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(54) Titre : ATTACHE A DOUBLE USAGE
(54) Title: DUAL-PURPOSE CLIP

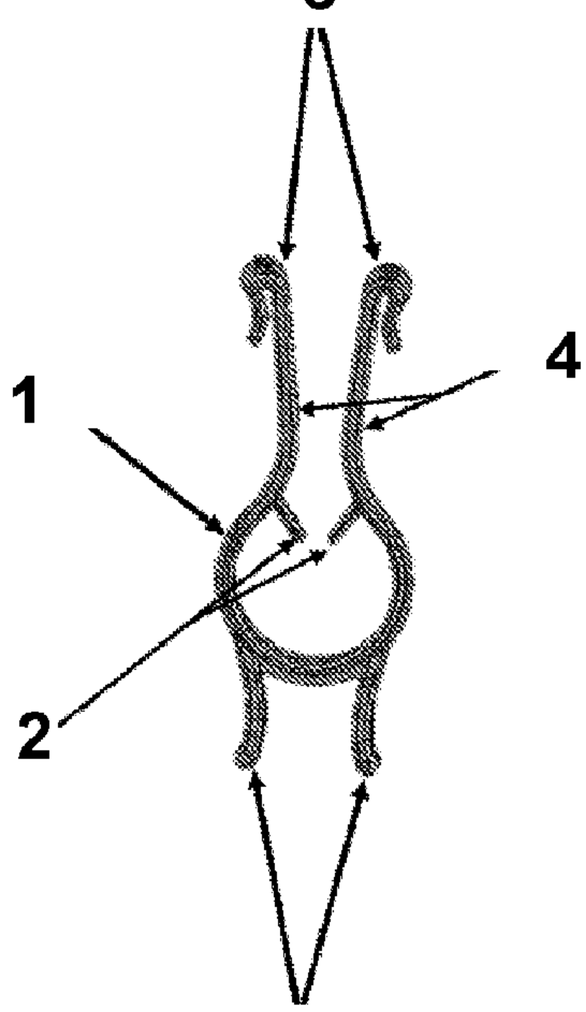

Fig. 1A

(57) Abrégé/Abstract:
This invention provides a single dual-purpose clip that accompanies the plant from the seedling stage at the nursery to full growth at the greenhouse. The clip comprises a ring with an opening, levers attached to the ring at opposing locations to the opening,

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(57) Abrégé(suite)/Abstract(continued):
inwardly deflected projections at the opening edges and arms extending outwardly from the edges, with edges configured for holding a wire that can be attached to an elevated wire of a trellising system.

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[Continued on next page]

(54) Title: DUAL-PURPOSE CLIP

(57) Abstract: This invention provides a single dual-purpose clip that accompanies the plant from the seedling stage at the nursery to full growth at the greenhouse. The clip comprises a ring with an opening, levers attached to the ring at opposing locations to the opening, inwardly deflected projections at the opening edges and arms extending outwardly from the edges, with edges configured for holding a wire that can be attached to an elevated wire of a trellising system.

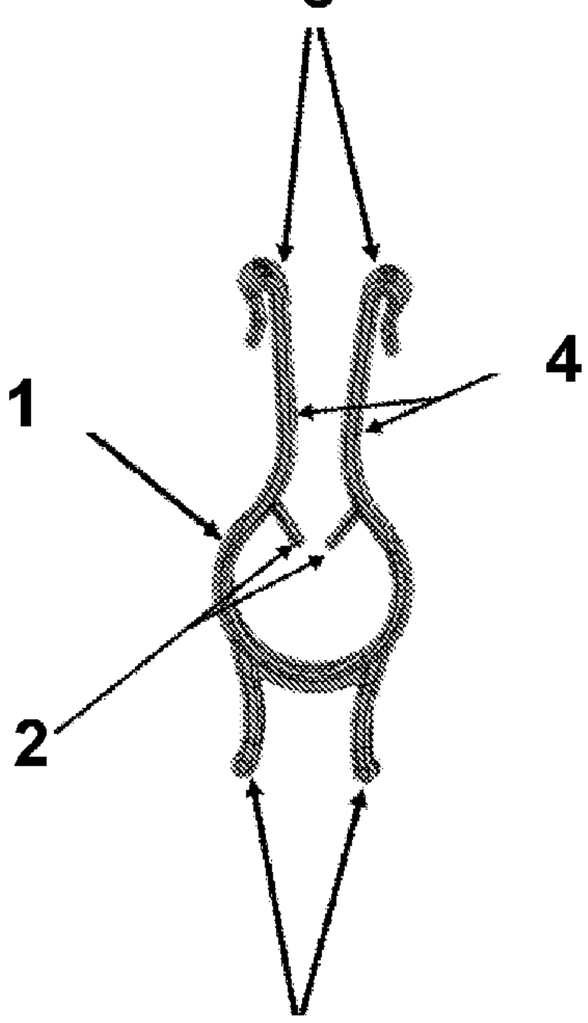

Fig. 1A

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Dual-Purpose Clip

Technical Field

The present invention pertains to trellising plants. More particularly, the present invention pertains to a dual-purpose clip enabling the simultaneous vertical support of a plant stem from a stick inserted in the ground and/or from upper support of the plant from an elevated wire of a trellising system.

Background

Intensive vegetable growing divides a plants life into several periods. In the first period, the seed is sown in dedicated nurseries until the plant reaches the age of a number of weeks. In the second period, the plant is transferred to a greenhouse for continued growing. At the nursery, the plants are supported with a stick for vertical growth, using a dedicated clip wrapping around their stem to provide them with support for that period and prevent breakage of the plants when moved out of the nursery. When moved to a greenhouse, a trellis system is used, to which the plants are attached with a second special clip to enable them grow vertically up. This second special clip holds a wire that attaches to an elevated trellising wire at the greenhouse.

The clip, which is used at nurseries, is a C shape clip with inwardly deflected projections at its edges for narrowing the ring opening and preventing it from slipping off of the plant or support stick. At the rear side of the clip, attached to the ring are two levers in opposing positions to the projections. The material of the C shape clip, projections and arms is semi-rigid, semi-elastic with about 2-3 mm thickness, so that pressing the levers one toward the other causes the projections to distance from each other and widen a path to the clip enclosed space between the projections. At the nursery, the plant stem is introduced into that space. A support stick is positioned next to the plant. The clip connects the plant to the stick so that the stick supports the seedling throughout the process of growth until it is moved to and planted in the greenhouse.

After the seedling is planted in the greenhouse, the plant is attached to a vertical trellis wire using a designated clip designed to attach the plant stem to the trellis wire. This clip is specially designed for this purpose, and uses semi-rigid/semi-elastic polymeric material to provide the required functionality of the clip.

As described above, the support of the plants at the nursery and greenhouse with a stick or trellis system is done with two different devices or clips. This renders plant treatment cumbersome and relatively costly, risking plant stem erection and surface while attaching clips around it twice. The transfer of plant seedlings from the nursery to the greenhouse already requires gentle handling. Adding further attachment of a second clip to the plant stem requires extra careful handling when wrapping that clip around their stem without causing breakage, injuries or damage.

It is, therefore, an object of the present invention to provide a single dual-purpose clip that accompanies the plant from the seedling stage at the nursery to full growth at the greenhouse.

It is yet another object of the present invention to provide a single dual-purpose clip that is used for attaching a seedling at the nursery throughout the plant growth at the greenhouse to supporting objects, e.g., stick, pole, elevated wire of a trellising system at the greenhouse, for continued vertical growth of the plant.

Summary of Invention

In one aspect, the present invention provides a single dual-purpose clip that is designed for two required functionalities of plant stem support and attachment to a trellising system. Accordingly, this clip integrates a support nursery used clip for a seedling with means for attachment to an elevated wire of a trellising system at the greenhouse. This way, support of the plant stem is continuous from the seedling stage at the nursery to the greenhouse.

Hence, while in the greenhouses, the worker connects the trellis wire that is suspended above directly to the dual-purpose clip without the need for an additional clip.

Application wise, this dual-purpose clip is configured for use for all types of plants for vertical growth throughout their lives, whether these are vegetable or any other type of plants. Accordingly, this clip is labor-saving with no potential damage to the plant, removing the need to apply another clip and reducing the manhandling of the plant itself in comparison to using the currently used clips.

In one aspect, the present invention provides a dual-purpose clip, which is used to support the plant by attaching the seedling to a support stick. When the plant is transferred to a greenhouse for continuation and completion of growth, the dual-purpose clip is used to attach the plant to a trellis twine system.

In one embodiment, the dual-purpose clip has an open C-shape ring structure with inwardly deflected projections at its open ends to narrow the ring opening and prevent the plant stem from falling outside the space enclosed by the ring.

In still another embodiment, the C-shape ring comprises a pair of levers or arms attached to the ring at the distal end opposing the ring opening for widening the clip opening to introduce the plant stem into the space enclosed by the ring.

In still another embodiment, the dual-purpose clip comprises one or more anchors for holding a wire and attaching it to an elevated wire of a trellising system.

In still another embodiment, the dual-purpose clip is made of a semi-elastic, semi-rigid material, which is configured to respond to applied pressure by distortion of shape. Particular such semi-elastic, semi-rigid materials comprise visco-elastic polymers, elastic metals and any composition thereof with such property. In yet another embodiment, the anchors are designed in any shape that is configured for holding a wire on one end, where this wire may be connected to an elevated trellising wire on its other end.

In still another embodiment, the anchor comprises a curved edge for holding the wire. In particular, such curve is selected from hook shape, groove edge and protrusion

along the edge to enable it to effectively hold a wire, which then may be connected to a trellising system.

The following describes particular exemplary non-limiting embodiments of the present invention with reference to the accompanying drawings and without departing from the broadest scope of the present invention.

Brief Description of the Drawings

Figs. 1A-B illustrate side view of two optional designs for the dual-purpose clip.

Figs. 2A-D show perspective top views of the dual-purpose clip anchored to a plant and trellising from an elevated wire.

Fig. 3 shows the dual-purpose clip in widened state.

Detailed Description of the Drawings

The dual-purpose clip used in nurseries is typically manufactured from semi-rigid material such as polymeric material of a thickness of 2-3 mm. The clip normally has an open ring shape like the letter *"C"* with projections at its ends deflected inwards to narrow the opening and prevent the clip from slipping off of the plant stem or from its support stick. **Figs. 1A** and **B** illustrate side views of two optional designs for the dual-purpose clip (**100**) which is used to attach a plant seedling to a support stick. In both designs, the clip (**100**) has an open C shape ring (**1**) with projections (**2**) at its ends deflected inwards to narrow its opening to a certain diameter and prevent the clip (**100**) from slipping off of the plant or support stick. The opening or closing of the dual-purpose clip (**100**) can be done manually with two special levers (**3**) connected to the bottom side of the ring (**1**). In one particular embodiment, the levers (**3**) are connected to the ring at locations opposing the edges of the ring opening. In still another particular embodiment, the distance between the levers (**3**) is sufficient to cause the ring opening to widen upon application of pressure on the levers (**3**) and enable the introduction of a plant stem or seedling into the space enclosed by the ring.

The levers (**3**) themselves may be ergonomically shaped for manual grip and application of pressure. In one embodiment, the surface of the levers (**3**) is textured, wavy, serrated or indented for improved manual grip and application of pressure.

Along its top side, the design of the dual-purpose clip (**100**) employs one (**Fig. 1B**) or two (**Fig. 1A**) lifting arms (**4**) with curve shaped edges (**5**) and (**6**), respectively, which are required to accommodate a wire introduced within the gap formed within the curve shaped edges, lift the plant seedling or stem and attach the clip (**100**) to an elevated wire of a trellising system. As shown in **Fig. 1A**, for effective lifting and holding of the dual-purpose clip (**100**) and plant to the trellising system, the lifting arm edges are designed to have a curved edge with a geometrical shape similar to a hook. The arms (**4**) also provide a path for leading the plant stem into the space enclosed by the C-shaped ring (**1**).

Figs. 2A and **C** show top perspective views of the dual-purpose clip (**100**) with its two functionalities in two possible applications. **Figs. 2A** and **C** show the clip (**100**) holding the plant stem (**7**) with the ring shape part (**1**) in its closed position, attaching it with a dedicated cable (**8**) to a support stick (not shown). **Figs. 2B** and **D** show the clip (**100**) holding the plant stem (**7**) and lifting it vertically by attaching the dedicated wire (**8**) to a trellising system (In both Figures the support stick and trellising system parts are not shown). **Figs. 2C-D** are zoom-in views of **Figs. 2A-B**, respectively, showing closer view of the dual-purpose clip arms (**4**), the anchor curved edges (**5**) that hold the wire (**8**) and the inwardly deflected projections (**2**) that close the inner space enclosed within the ring (**1**). In **Fig. 2D**, the curve shaped edges (**5**) are brought close to each other by inserting a wire (**8**) in their gaps and pulling it away from them. This also causes the projections (**2**) to be brought together and close the inners space enclosed within the ring (**1**).

Fig. 1B shows an alternative optional design of the clip (**100**) which employs a single lifting arm (**4**) attached to one edge of the ring (**1**) opening of the clip (**100**). In this case, to improve the hooking functionality of the single lifting arm (**4**), its edge (**6**) is designed to have a curved T-shape like edge (**6**) which is curved along both of its sides creating a double hooking functionality along the edge of the single arm, This

design enables a similar holding and lifting functionality as the design shown in **Fig. 1A**, enabling the locking of a wire for attaching to an elevated wire of a trellising system. As a result, this optional design is employed to sustain the stability of the clip as that in **Fig 1A** by creating an efficient vertical lifting option for the plant using only a one lifting arm.

As is seen in the Figures, the design and shape of the clip is configured to simultaneously connect the plant stem to both a support stick for holding the plant stem upright and an elevated wire of a trellising system through a wire held by the curve-shaped edges of the arms. As a result, the plant growth is kept vertical throughout the different stages of its growth and transfer from the nursery to its planting in the greenhouse. It should be noted that the attachment to a support stick can begin from the early life of the plant as a seedling in the nursery and continue in the greenhouse.

Fig. 3 shows the dual-purpose clip (**100**) with the levers (**3**) pressed toward each other, widening the gap between the arms (**4**) and the gap between the projections (**2**)and enlarging the ring (**1**) opening. This enables introducing the seedling or plant stem into the space enclosed within the ring (**1**), attach a support stick to it, and further to an elevated wire of a trellising system.

Claims

1. A dual-purpose clip comprising:
   - a partially open C-shaped ring;
   - inwardly deflected projections at edges of opening of said C-shaped ring ;
   - a pair of levers attached to said C-shaped ring at positions opposing said edges of opening of said C-shaped ring;
   - one or more arms extending outwardly from said edges; and
   - one or more edges of said one or more arms, said edges are configured for holding a vertical wire and attaching said dual-purpose clip to an elevated wire of a trellising system.

2. The dual-purpose clip according to claim 1, wherein surface of said levers is ergonomically shaped for manual grip and application of pressure.

3. The dual-purpose clip according to claim 2, wherein said surface is textured, wavy, serrated or indented for improved manual grip and application of pressure.

4. The dual-purpose clip according to claim 1, wherein said one or more edges of said one or more arms are curve-shaped edges.

5. The dual-purpose clip according to claim 4, wherein said curve-shaped edges are in the form of a hook.

6. The dual-purpose clip according to claim 4, comprising single said arm, said edge of said single arm is a T-shape like edge curved along both sides of said single arm.

7. The dual-purpose clip according to claim 4 comprising a pair of said arms, wherein said edge at each one of said pair of arms is a curve-shaped edge in the form of a hook.

8. The dual-purpose clip according to claim 1, wherein said one or more edges are in the form of a groove.

9. The dual-purpose clip according to claim 1, wherein said one or more edges are in the form of a protrusion.

10. The dual-purpose clip according to claim 1, wherein said dual-purpose clip is made of semi-rigid, semi-elastic material.

11. The dual-purpose clip according to claim 10, wherein said semi-rigid, semi-elastic material is selected from polymeric material, metallic material and any combination thereof.

12. The dual-purpose clip according any one of the preceding claims, wherein said clip is configured for simultaneous attachment to support stick and elevated wire of trellising system.

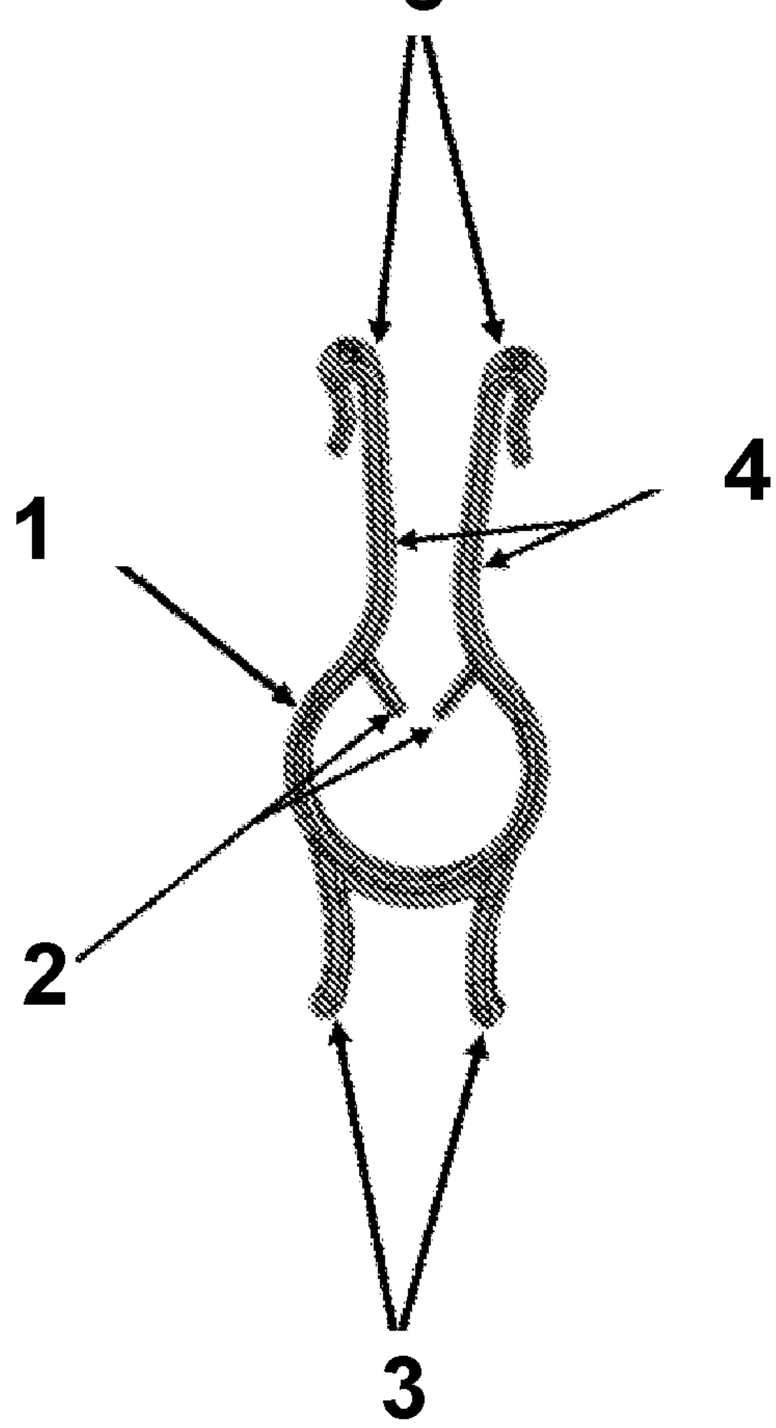

Fig. 1A

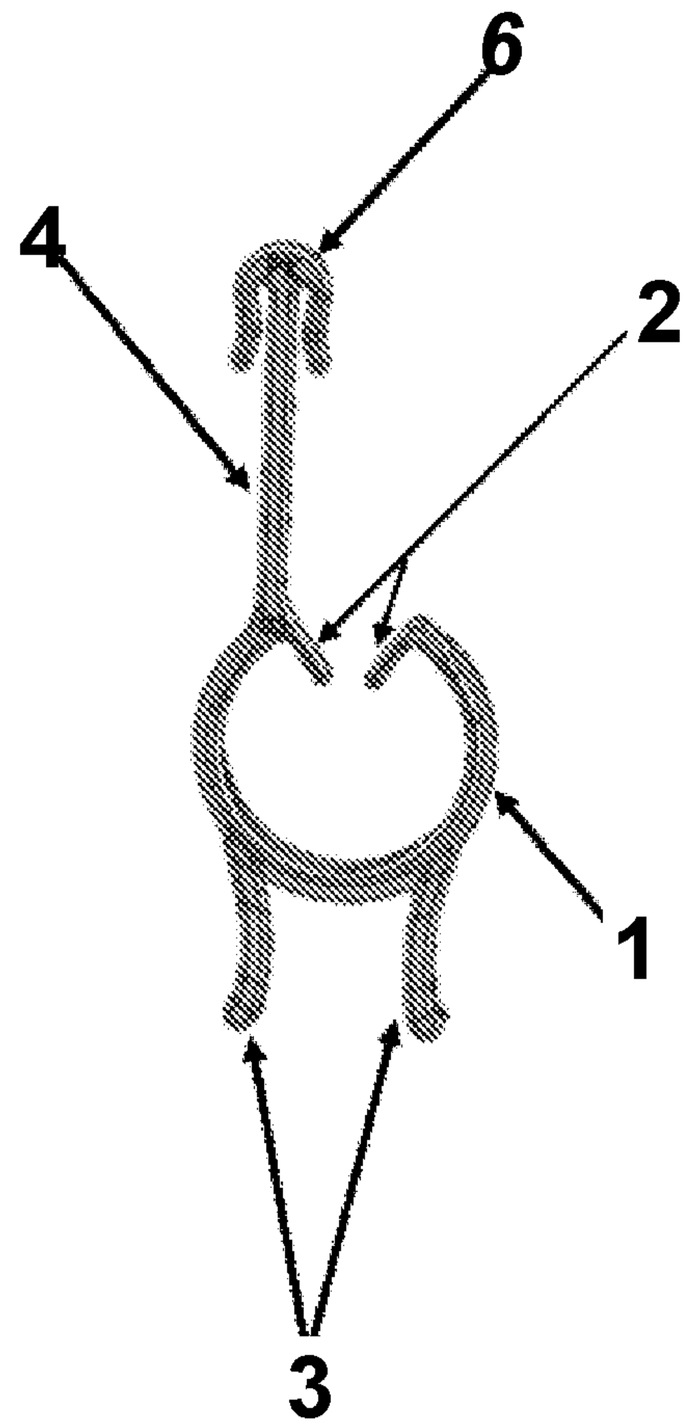

Fig. 1B

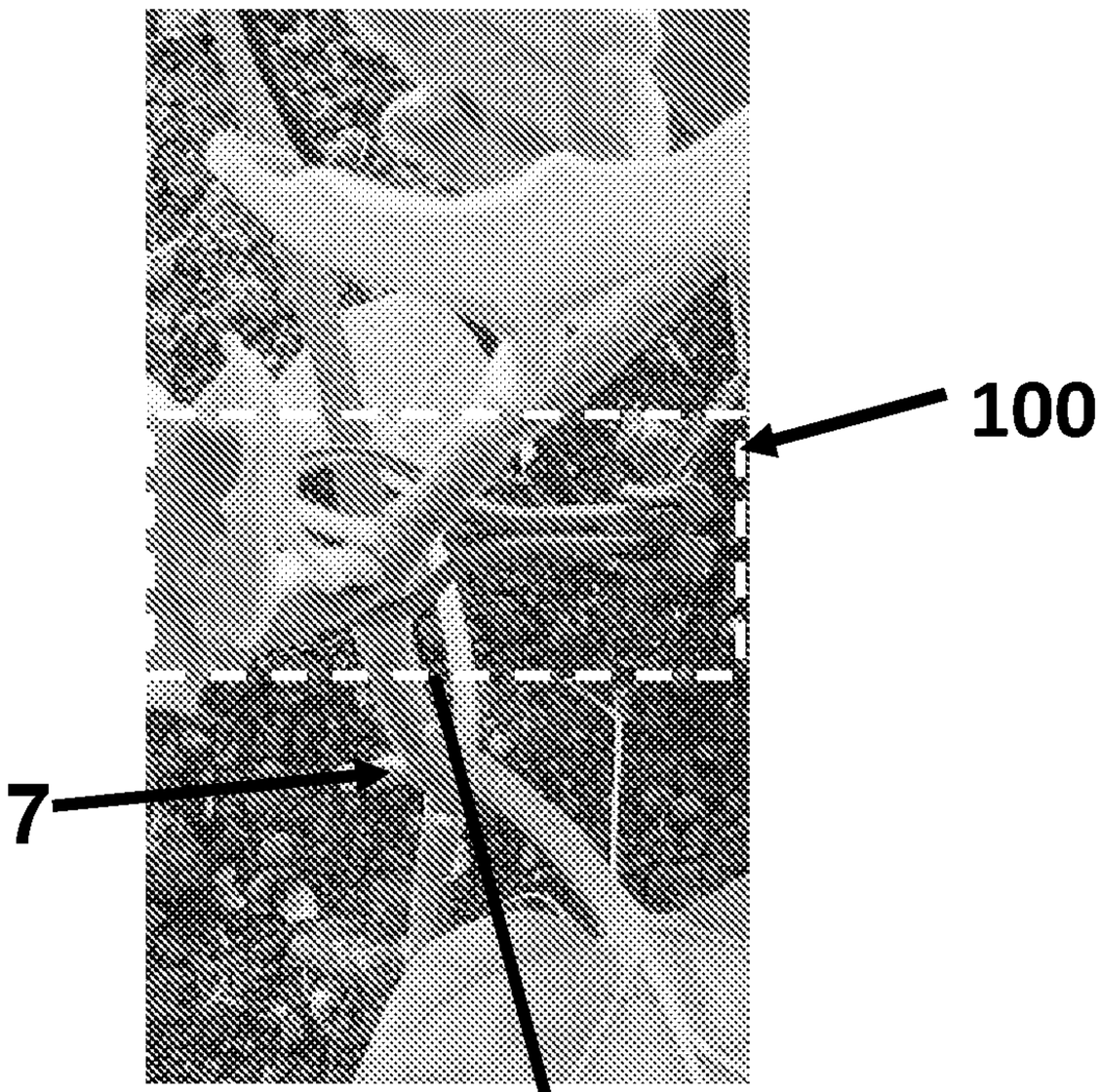

Fig. 2A

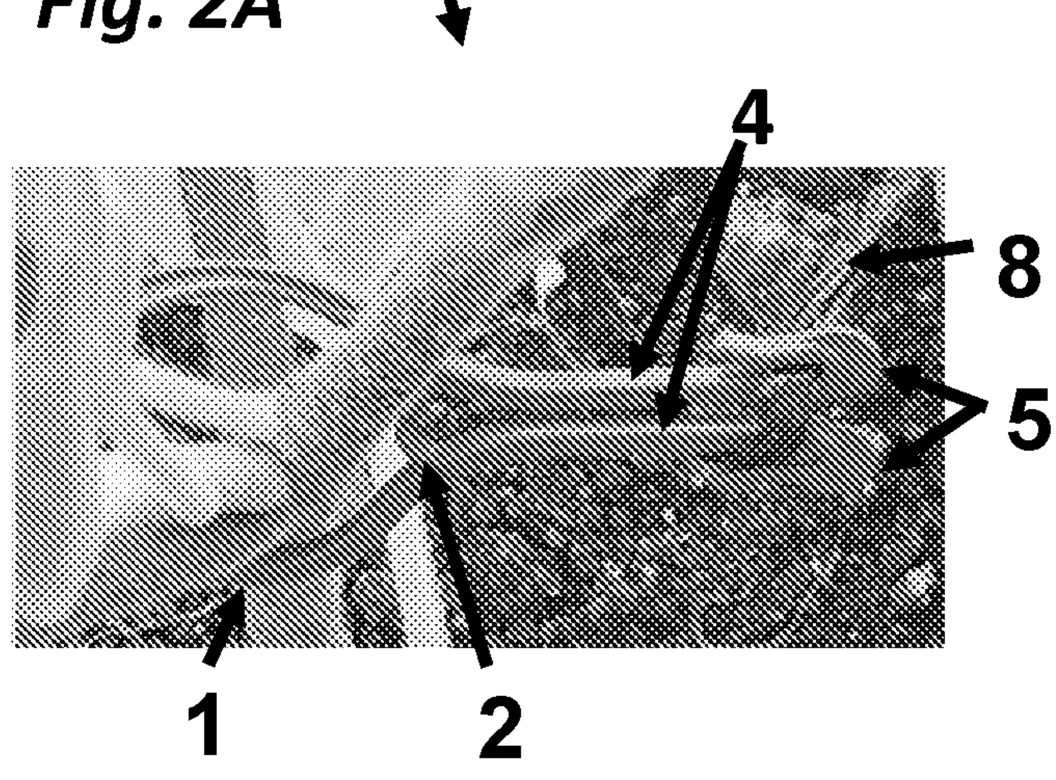

Fig. 2C

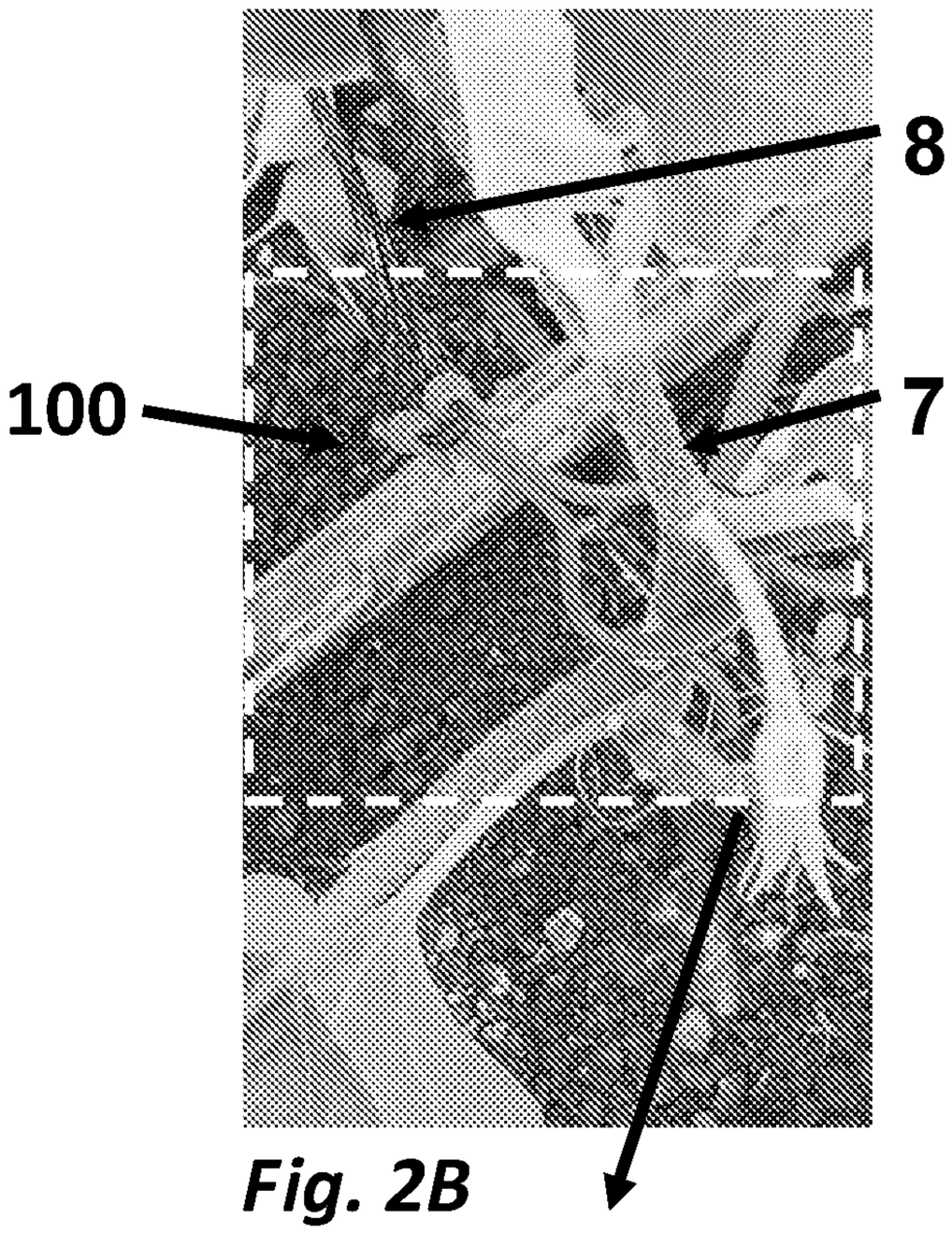

Fig. 2B

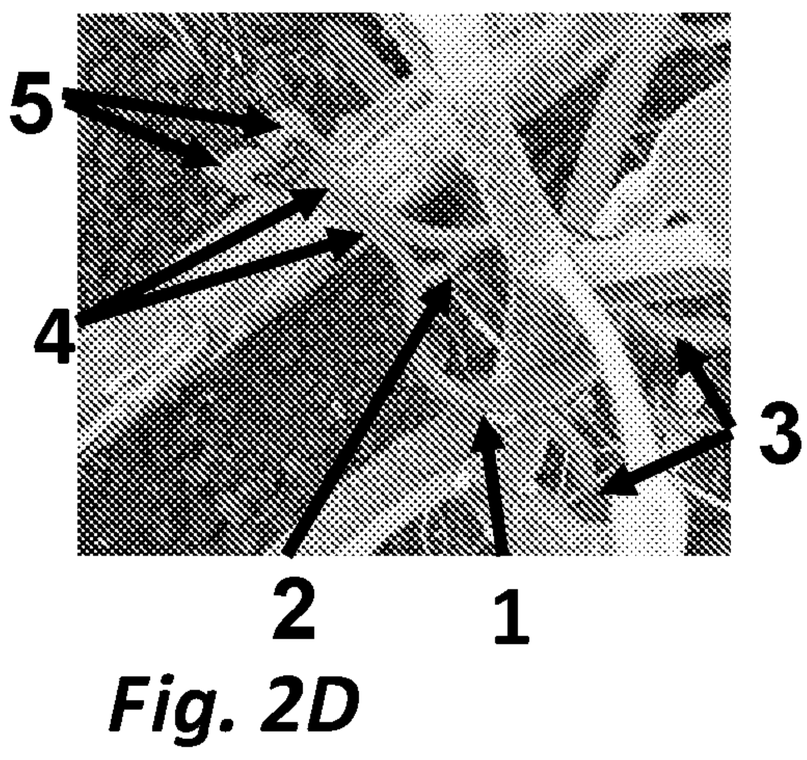

Fig. 2D

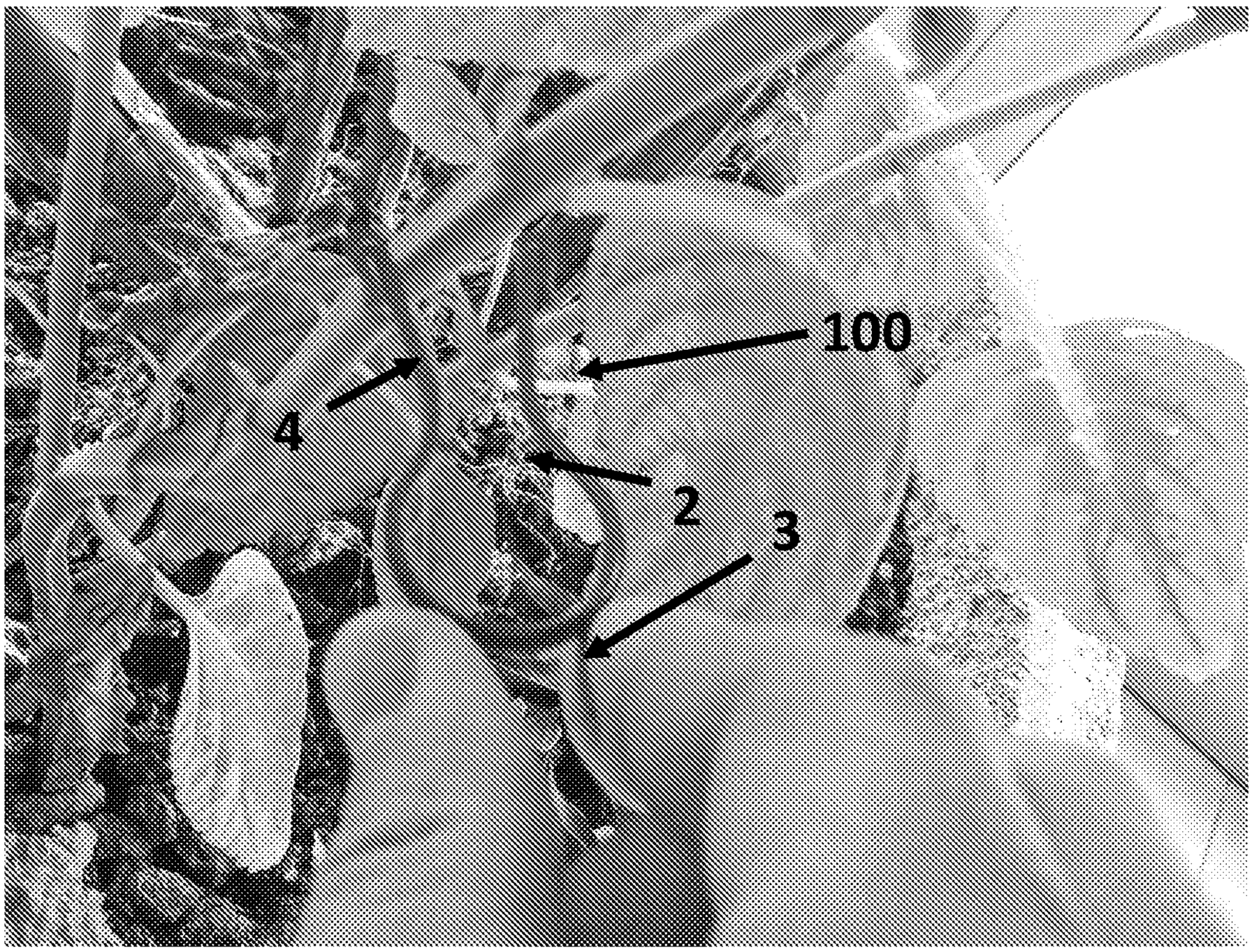

Fig. 3

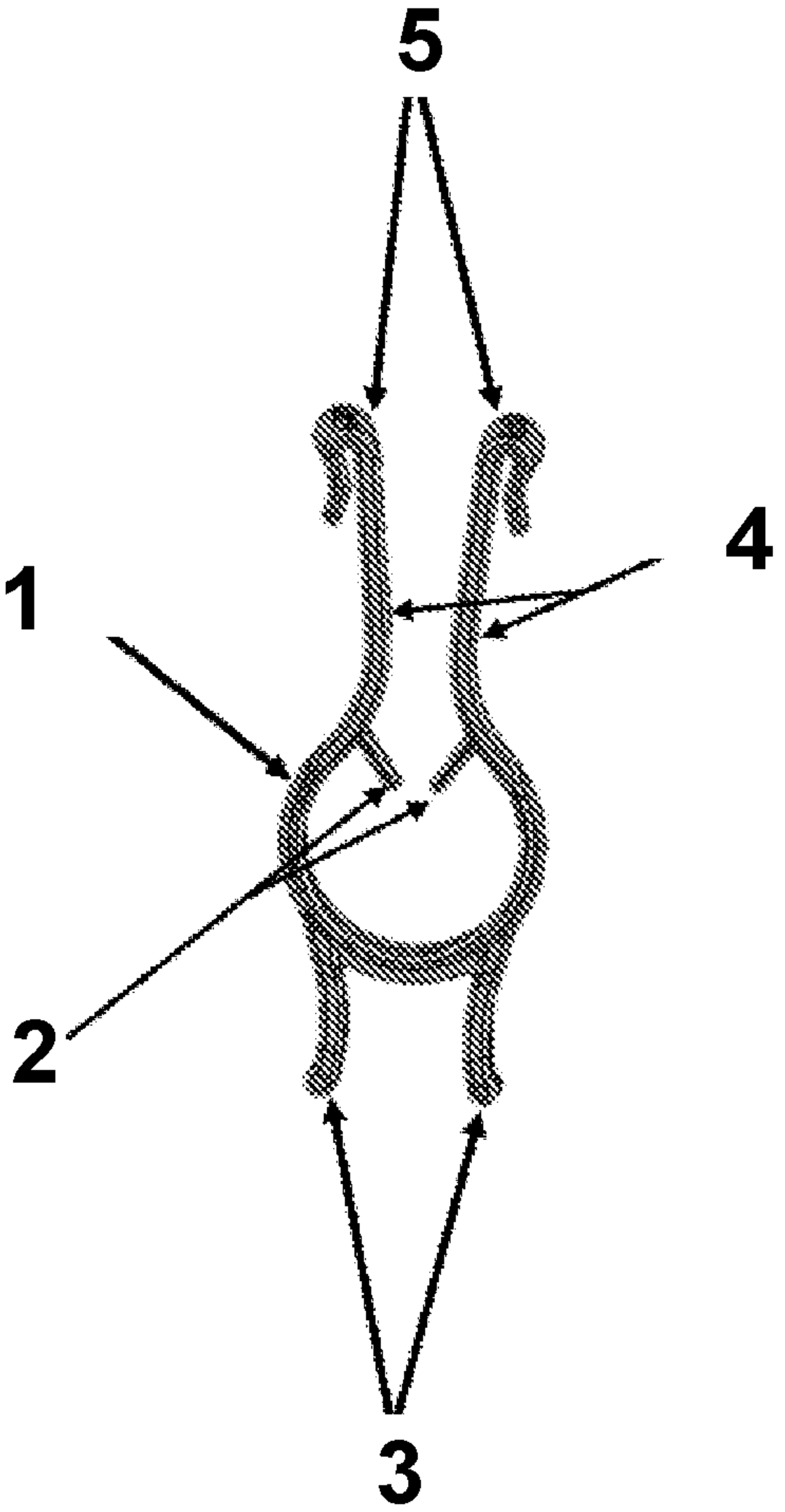

Fig. 1A