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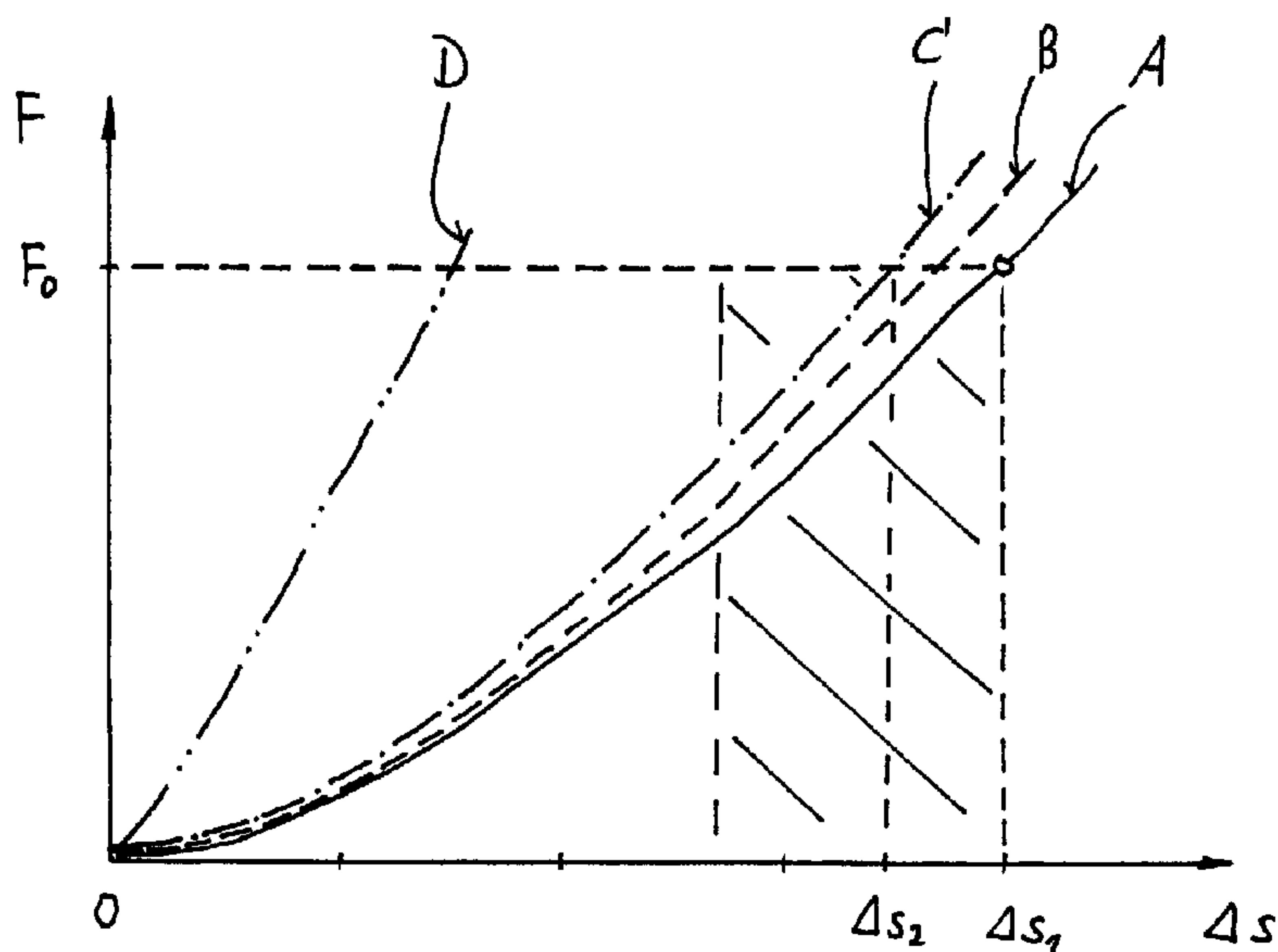


Fig. 76

(57) **Abrégé/Abstract:**

The invention relates to an article of clothing (1) comprising a textile supporting material (2) that encompasses a section of the body of the wearer of the clothing (1), wherein on the side of the supporting material (2) that faces the section of the body an adhesive layer (3) is arranged on the supporting material (2), which adhesive layer is in contact with a part of the section of the body when the article of clothing (1) is being used as intended, and the textile supporting material (2) without the adhesive layer (3) stretches by a first elastic extension value (Δs_1) under the exertion of a defined extension force (F_0). To exert a stimulative effect on the skin of the wearer of said article of clothing, according to the invention the textile supporting material (2) including the adhesive layer (3) stretches by a second elastic extension value (Δs_2) under the exertion of an extension force (F_0), which is at least 65%, preferably 75%, of the first elastic extension value (Δs_1).



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Abstract

The invention relates to an article of clothing (1), comprising a textile carrier material (2), which surrounds a body section of a wearer of the article of clothing (1), wherein an adhesion layer (3) is arranged on the carrier material (2) at that side of the carrier material (2) which faces the body section, which adhesion layer (3) contacts a part of the body section during the intended use of the article of clothing (1), wherein the textile carrier material (2) without adhesion layer (3) expands itself by a first elastic amount of expansion (Δs_1) during application of a defined expansion force (F_0). To apply a stimulation effect to the skin of the wearer of the article of clothing the invention proposes that the textile carrier material (2) with adhesion layer (3) expands itself by a second elastic amount of expansion (Δs_2) during application of the expansion force (F_0) which is at least 65 %, preferably at least 75 %, of the first elastic amount of expansion (Δs_1).

(Fig. 16)

25

Article of Clothing

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The invention relates to an article of clothing, comprising a textile carrier material, which surrounds a body section of a wearer of the article of clothing, wherein an adhesion layer is arranged on the carrier material at that side of the carrier material which faces the body section, which adhesion layer contacts a
10 part of the body section during the intended use of the article of clothing, wherein the textile carrier material without adhesion layer expands itself by a first elastic amount of expansion during application of a defined expansion force.

15 Article of clothing according to the generic kind are used in the field of sports and medicinal to execute a compression on certain desired regions of the body. Thereby, a stimulation is created which acts typically circularly, for example in the region of an arm or of a leg, to improve the venous return and to counteract a thrombosis or a lymph swelling.

20

Thereby, different methods are used to influence the biomechanical body functions of the wearer of the article of clothing. Currently, among other things a base compression and the application of different so-called tapes or zones with a high strain resistance are in use. Those technologies work with a
25 differentiated contact pressure, which the different stretchability (expansion force which has to be applied) of the different zones of the article of clothing carries out onto the body of the wearer of the article of clothing. A direct contact of the active materials with the skin and a direct effect onto the skin, as it is postulated by the so-called kinesiological taping, does not exist at
30 those techniques.

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Other applications have to support joints and have to give hold to the same respectively. Here, an application in the knee region should be mentioned as an example at which the patella is left open. With respect to this concept an
5 article of clothing of the kind as mentioned above is known from **EP 1 810 649 B1**. Here, a close-fitting article of clothing is described which is provided with a material with a high coefficient of friction at that side which faces the skin of the wearer. To limit the movement of muscles, joints and other body parts, to prevent contusions, bruises, extensions of muscles, sprains, bone
10 fractures as well as other injuries a bandage is provided, for which reason here it is specifically provided to design the material with a high coefficient of friction in such a manner that its elasticity is smaller than the elasticity of the textile basic material. The ability of movement of the textile which is contacted by the material with the high coefficient of friction is thus
15 specifically restricted in its ability of movement.

Insofar applications exist which work with the base function of an unlimited circularly compression as well as further developments with regional compression. Unlimited circularly compression means the contact pressure by
20 means of a tight article of clothing which is created by the textile material onto the body of the wearer. This pressure must be defined and must decline from remote from the heart to near the heart – i. e. from distal to proximal. The blood circulation is stimulated by the reduction of the cross section of the veins – at least in resting state – and also the evacuation of waste products is
25 accelerated.

Insofar, the described techniques work according to a simple principle at which the (tension)force is substantially delivered by the material of the article of clothing and at which it acts onto the body in an unspecific manner.
30 Such compression garment is known as sports garment for the improvement

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in performance as well as for regeneration. Garment exists with a general compression or with a specific contact pressure.

Thereby, materials with different stretchability are often used, as the case may
5 be with so-called tapes and laminations respectively which are applied from the outside. A direct effect onto the skin is not achieved with this.

DE 20 2010 016 255 U1 discloses an adhesion band which is inserted between an article of clothing and the skin of the wearer to prevent a slipping
10 of the article of clothing. In **US 2006/0154053 A1** an adhesive textile material is described which shall adhere on the skin of a person. **US 2008/0236417 A1** discloses the coating of stockings and socks to minimize their slipping on the skin of the wearer.

15 The so-called kinesiological taping goes back to the Japanese chiropractor Kenzo Kase. About 30 years ago he developed a special band-aid (tape) which is highly elastically, breathable and eudemic. It rests onto the skin as a second skin. It stretches with every movement and contracts again without limiting the freedom of movement. Compared with other band-aids and
20 bandages the musculature is not released so that it does not degenerate. Instead, the skin is gently lifted and massaged during each movement by the elastic tape. The flow of lymph and blood should be stimulated and support the metabolism in the muscles and sinews. As a consequence tensions should be reduced and inflammations should be regressed.

25

Usually, kinesiological taping is used to protect specific muscle groups against injuries or also merely for the improvement in performance of an athlete.

30 Nowadays, the kinesiological taping works with high elastic cotton bands which are impregnated at the inner side with an adhesive film. This tape is

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glued onto the skin along the respective muscle strands which should be supported or stimulated. The tape has the same stretchability than the human skin and is applied onto the skin without additional tension. So it is ensured that the tape does not form an additional mechanical enforcement. The tape stimulates the muscle fibres and the subcutaneous metabolism, it improves the biomechanical performance and supports the recreation.

It is the object of the invention to provide an article of clothing, especially a pair of trousers or a top for the use in sports, by which it is possible in a simple and efficient manner to carry out a stimulation effect onto the skin, wherein the effect should be used as it occurs during the kinesiological taping.

The solution of this object by the invention is characterized in that the textile carrier material with adhesion layer expands itself by a second elastic amount of expansion during application of the expansion force which is at least 65 % of the first elastic amount of expansion, wherein the article of clothing is cut in such a manner that it attaches itself with an elastic tension around the body section of the wearer of the article of clothing which body section is covered by the article of clothing and thereby the article of clothing is close-fitting to the skin of the wearer and so creates a defined compression which ensures a pressing of the adhesion layer on the skin.

Preferably, the second elastic amount of expansion is at least 75 % of the first elastic amount of expansion.

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Accordingly, it is thus provided that – in distinction to the above mentioned state of the art according EP 1 810 649 B1 – an article of clothing made of a textile carrier material is provided with an adhesion layer at the inner side, i. e. facing the skin of the wearer of the article of clothing, that however is designed in such a manner that the resistance during stretching rises only minimally which is expressed by the mentioned change of the elastic amount

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of expansion which results necessarily when the adhesion layer is applied onto the textile carrier material.

A preferred embodiment of the concept according to the invention provides
5 that the adhesion layer is arranged on the textile carrier material lamellar. Here, a plurality of parallel lamellar regions of the adhesion layer can be arranged on the textile carrier material.

The adhesion layer can be arranged on the textile carrier material also
10 wavelike, wherein it can be provided again that a plurality of parallel wavelike regions of the adhesion layer is arranged on the textile carrier material.

The adhesion layer can also be arranged on the textile carrier material as a dot
15 pattern.

In all cases it is made sure by the proposed geometrical design of the adhesion layer that the mechanical resistance against tension remains as small as possible which is created by the additional material of the adhesion layer
20 which is applied onto the textile carrier material.

Thereby, the lamellar or wavelike arranged adhesion layer can extend in the direction of a provided longitudinal expansion of the article of clothing or can also run transverse to this direction. This longitudinal expansion corresponds
25 generally with the direction of the respective muscle fiber.

The adhesion layer consists preferably of silicone or comprises at least silicone. It can be imprinted, glued or laminated on the textile carrier material.

30 The textile carrier material consists preferably of polyester. An alternative solution provides that the textile carrier material consists of a block

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copolymer from the components polyurethane and polyethylene glycol (Elastan). It is also possible according to a preferred solution to employ a combination of polyester and Elastan. Generally, it can be provided that the textile carrier material consists of a synthetic spun fiber which is combined
5 with Elastan.

Elastan is a highly elastic synthetic fiber and is similar to rubber but has a higher rigidity and is more durable. The urethane forms stiff elongated sections which accumulate longitudinally to another and allow the cohesion of
10 the fibres due to the creation of additional valence forces. However, the rubber-like blocks of poly alcohol are strongly balled up, but can be stretched easily. By this combination of stiff and elastic blocks the very high elasticity of more than 700 % is obtained.

15 By the proposed design the adhesion layer is pressed onto the skin surface and a good hold on the skin is ensured due to the high coefficient of friction of the adhesion layer.

Preferably, the material of the adhesion layer has a coefficient of static
20 friction (on the skin) which is at least $\mu = 0.4$, preferably at least $\mu = 0.5$. In contrast, the textile carrier material has preferably a coefficient of static friction (on the skin) which is maximal $\mu = 0.3$, preferably maximal $\mu = 0.25$.

The proposed article of clothing thus is a tight fitting article of clothing which
25 is especially printed or laminated with an adhesion layer on the inner side, i. e. at the side facing the skin. This adhesion layer in the form of a film has a coefficient of friction which is different from the textile basis material. Those different surface properties between textile carrier material and adhesion layer cause a stimulation effect during the wearing of the article of clothing which
30 stimulates or relaxes the bio-mechanical functions and defined muscle groups respectively

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according to the embodiment. The arrangement and embodiment of the zones can be carried out according to the principles of the described kinesiological Taping.

- 5 Thus, the present invention uses the principle of the kinesiological taping and applies it specifically to a garment. A pressure with high friction resistance is applied at the inner side of the garment like a film. The garment is arranged in tight fit on the skin and creates so a defined compression which ensures a pressing of the adhesion layer on the skin. The zones which are printed with
10 the adhesion layer thus correspond to the principles of the kinesiological taping.

It is essential that the adhesion layer is arranged in the inner of the garment and lies on the skin during intentional use of the garment. Specific
15 manipulations of the body functions can be carried out via the material properties of the adhesion layer as well as via the structure.

The stimulation effect is created only by the different static friction properties of the textile carrier material and adhesion layer. In distinction to other pre-
20 known solutions (see the above discussed EP 1 810 649 B1) no mechanical reinforcements shall be generated by an increased strain resistance. That means that the muscular force must be raised only by the wearer of the garment. Accordingly, the tonicity is obtained and it is trained respectively.

- 25 So, it is an essential aspect of the proposed solution that the strain resistance of the textile carrier material is kept and is modified as little as possible respectively to accomplish the mentioned stimulation effect due to the

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Amended Patent Claims:

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1. Article of clothing (1), comprising a textile carrier material (2), which surrounds a body section of a wearer of the article of clothing (1),

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wherein an adhesion layer (3) is arranged on the carrier material (2) at that side of the carrier material (2) which faces the body section, which adhesion layer (3) contacts a part of the body section during the intended use of the article of clothing (1),

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wherein the article of clothing (1) is cut in such a manner that it attaches itself with an elastic tension around the body section of the wearer of the article of clothing (1) which body section is covered by the article of clothing and thereby the article of clothing is close-fitting to the skin of the wearer and so creates a defined compression which ensures a pressing of the adhesion layer on the skin,

25

wherein the textile carrier material (2) without adhesion layer (3) expands itself by a first elastic amount of expansion (Δs_1) during application of a defined expansion force (F_0), and

wherein the textile carrier material (2) with adhesion layer (3) expands itself by a second elastic amount of expansion (Δs_2) during application of

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the expansion force (F_0) which is at least 65 % of the first elastic amount of expansion (Δs_1).

- 5 2. Article of clothing according to claim 1, characterized in that the textile carrier material (2) with adhesion layer (3) expands itself by a second elastic amount of expansion (Δs_2) during application of the expansion force (F_0) which is at least 75 % of the first elastic amount of expansion (Δs_1).

10

3. Article of clothing according to claim 1 or 2, characterized in that the adhesion layer (3) is arranged on the textile carrier material (2) lamellar.

15

4. Article of clothing according to claim 3, characterized in that a plurality of parallel lamellar regions of the adhesion layer (3) is arranged on the textile carrier material (2).

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5. Article of clothing according to claim 1 or 2, characterized in that the adhesion layer (3) is arranged on the textile carrier material (2) wavelike.

- 25 6. Article of clothing according to claim 5, characterized in that a plurality of parallel wavelike regions of the adhesion layer (3) is arranged on the textile carrier material (2).

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7. Article of clothing according to claim 1 or 2, characterized in that the adhesion layer (3) is arranged on the textile carrier material (2) as a dot pattern.

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8. Article of clothing according to one of claims 3 to 6, characterized in that the lamellar or wavelike arranged adhesion layer (3) extends in the direction of a provided longitudinal expansion (L) of the article of clothing (1).

10

9. Article of clothing according to one of claims 3 to 6, characterized in that the lamellar or wavelike arranged adhesion layer (3) extends transverse (Q) to a provided longitudinal expansion (L) of the article of clothing (1).

15

10. Article of clothing according to one of claims 1 to 9, characterized in that the adhesion layer (3) consists of silicone or comprises silicone.

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11. Article of clothing according to one of claims 1 to 10, characterized in that the adhesion layer (3) is imprinted on the textile carrier material (2).

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12. Article of clothing according to one of claims 1 to 10, characterized in that the adhesion layer (3) is glued or laminated on the textile carrier material (2).

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13. Article of clothing according to one of claims 1 to 12, characterized in that the textile carrier material (2) consists of polyester.

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14. Article of clothing according to one of claims 1 to 12, characterized in that the textile carrier material (2) consists of a block copolymer from the components polyurethane and polyethylene glycol (Elastan).

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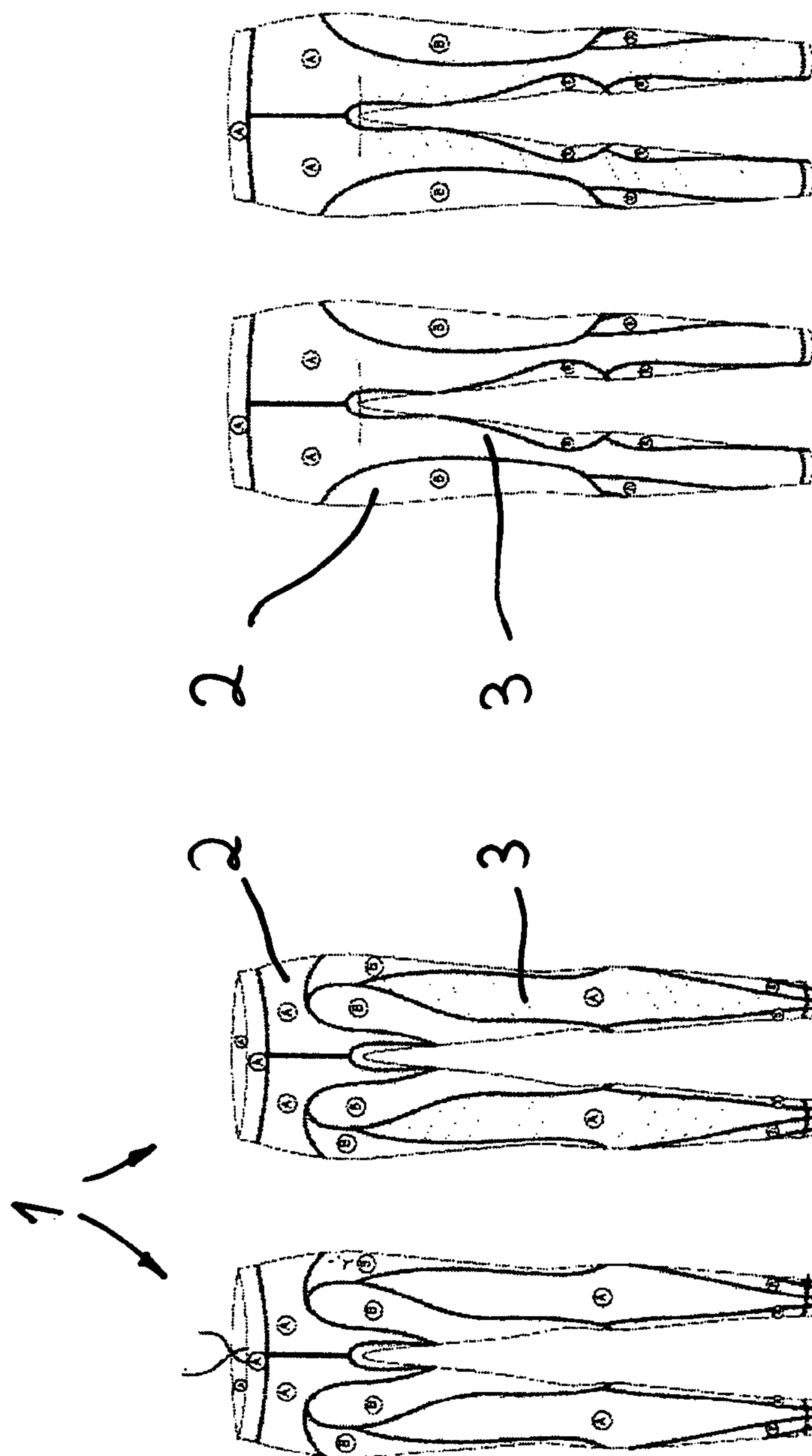
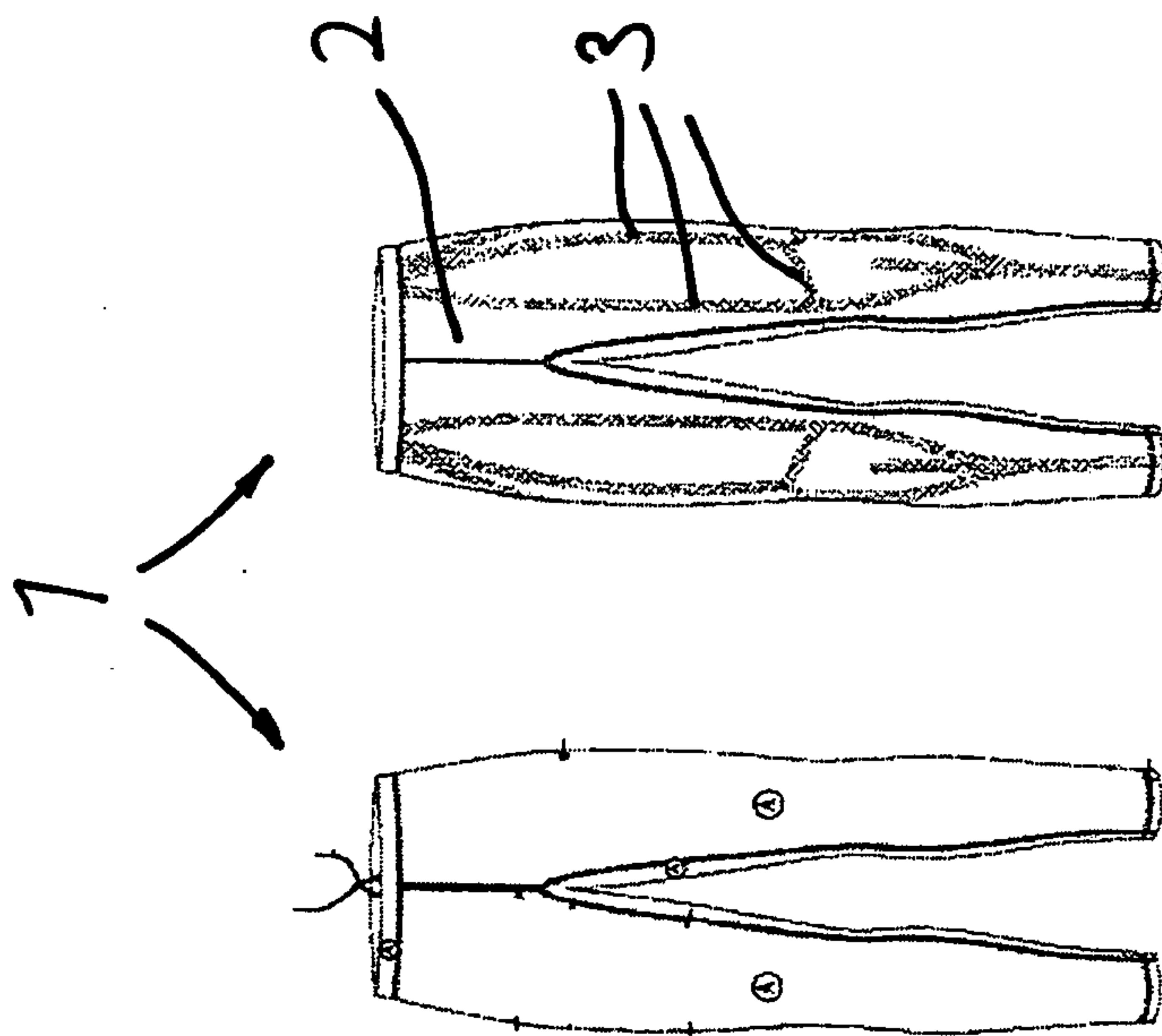
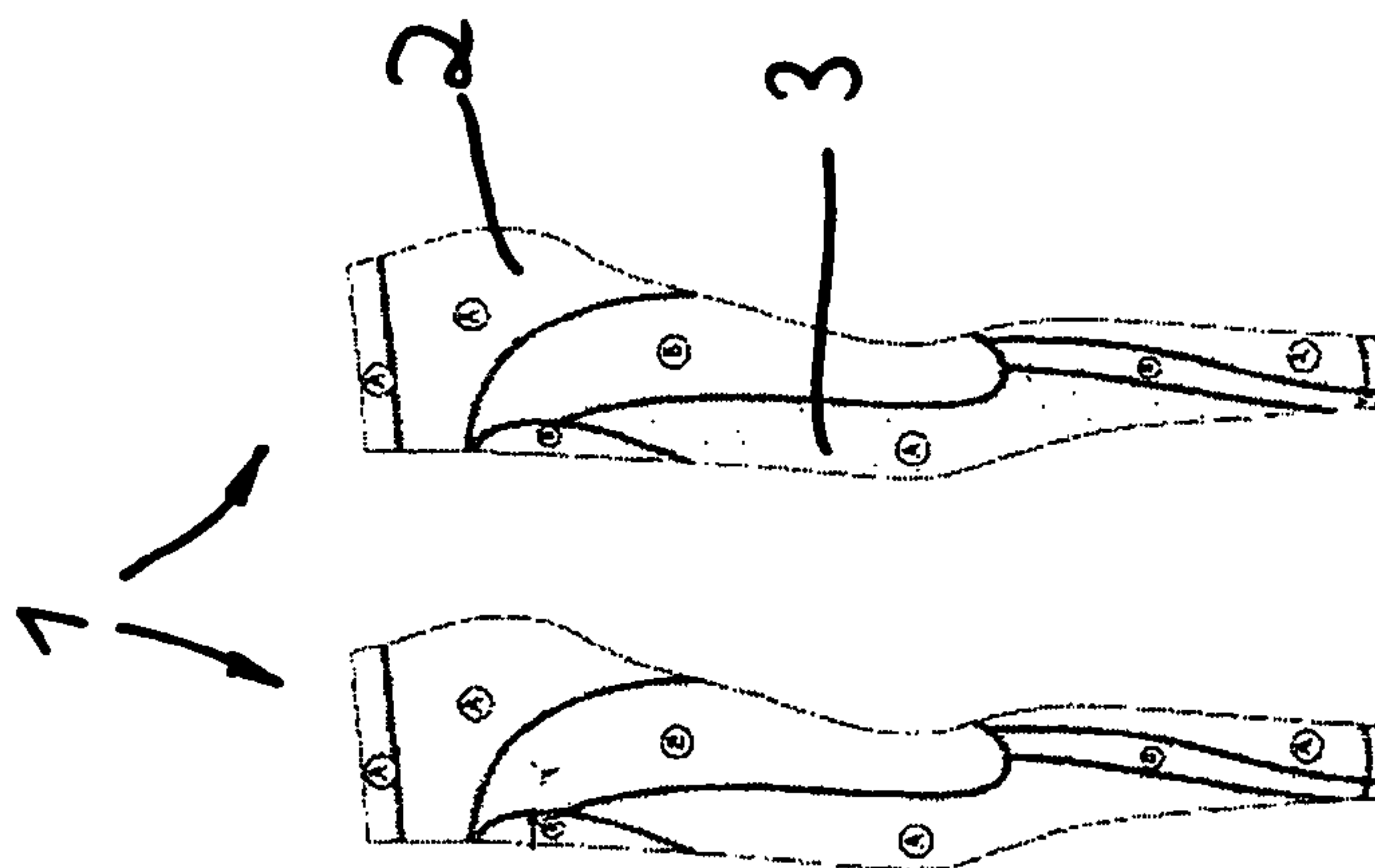


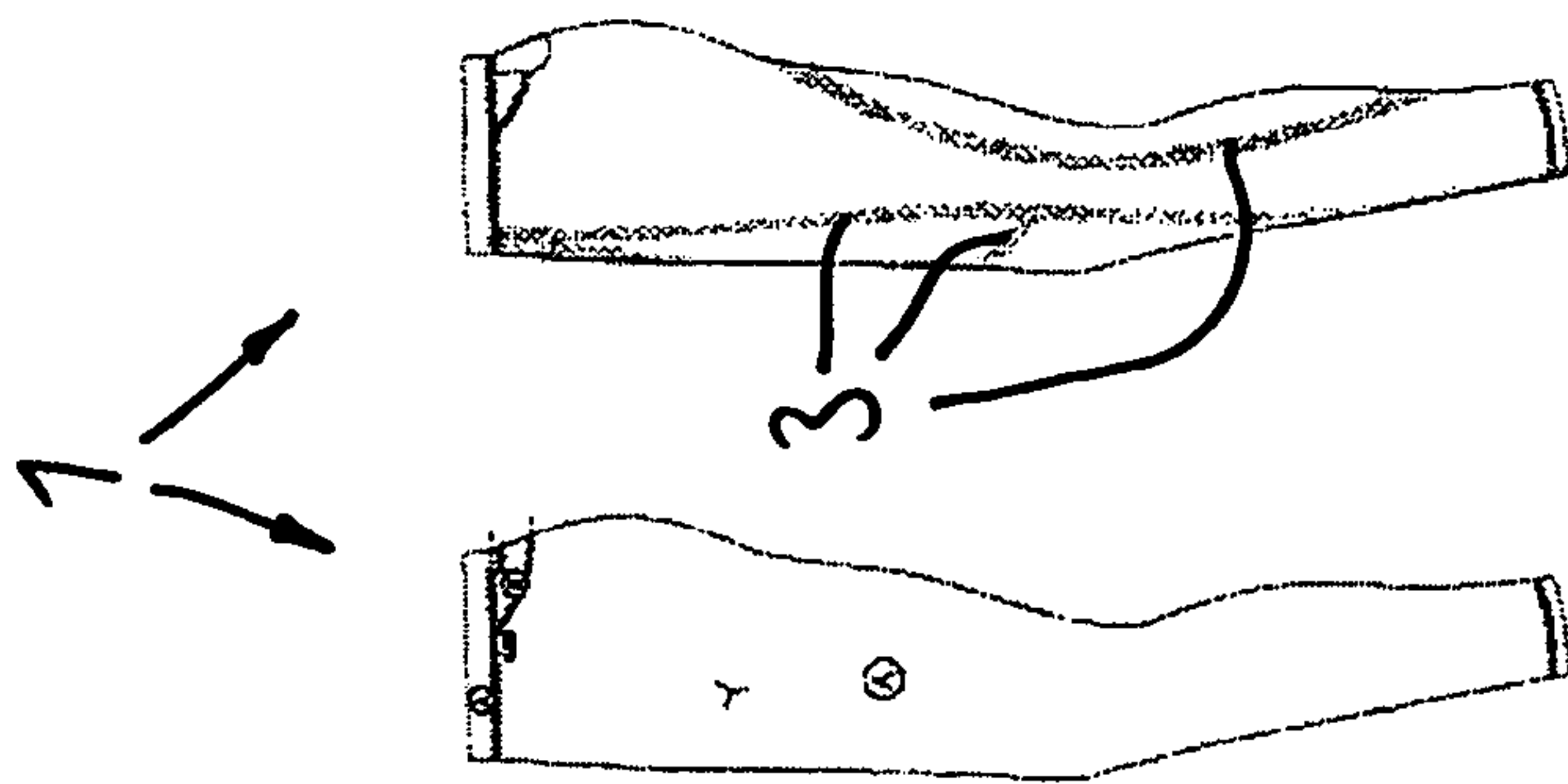
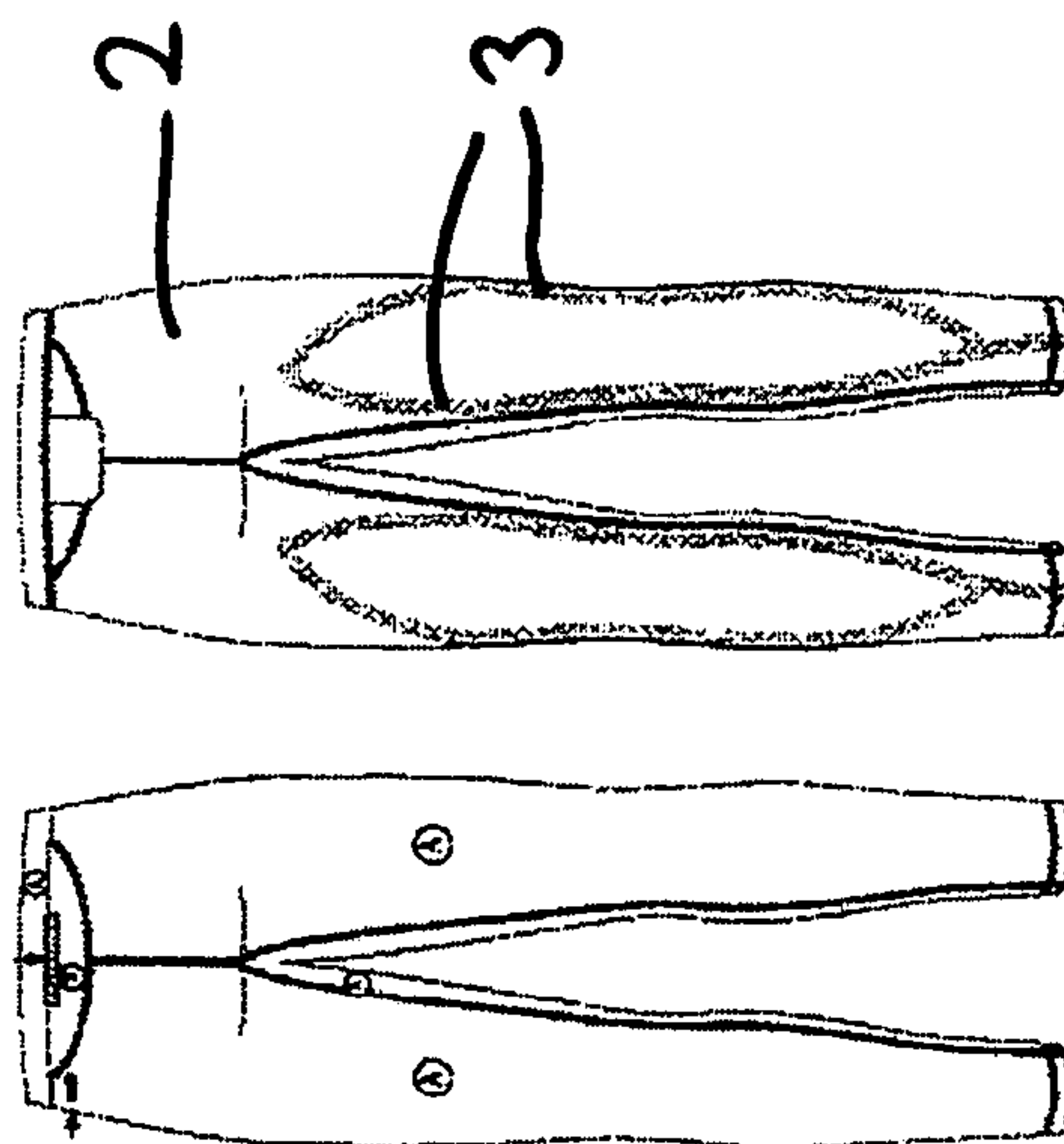
Fig. 2b

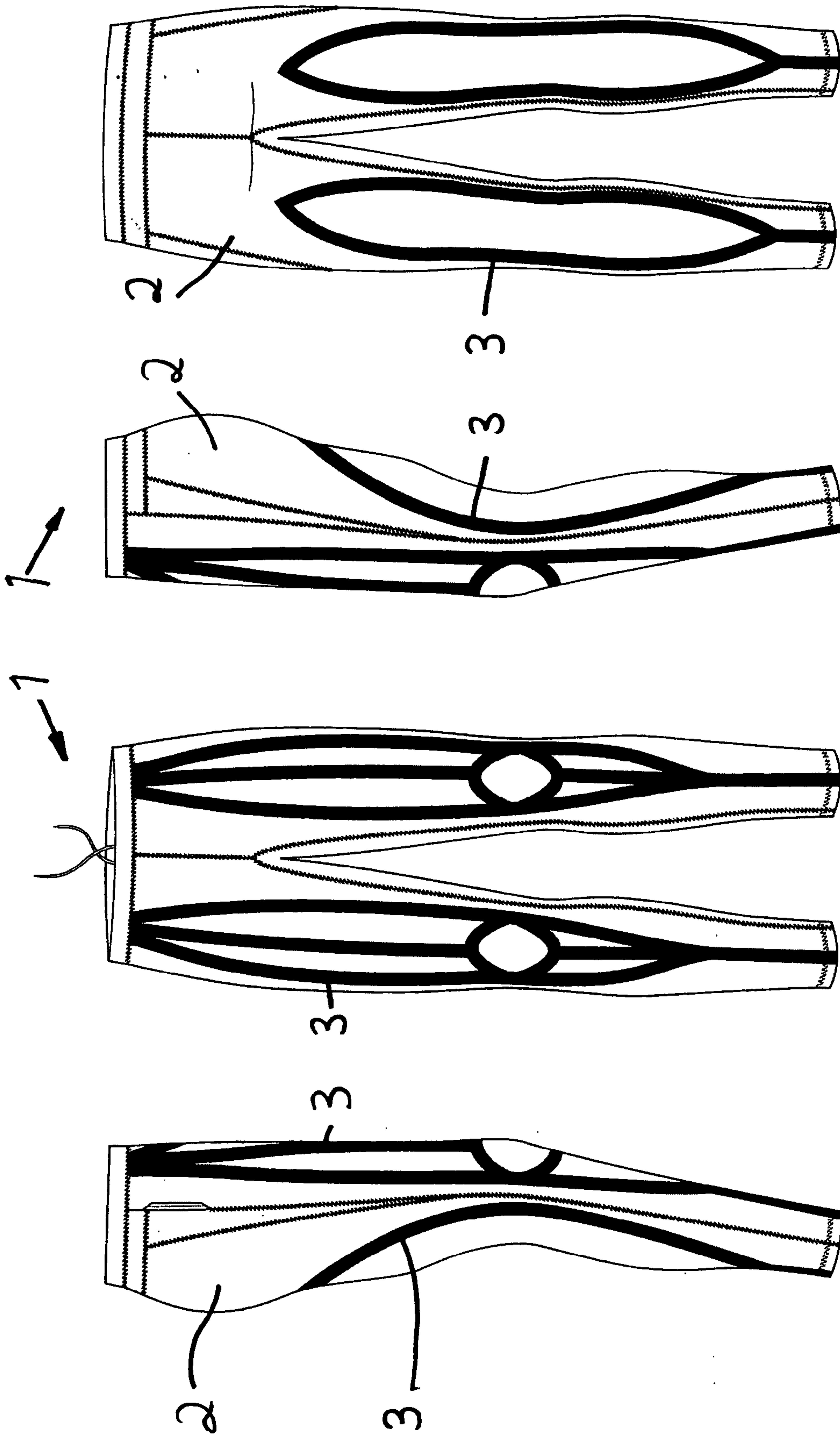
Fig. 2a

Fig. 1b

Fig. 1a

Fig. 4bFig. 4aFig. 3bFig. 3a

Fig. 6bFig. 6aFig. 5bFig. 5a

Fig. 7dFig. 7cFig. 7bFig. 7a

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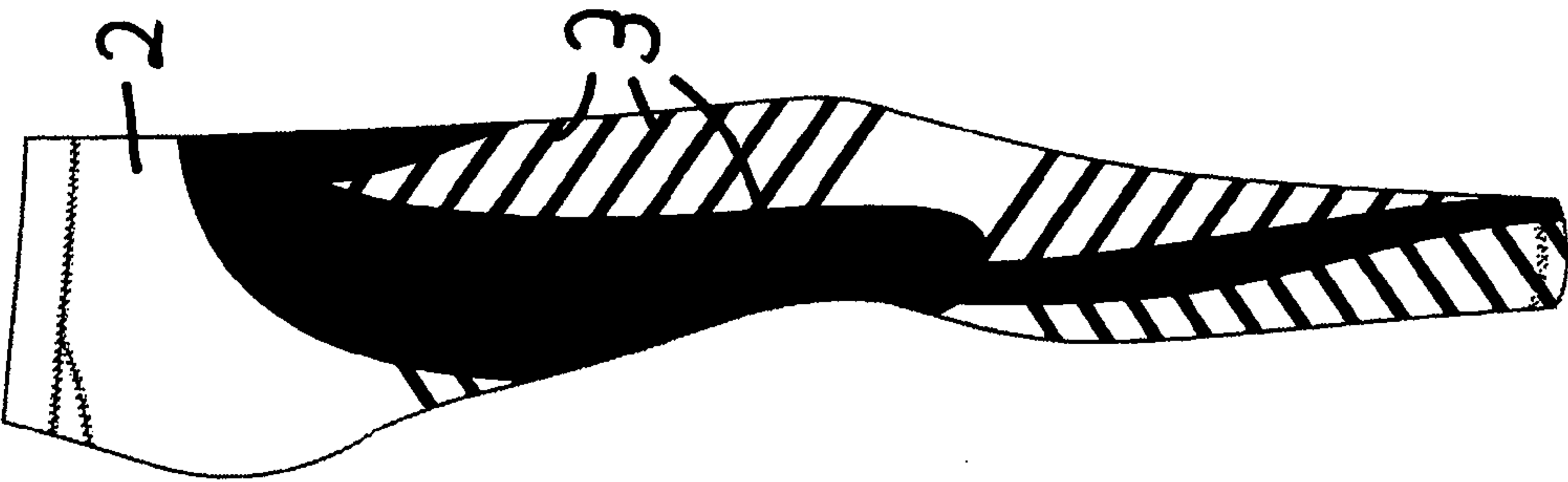


Fig. 8a

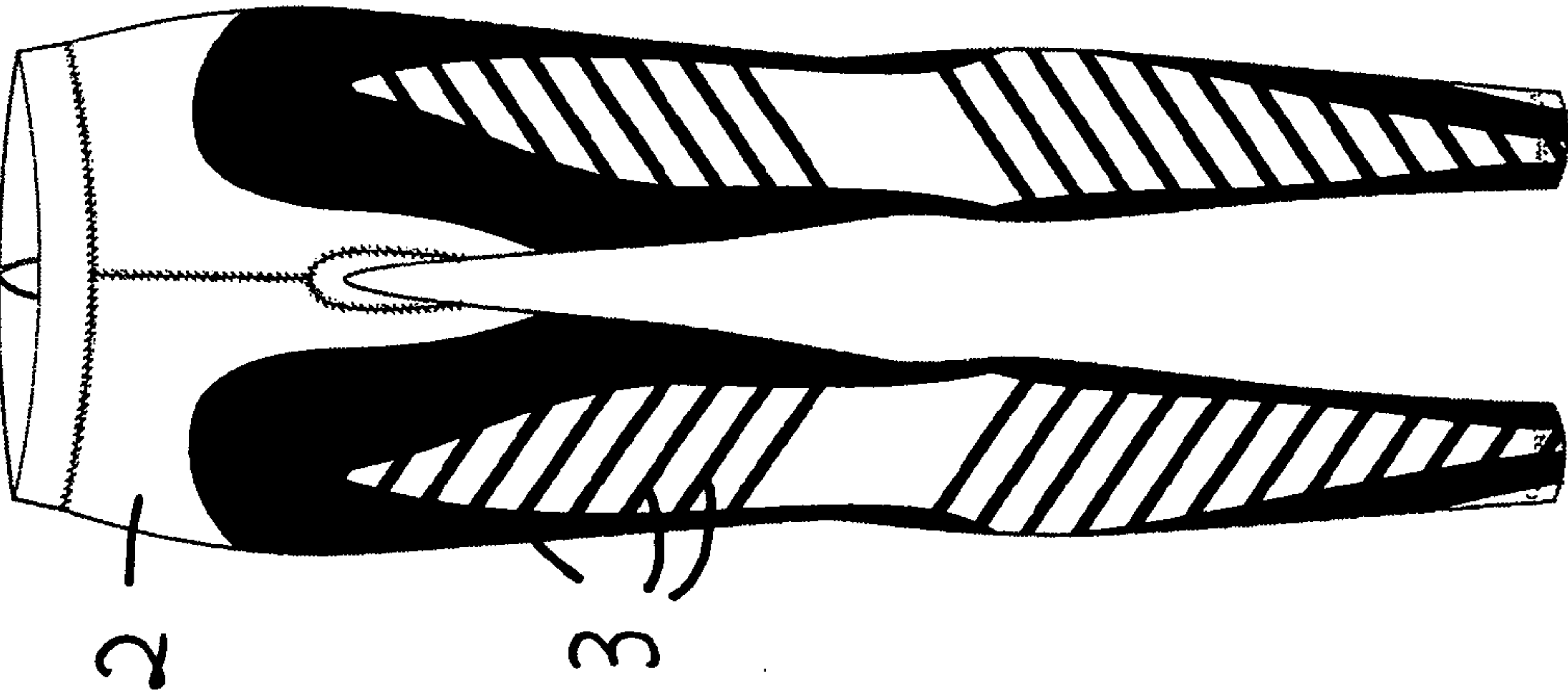


Fig. 8b

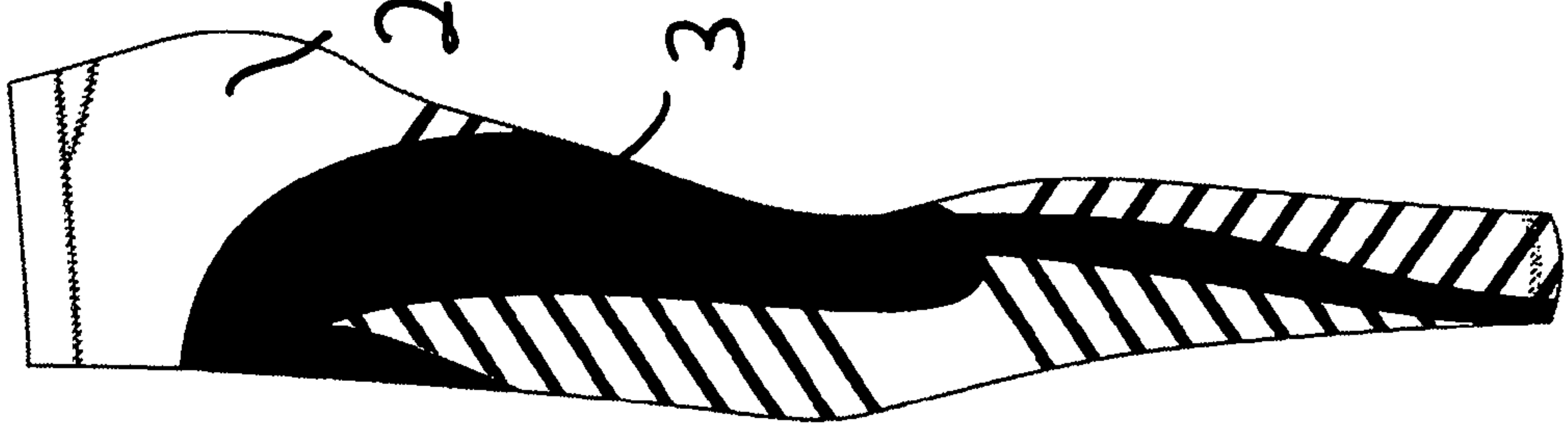


Fig. 8c

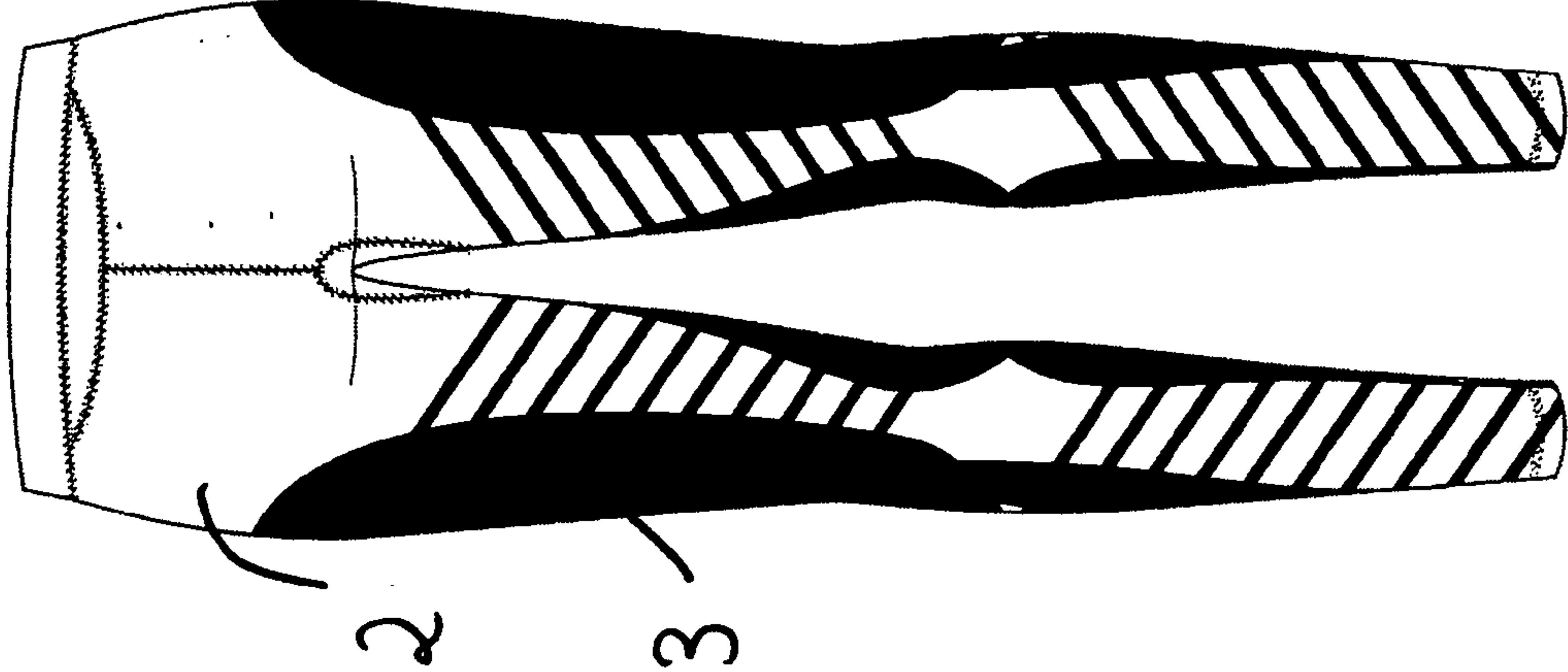
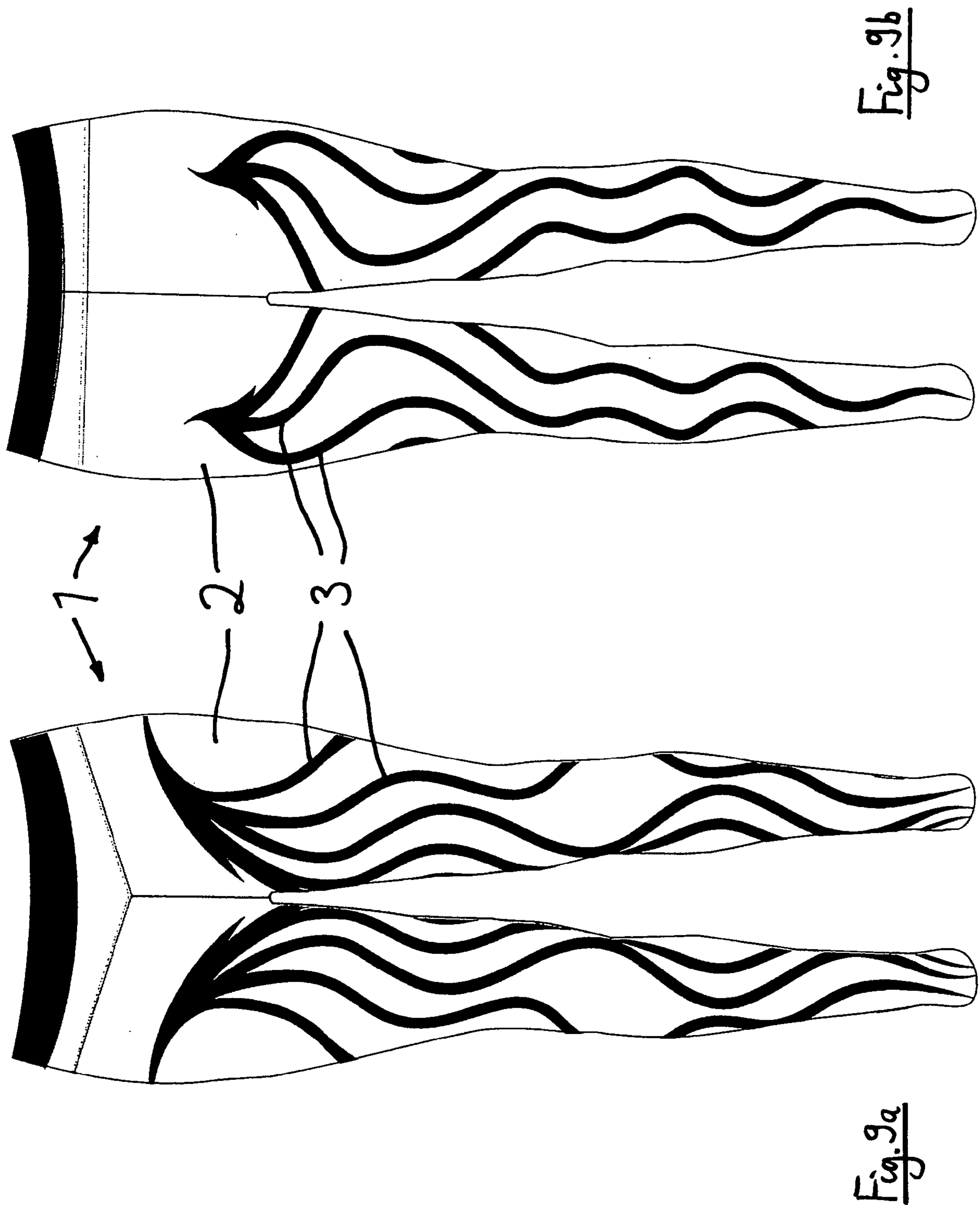
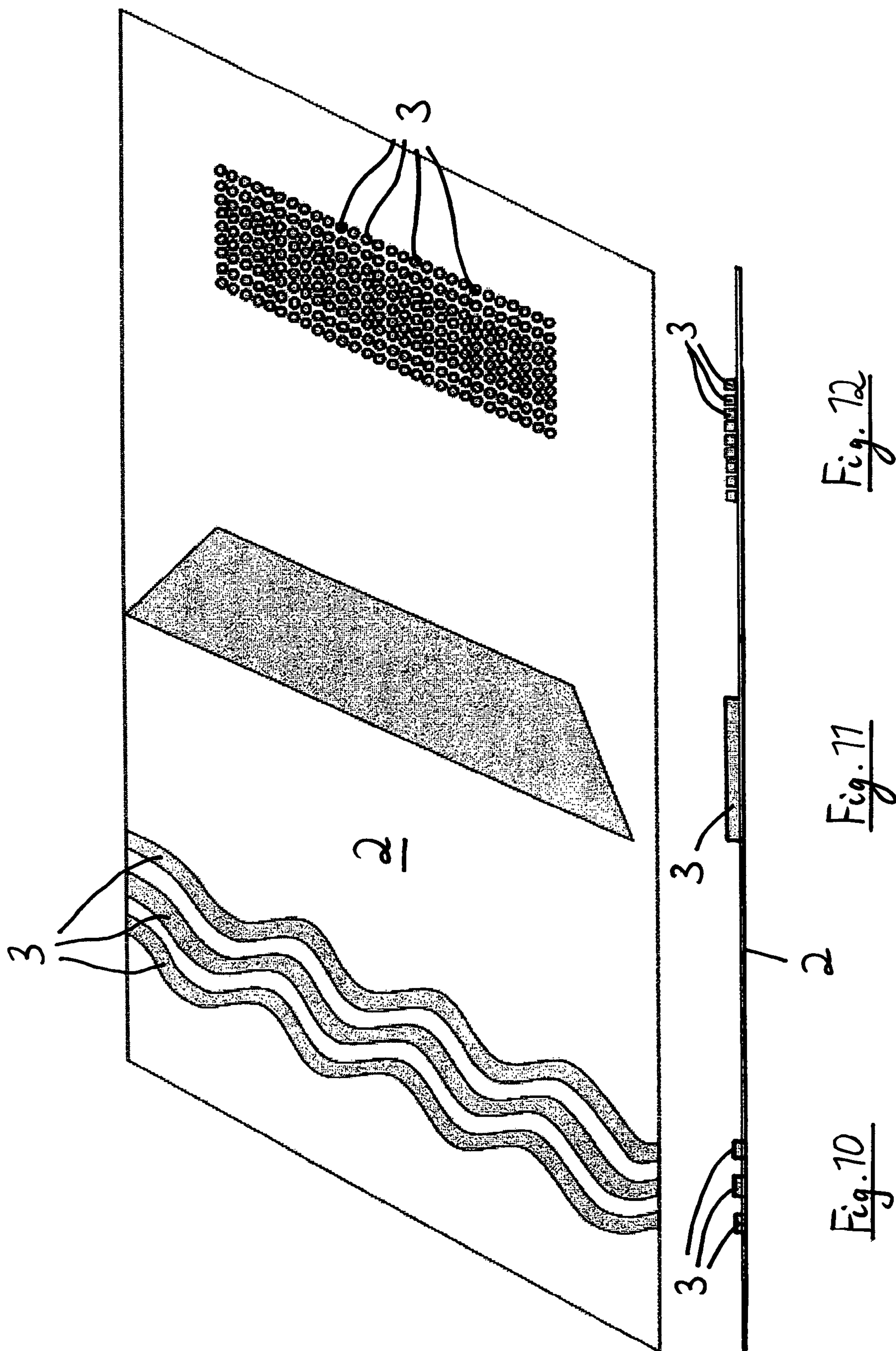


Fig. 8d





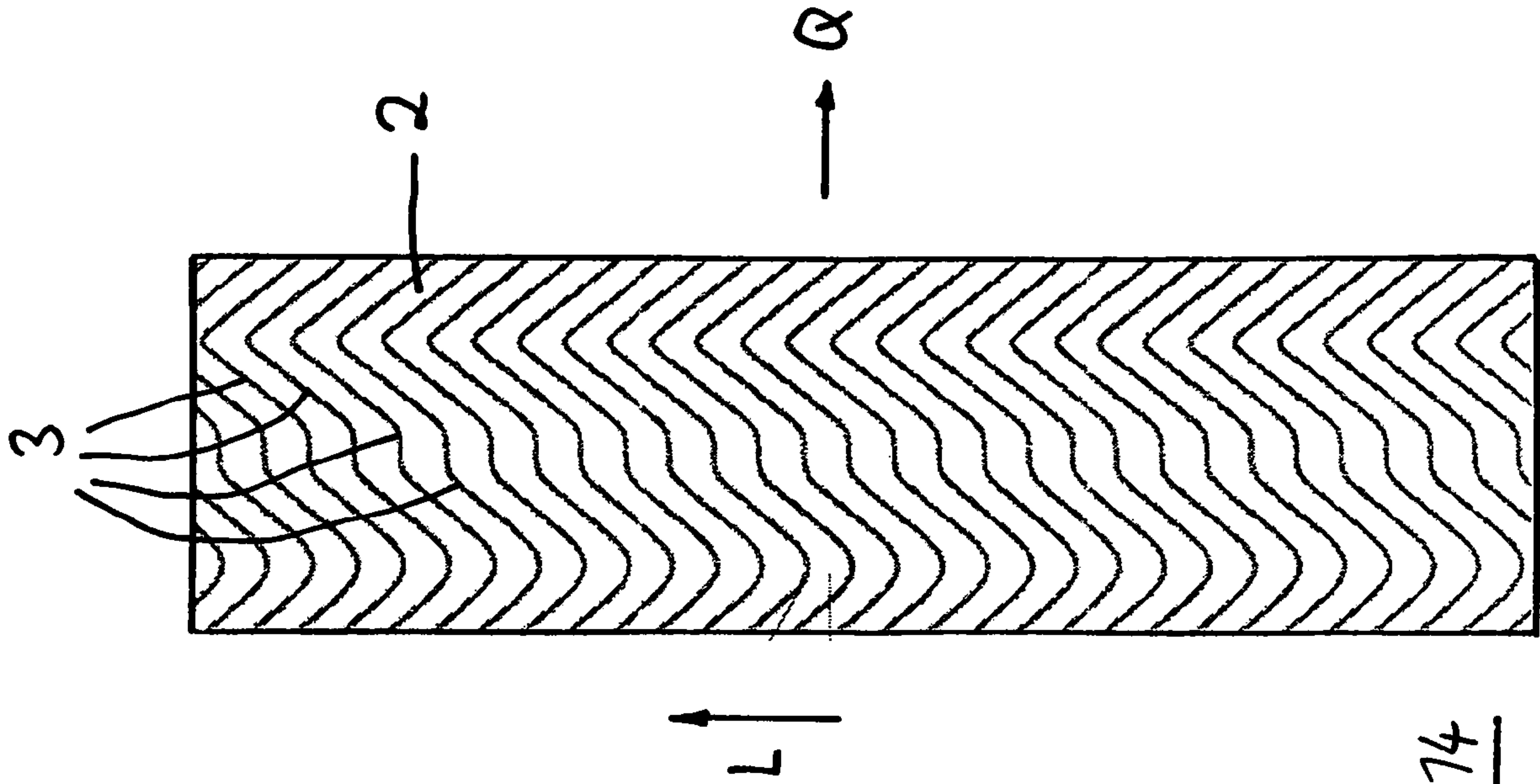


Fig. 74

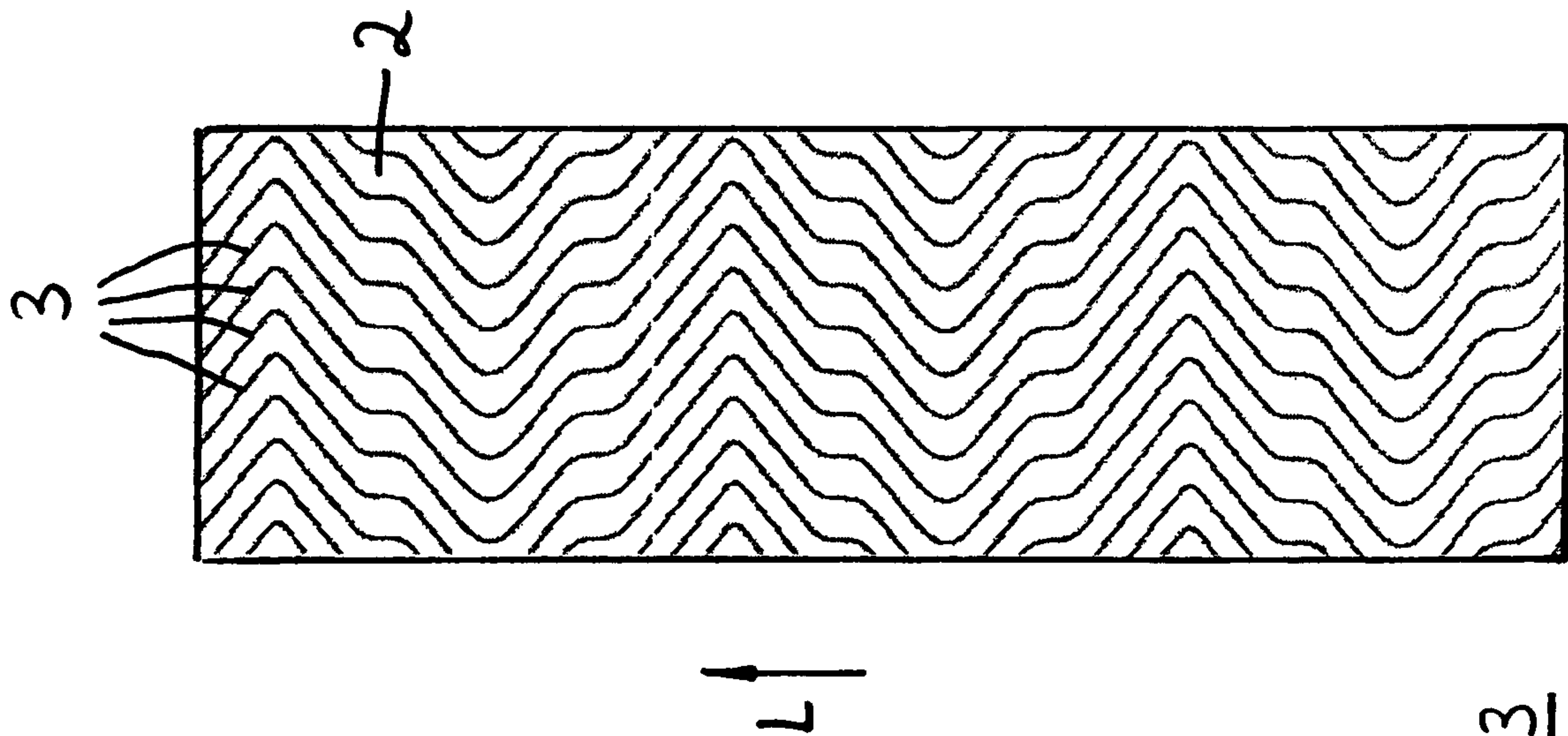
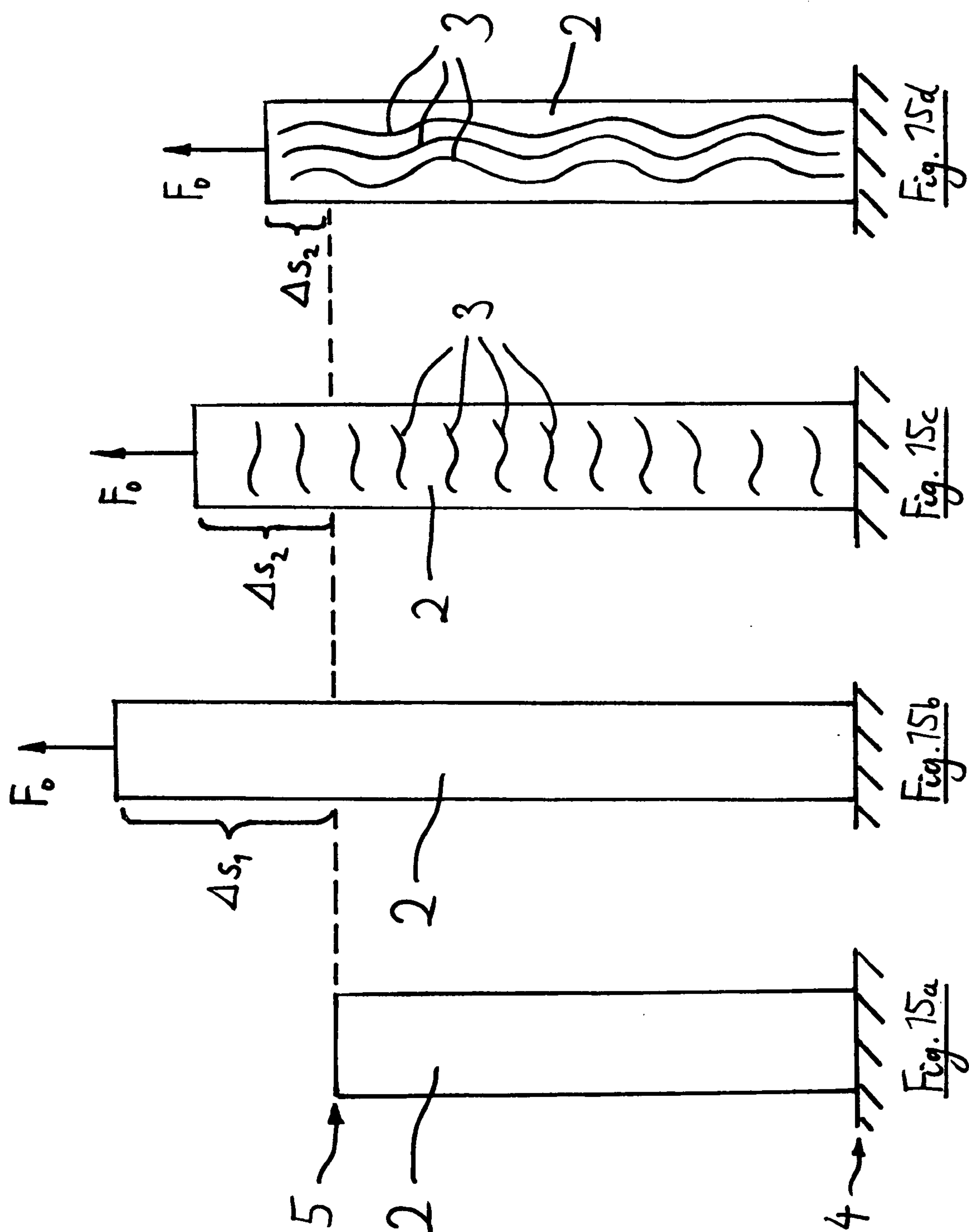


Fig. 73



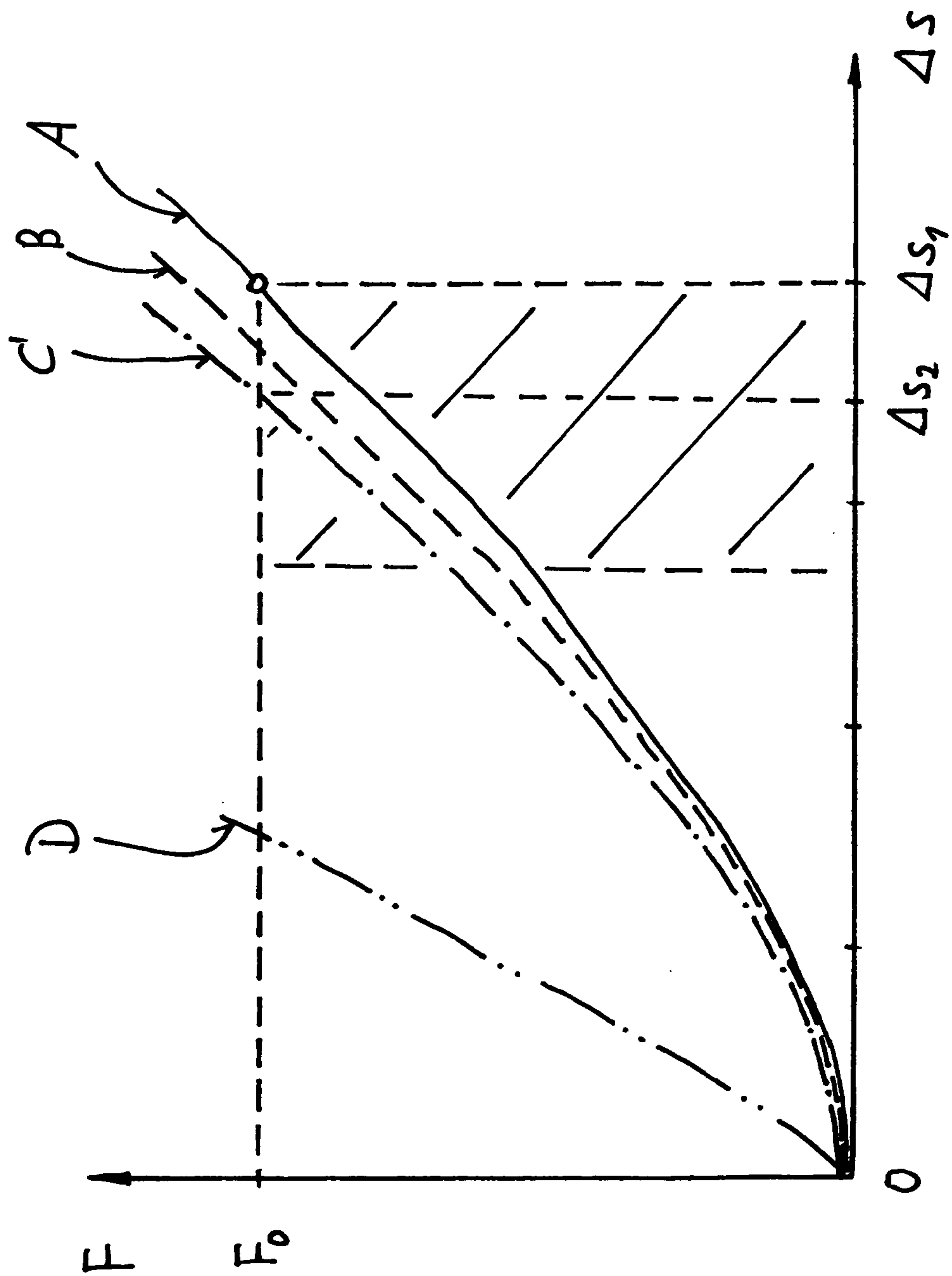


Fig. 76

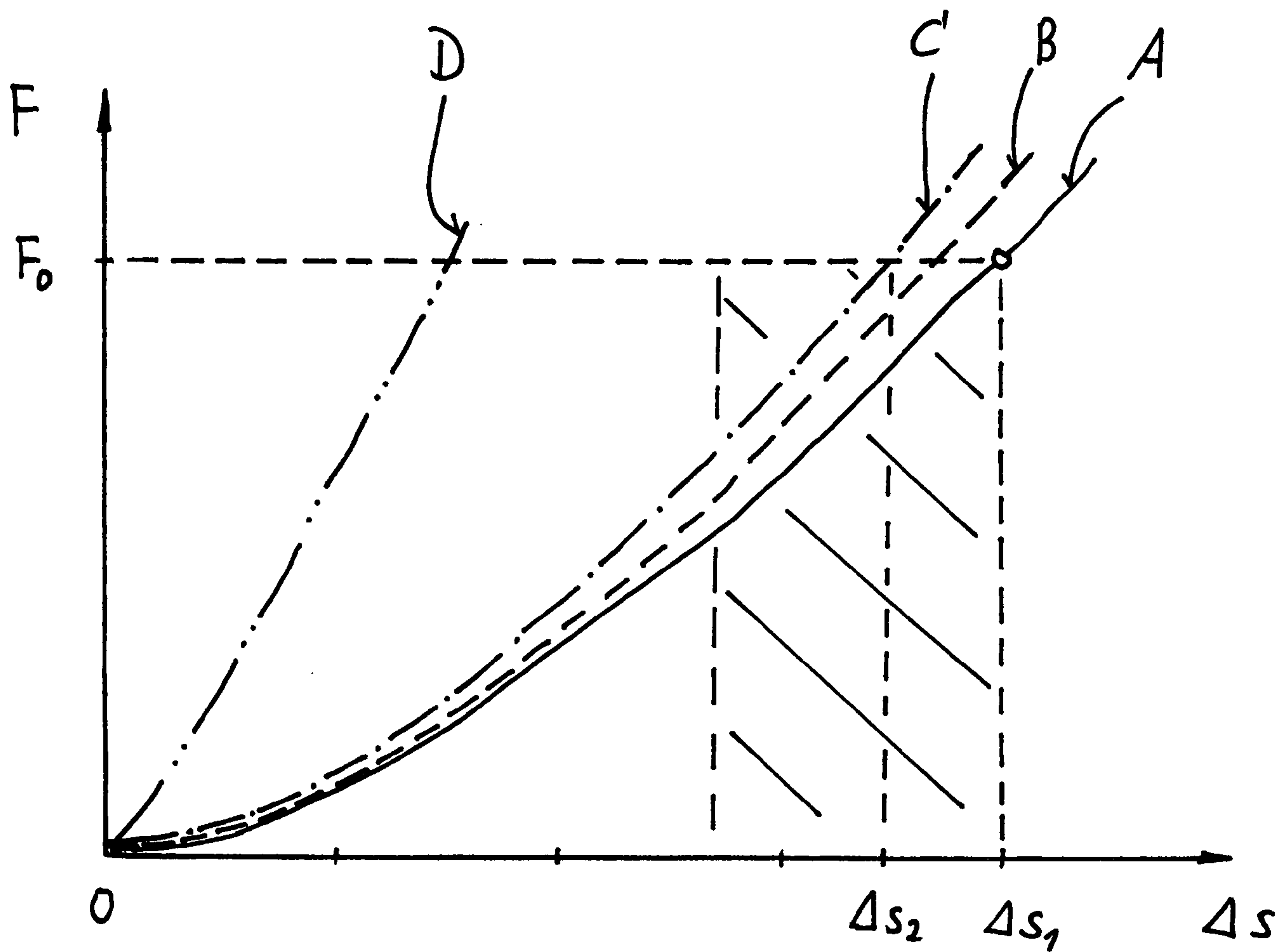


Fig. 76