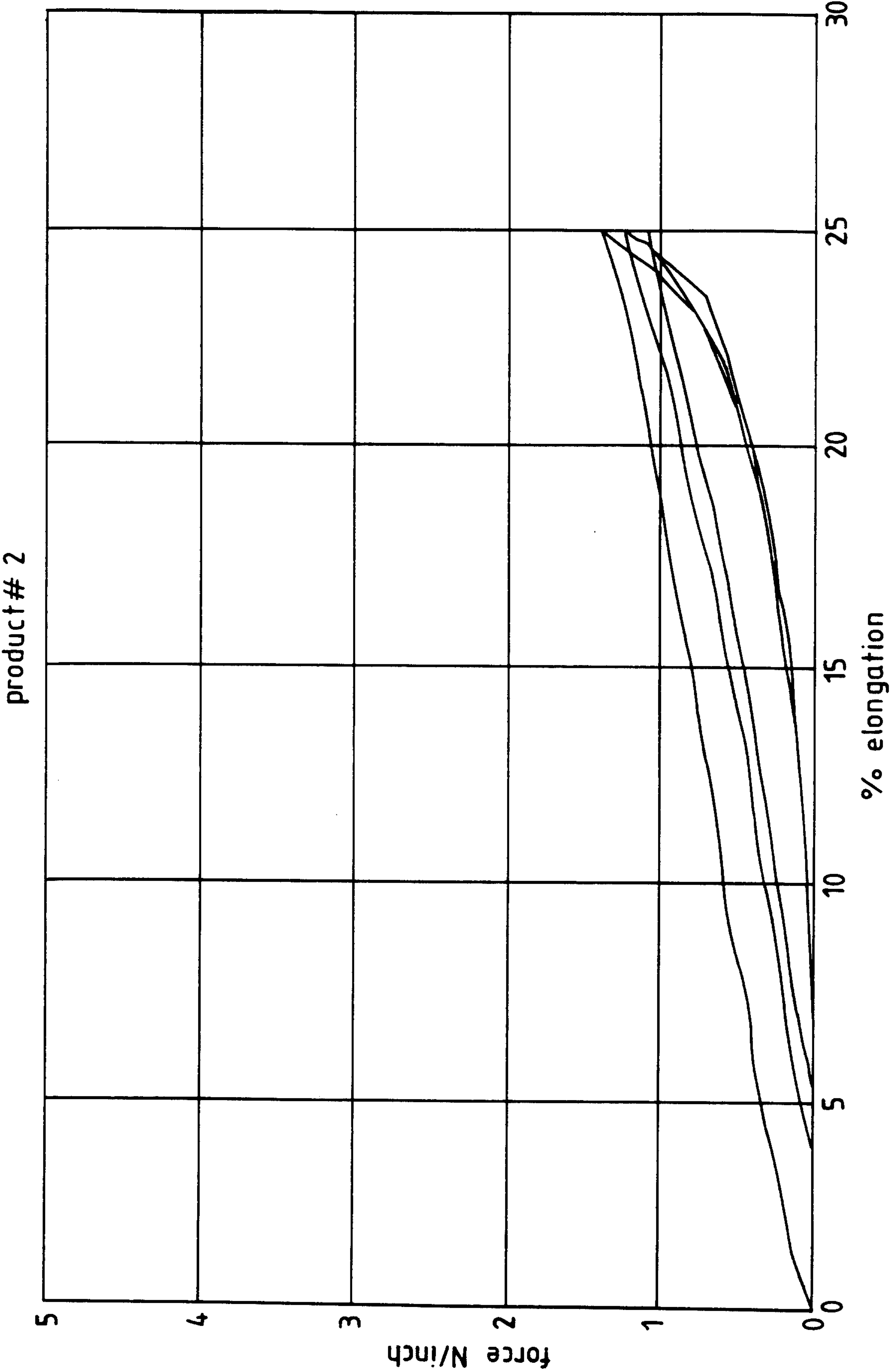


Fig.5.

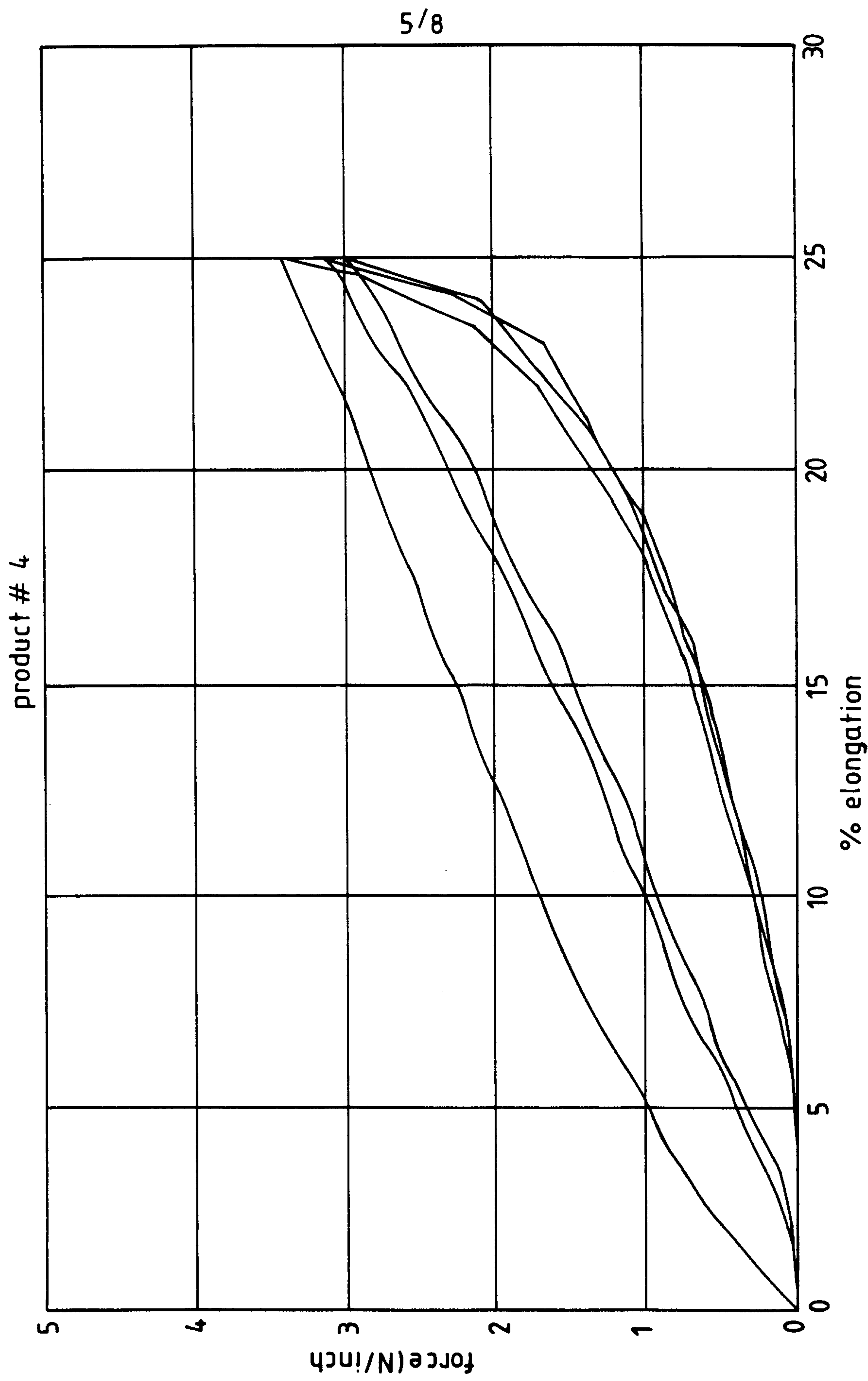


Fig.6.

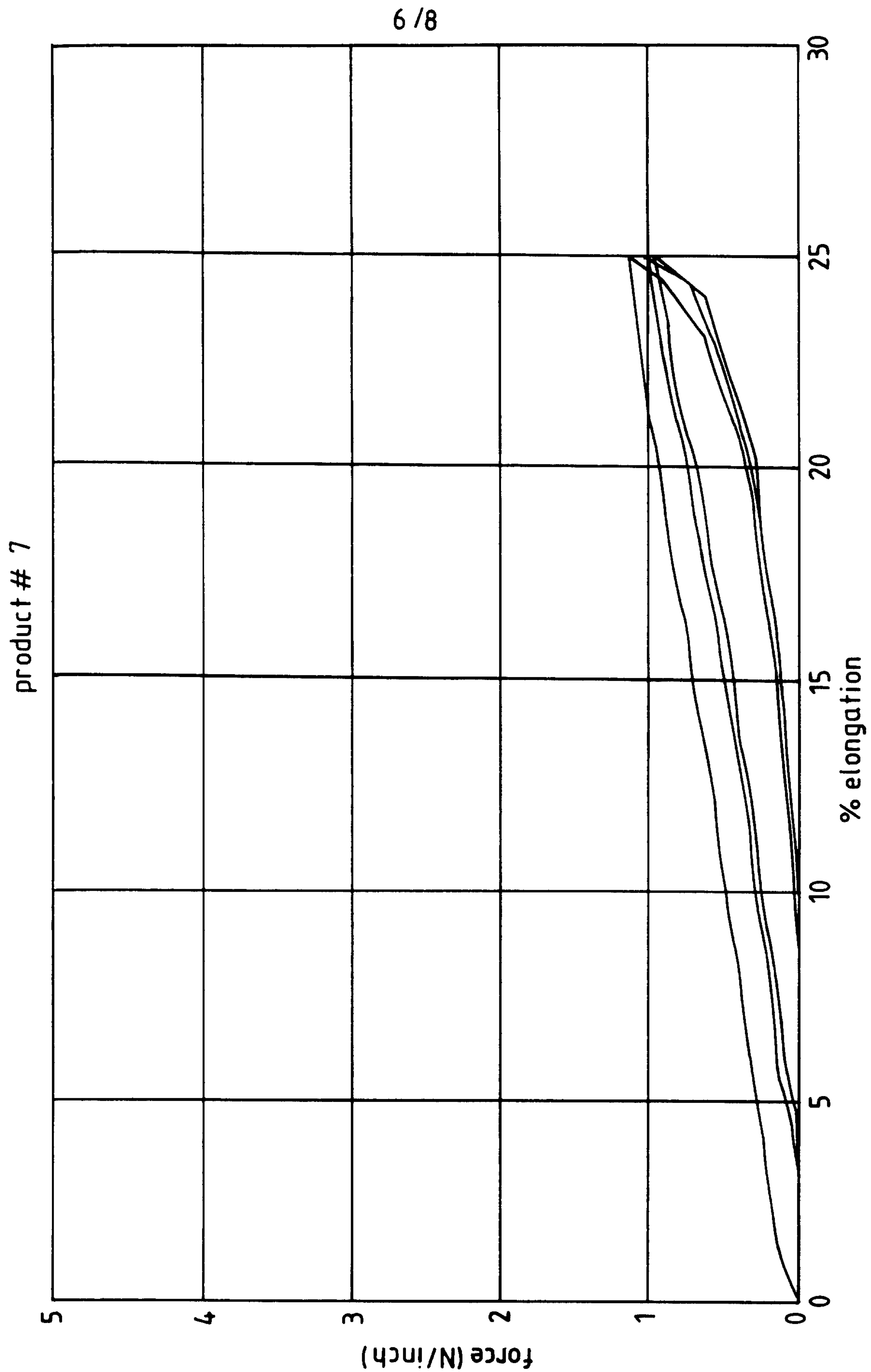


Fig.7.

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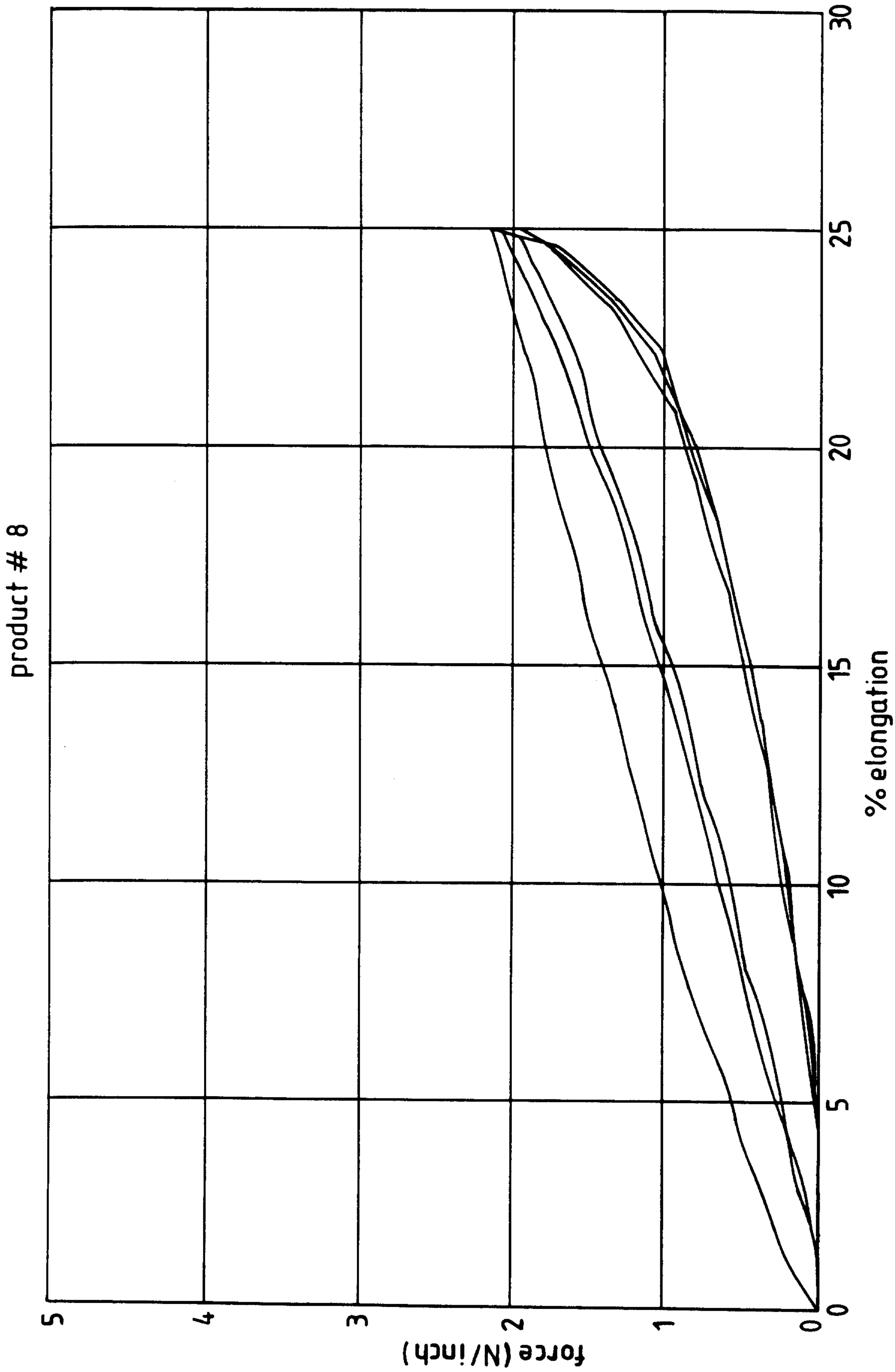


Fig.8.

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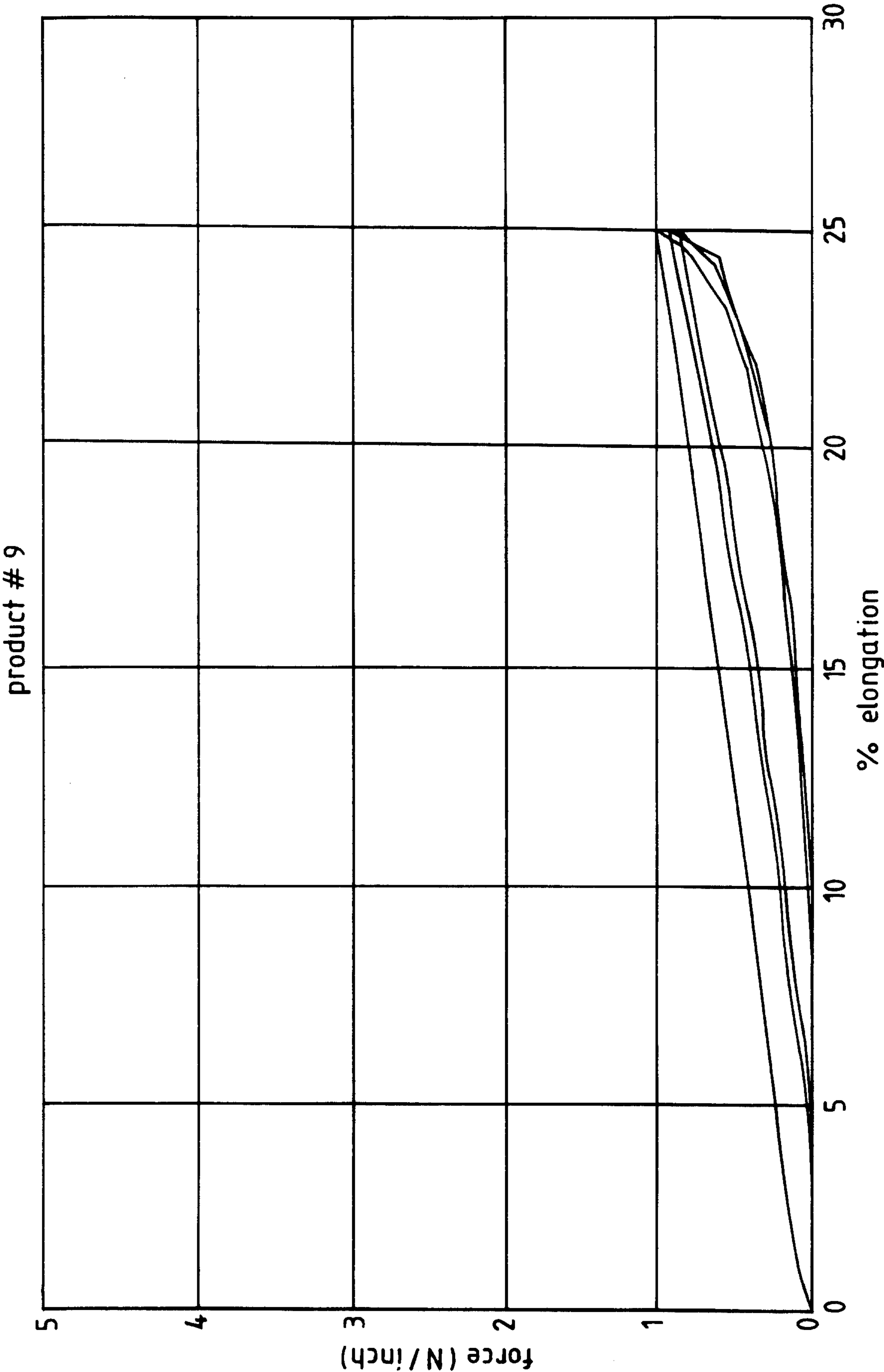


Fig.9.

