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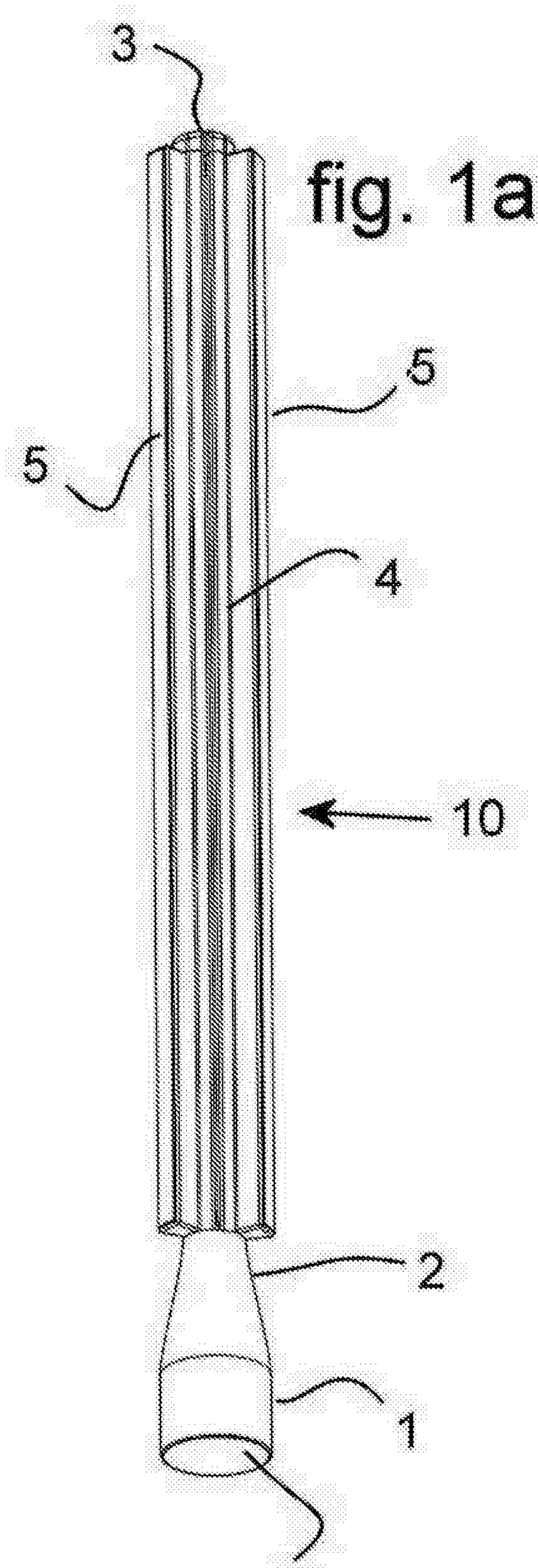

fig. 1a

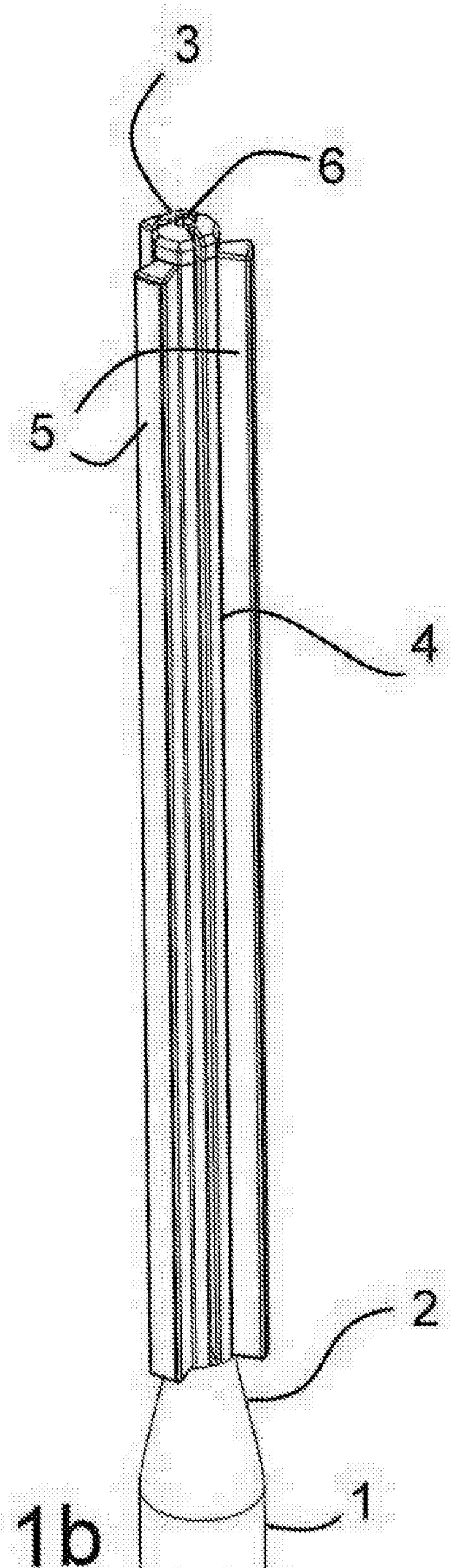

fig. 1b

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fig. 2a

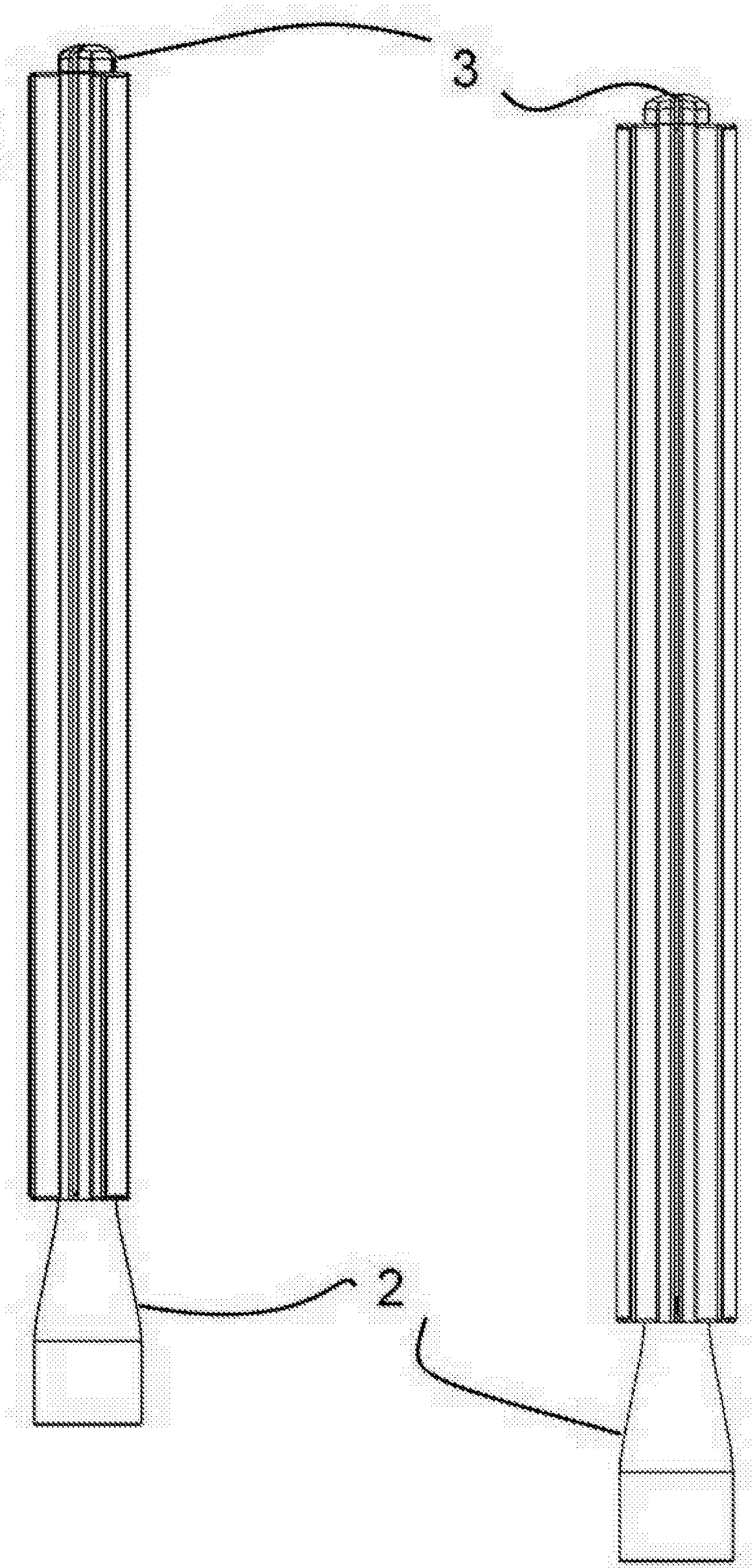

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fig. 2b

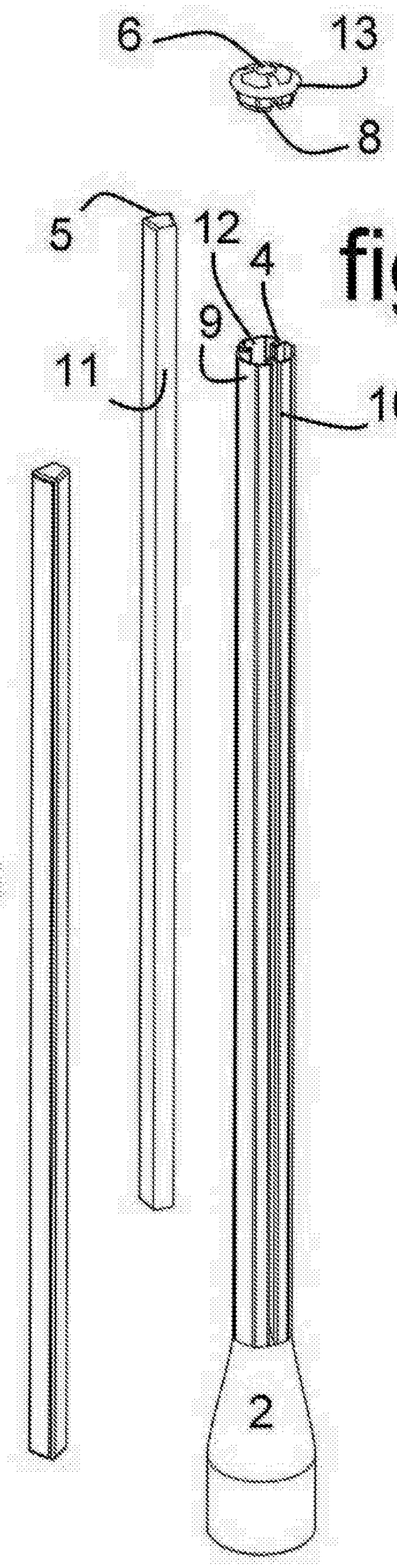

fig.3

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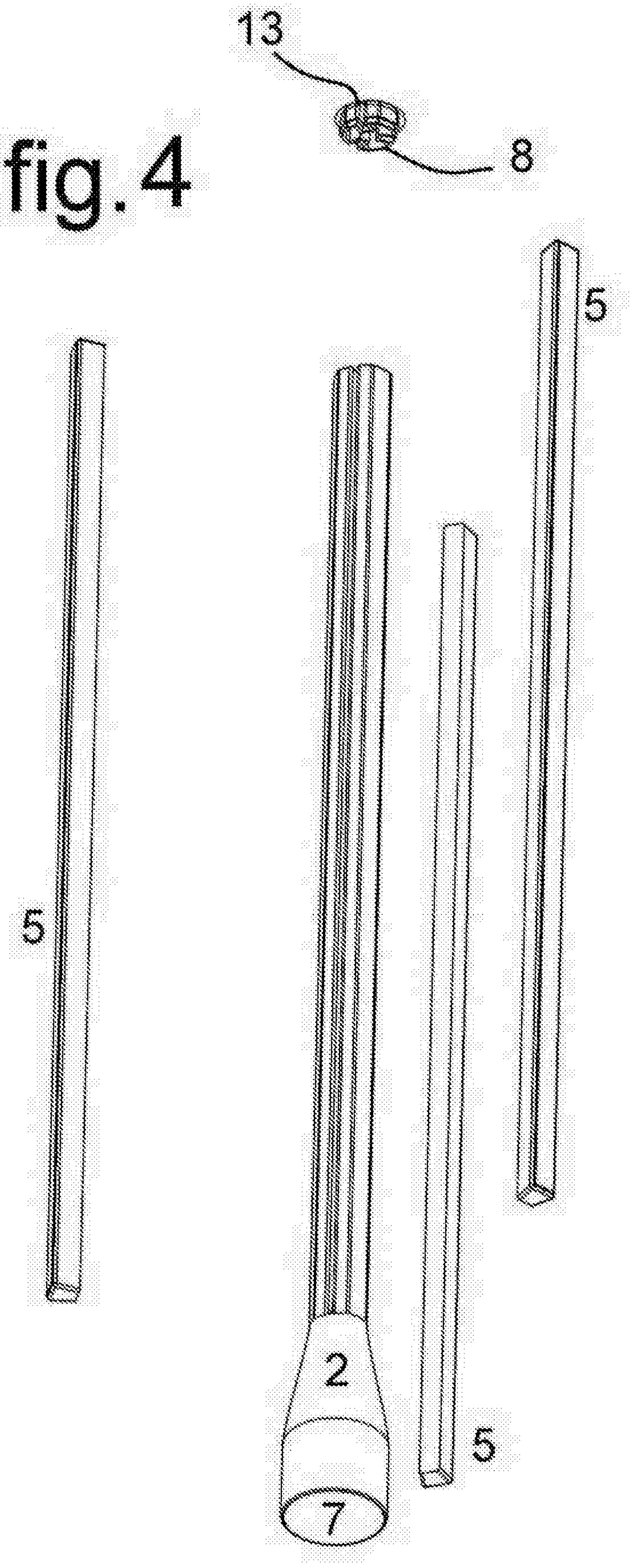
fig.4



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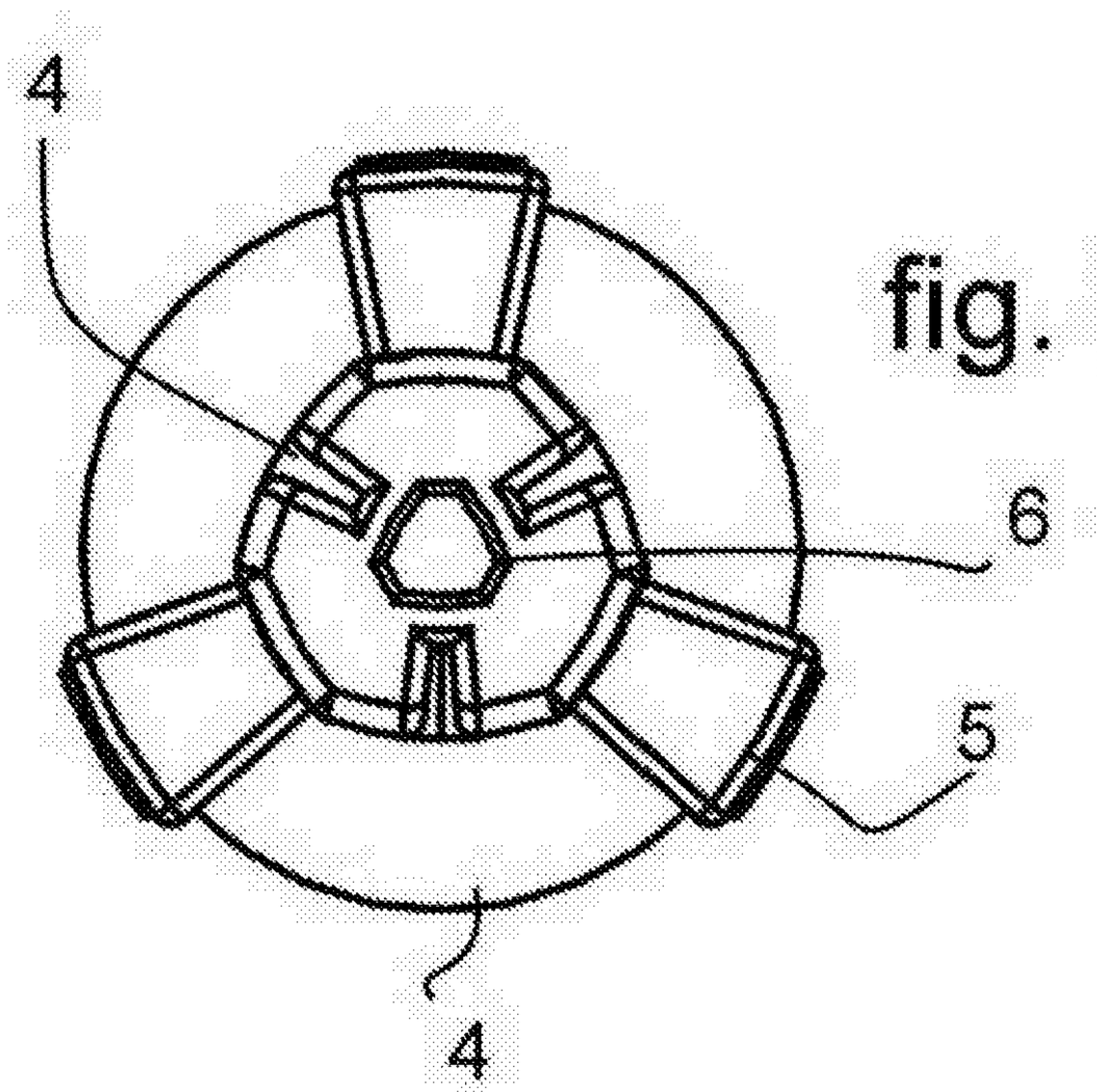

fig. 5a

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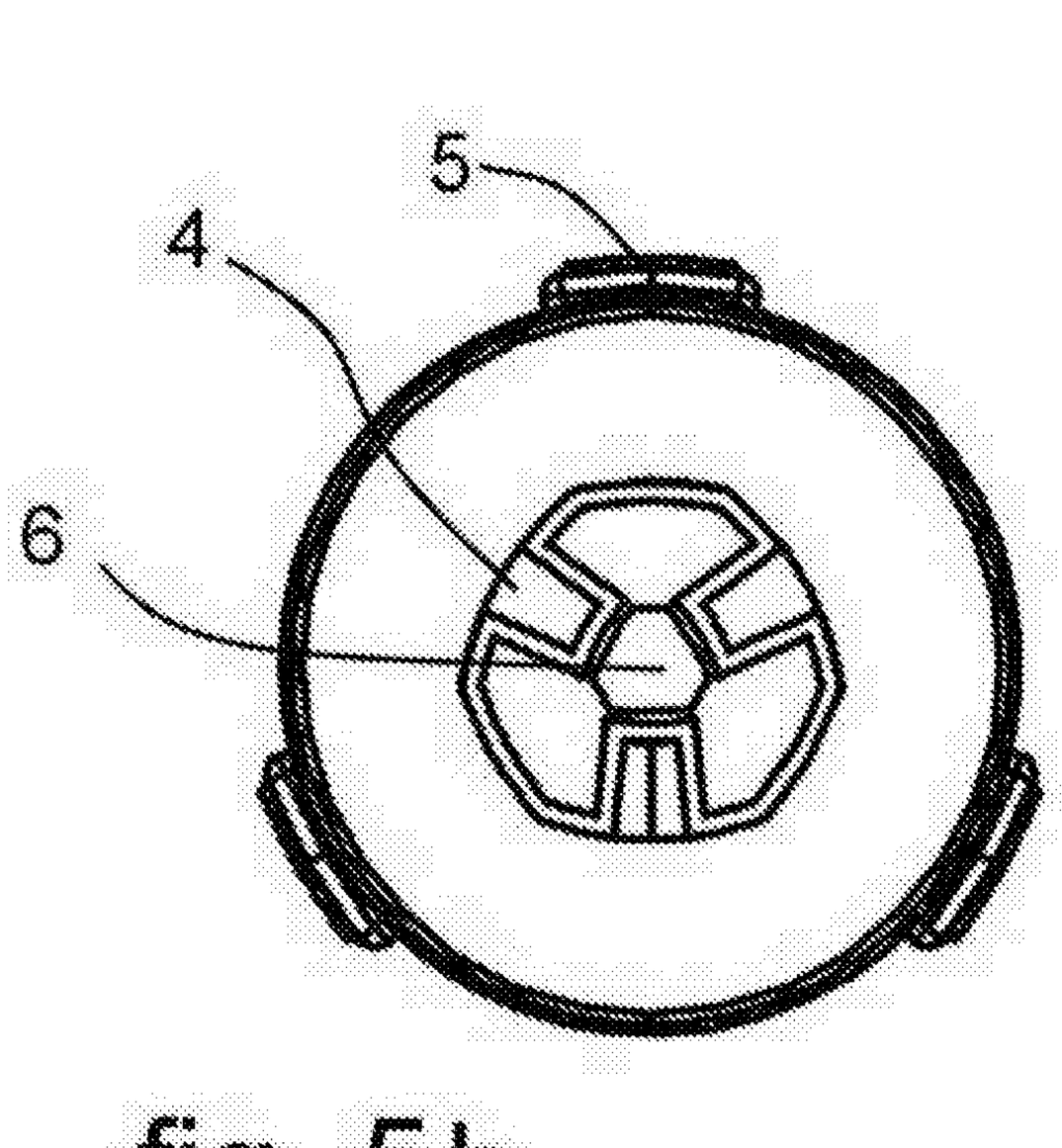

fig. 5b

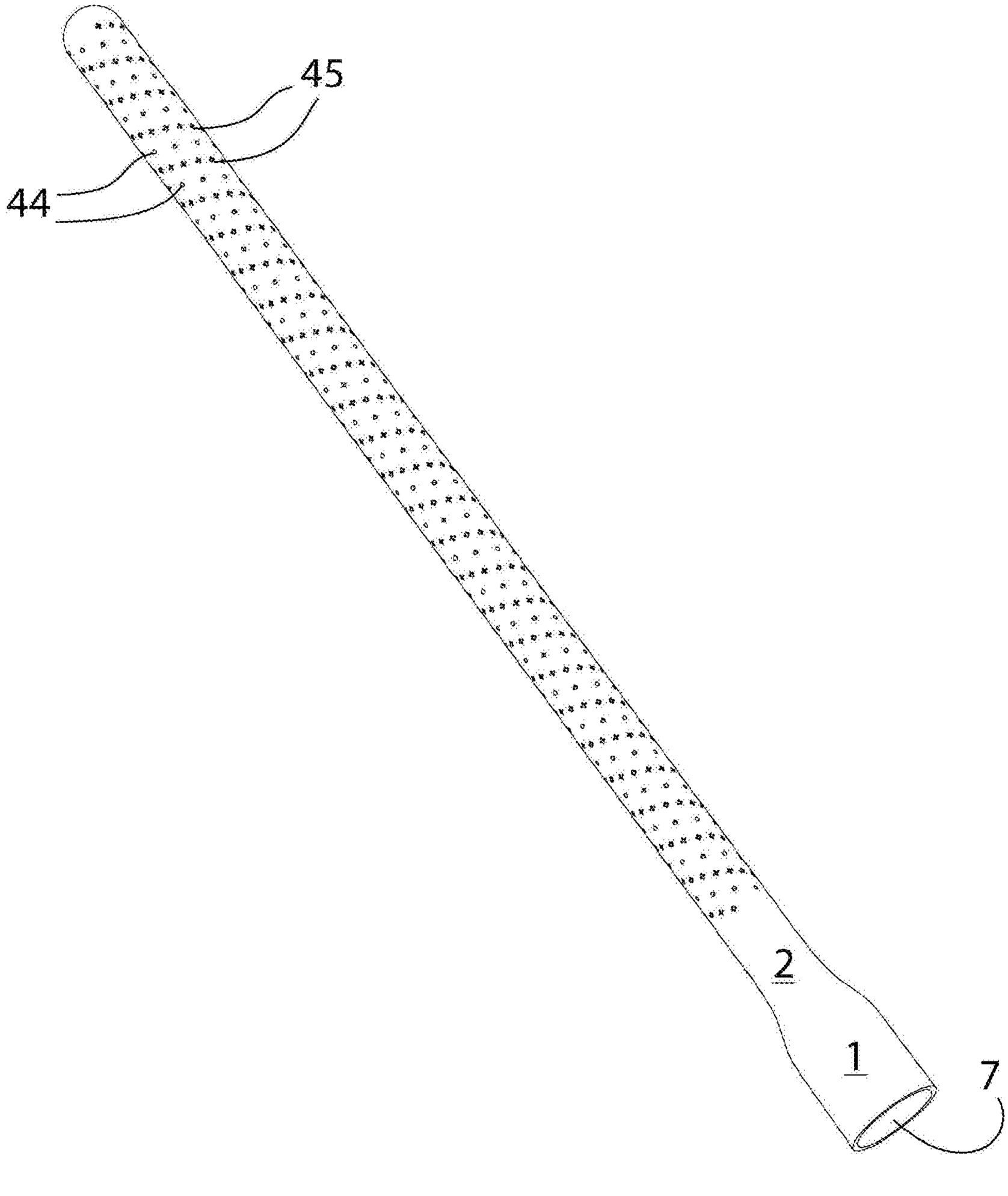

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fig. 6

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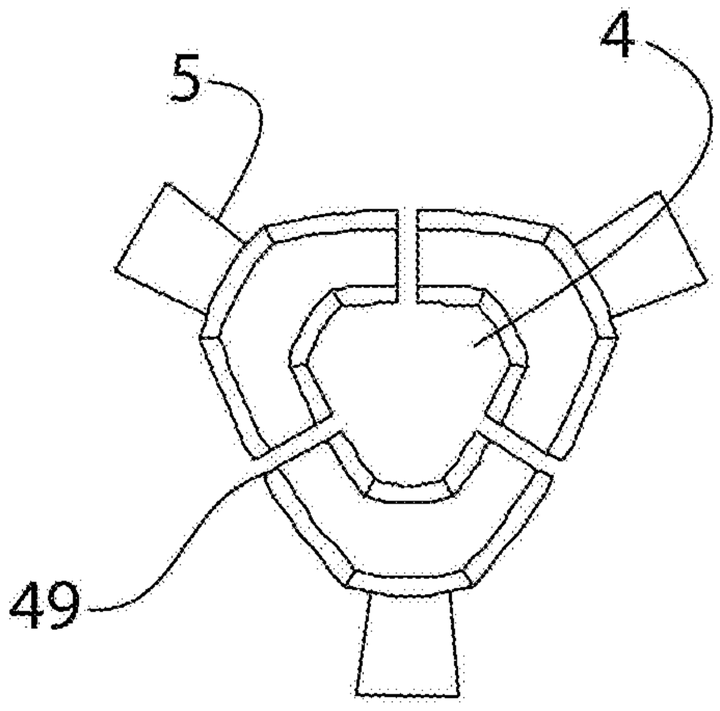

fig. 7a

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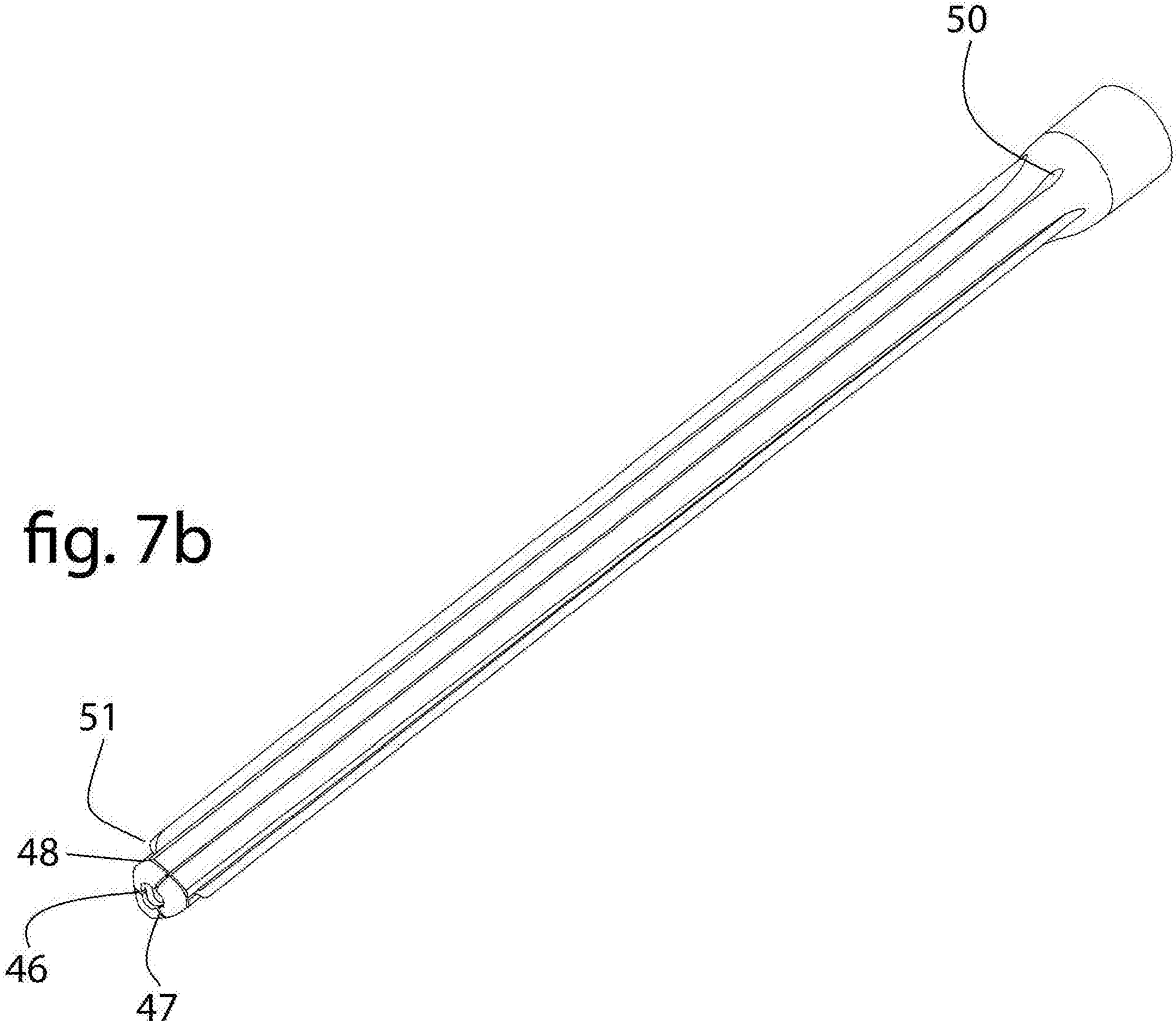
fig. 7b



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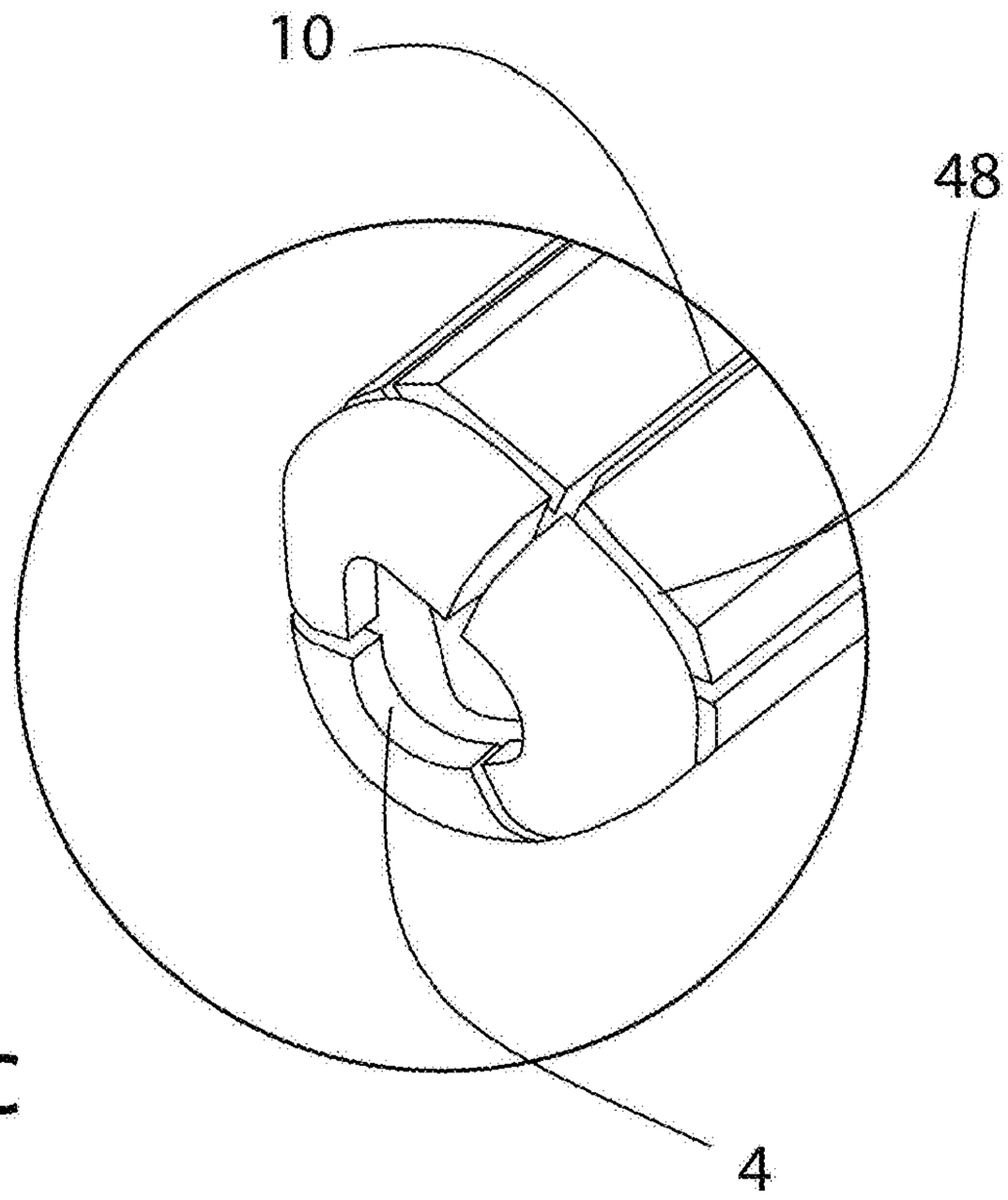

fig. 7c

A CLEANER ATTACHMENT DEVICE

Field of the Invention

The present invention relates to a cleaner attachment device, in particular a device for attachment to a vacuum or pressure cleaner. More particularly, but not exclusively, the invention relates to an attachment for cleaning behind water heaters or in other narrow spaces.

Background

Increasing awareness of cleanliness, hygiene and allergens in many societies leads many users to seek higher levels of maintenance of their environment.

Many users may use vacuum cleaners or pressure cleaners to clean their homes or business premises.

Vacuum cleaners in particular come with a variety of attachments arranged for accessing a variety of different areas in a typical environment.

For example long attachments for vacuuming in narrow spaces are common in the art. However, distancing the point of suction further away from the vacuum cleaner does not particularly aid in cleaning the sides of the narrow space.

Prior Art

Accordingly a number of patent applications have been filed in an attempt to resolve the problem.

United States patent US 8 083 860 (LOFTIS) discloses a cleaning system for dusting and cleaning a room.

German patent application DE 20 313 244 (GOLDIN et al) discloses a vacuum cleaner tool is an elastic, flexible pipe for connection at one end to a conventional vacuum cleaner and with its opposite end designed to suck dust from narrow spaces.

The pipe has several openings along its length that represent the suction surface. The outer surface of the pipe is fitted with elastic, flexible brushes.

Korean patent application KR 100 507 924 (PARK et al) discloses an auxiliary cleaning tool of a vacuum cleaner, comprising: a stationary body, formed as a hollow cylinder, which is removably connected to an end of a suction hose assembly connected to a cleaner body. The stationary body has a plurality of suction holes formed therealong.

Summary of the Invention

According to a first aspect of the present invention there is provided a cleaner attachment device, comprising: an elongate body with a plurality of longitudinally arranged apertures and a plurality of longitudinally arranged resiliently deformable portions extending from the body, wherein the longitudinally arranged apertures comprise a plurality of apertures arranged helixically around an exterior surface of the body.

Said cleaner may comprise a vacuum cleaner, or may in some embodiments comprise a pressure cleaner or other cleaner expelling fluid, rather than operating through suction.

In some embodiments the apertures are through the exterior surface or surfaces between the two opposite ends of the elongate body. In some embodiments the deformable portions are arranged longitudinally on the exterior surface or surfaces between the two opposite ends of the elongate body.

In some embodiments the resiliently deformable portions comprise padding or cellular structure material such as foam.

In some embodiments the portions comprise individual members such as bristles. For example the portions may comprise brushes, which brushes are arranged longitudinally on the body, with bristles extending orthogonally from the body. In this way the bristles may be arranged to be flexible individually as well as a whole brush, so that they may be used to dislodge small particles, as well as to sweep an area.

In some embodiments the apertures are extended to the length of the body or portions. In other embodiments the apertures may comprise a plurality of apertures

arranged along the body to approximate the length of the portions. For example, the apertures may be elongate slits which extend along the length of the body, or may comprise a plurality of apertures arranged along a longitudinal axis along the exterior surface of the body or may comprise a plurality of apertures arranged helixically around the radial axis along the exterior surface of the body.

In some embodiments the apertures are arranged intermediate the deformable portions, such that any dust dislodged by the portions will be sequentially or subsequently sucked through the apertures. In some embodiments the apertures may be of equivalent length to the deformable portions and may be interspersed between the deformable portions in order to form a discrete arrangement of portions and apertures. In some embodiments the apertures may be arranged within the portions. In some embodiments the apertures may be covered by the deformable portions, in such embodiments the deformable portions may be permeable to dust or other debris below a certain size. The portions may comprise plural bristles, for example of horsehair, plastics or other materials liable to be used in similar brush applications.

The interior of the elongate body may be hollow so as facilitate the passage of dust or debris which enters the body through the apertures along the length of the attachment means and into an external vacuum device. The interior of the elongate body may contain a smooth walled passageway through which dust or debris passes, so as to reduce the risk of objects becoming stuck inside the device, blocking it and thereby reducing the vacuum force.

In some embodiments the apertures are elongate slits parallel to the length of the body with two walls which extend into the body radially. The internal walls may narrow the slit internally to a central elongate opening to the internal volume of the body.

In some embodiments the body comprises at least one discrete opening, such that the device may be used for detail vacuuming. Such opening may be wider than the apertures, and/or more focussed or smaller, so as to allow greater control.

Such opening may be situated at, adjacent or one the end of the device which is distal from the vacuum cleaner in use.

In some embodiments the apertures may vary in width or shaping, for example along the length of the body. In this way the apertures may allow for variation in vacuum strength through the body, for example so as to enable uniform or controlled sucking. For example, in some embodiments the apertures may widen towards the end distal from the vacuum cleaner so as to compensate for the reduced vacuum force. Alternatively, the shape of width of the apertures may be varied so as to produce different sucking strengths at different points on the exterior surface of the body.

In some embodiments the apertures may be serrated, perforations, or sinuous.

The apertures may also be envisaged to continue past the brushes and/or past where the body is reduced in sectional diameter, the perforation of the vacuum attachment may continue such that dislodged matter is drawn into the vacuum cleaner hose better from air surrounding the portions.

In some embodiments the device comprises longitudinal apertures and resiliently deformable portions matching sides, for example providing a substantially triangular or other geometrically shaped multi-face sectional body profile, for example with extending portions from each face.. In this way the body provides a strong compact form both usable in a plurality of orientations and able to be pressed against a long flat surface in necessary.

In some embodiments the device comprises a vacuum attachment means. Such attachment means may comprise friction fitting, comprising a hose attachment means. This may facilitate the attachment of the vacuum attachment means to a conventional vacuum cleaner.

In some embodiments the vacuum attachment means may include a wider diameter than the body. The attachment means may comprise a standard vacuum cleaner attachment fitting, such as a friction fitting. This may allow the vacuum attachment means to be narrow than the hose of a conventional vacuum cleaner, thereby increasing the suction force through the apertures.

In some embodiments the device comprises flexible portion, which may comprise a hose or may comprise an articulated joint. In such way the device may comprise an

elongate rigid body and flexible hose which can be adjoined, for example wherein multiple flexible portions are connected to facilitate the device or cleaner use. The flexible portion may allow the user to manoeuvre the body into position, for example behind a radiator.

Some embodiments may include more than one flexible portion.

In some embodiments the body may be a rigid straight elongate tubular body so as to facilitate the manipulation and control of the device. In other embodiments the body may be a flexible hose with longitudinal apertures extending along the exterior of the length of the hose, thereby allowing the attachment to clean a variety of differently shaped areas or cavities.

In some embodiments the apertures may comprise shaping to encourage air into the body, for example funnelling or chamfered shoulders.

In some embodiments the resiliently deformable portions may be displaceable or may be replaceable, for example, wholly or slidably. For example the device may comprise anchors or slots therefor.

In some embodiments the apertures may comprise filter means. For example, in some embodiments filters may be displaceable or may be replaceable, for example wholly or slidably.

Brief Description of Figures

Figures 1 show isometric views of a first embodiment of the device according to the present invention;

Figures 2 show two side views of the embodiment shown in Figure 1;

Figure 3 shows an isometric exploded view of a second embodiment of the device according to the present invention;

Figures 4 show a reverse exploded isometric view of the embodiment shown in Figure 3;

Figures 5 show end views of the embodiment shown in Figure 1;

Figure 6 shows an isometric view of a second embodiment of the device according to the present invention; and

Figures 7 show sketches of detail views of further embodiments of the device according to the present invention.

Detailed Description of Figures

With reference to the figures there is shown two embodiments of the vacuum attachment means comprising a hose fitting end with a collar 1 describing an opening 7 arranged to friction fit a vacuum cleaner hose (not shown).

The opening diameter decreases in a Venturi cone 2 to an elongate body 10.

Three longitudinal apertures 4 pass through the exterior wall of the elongate body 10 and three longitudinal brush portions 5 are arranged on the exterior of the elongate body 10. The apertures 4 and brush portions 5 extend along the length of the body 10 between the distal end 3 of the body 10 and the venture cone 2 of the hose fitting end. The apertures 4 and brush portions 5 alternate around the substantially triangular circumference of the cross section of the body 10, such that an aperture 4 is between each two brushes 5 and a brush 5 is between each two apertures 4.

The elongate body is in the shape of an elongate triangular prism,

In some embodiments the device may be used with air suction or with water pressure, so as to remove matter from confined areas. In this way the device may be used to clean inside piping and tubing.

One specific application is as an attachment for domestic or industrial cleaner enabling the efficient removal of dirt or dust particles from spaces which are not reachable using existing vacuum cleaner attachments, for example, corrugated flutings, or behind, or under fixed objects with limited or narrow accessibility.

In use the device may be manipulated into small spaces and the brush portions may be gently or vigorously passed over surfaces to be cleaned so as to dislodge debris or dust particles, with suction removing the dislodged particles.

The body is formed from thermoplastics, metals or alloys, and the resiliently deformable brush portions comprise a plurality of plastic or other materials bristles.

The apertures comprise a chamfered opening 10, and are formed as single elongate apertures, defined by two internally radially extending sides narrowing internally to leave an open central elongate internal volume 12.

The brushes comprise splaying bristles and a backing plate 11, adhered in use to a planar base 9 on the body.

The device is arranged to be attached to the vacuum cleaner hosing by friction fitting, being slid onto the hose.

In variant embodiments the dimensions of bristle length, diameter and length of device may be varied.

The vacuum cleaner attachments will be used predominantly for the removal of dust from hard-to-reach areas like between walls and the backs of radiators or behind, beneath, above and within radiators and other structures.

The device may be envisaged as part of an existing vacuum cleaner or as a retrofit and standalone aftermarket item, for example in some embodiments suited to users with bronchial or asthmatic conditions.

After the dust is disturbed, agitated or dislodged it will be sucked through the three suction apertures positioned along the side of the body. In addition to this there is a triangular opening at the end of the tube to remove any remaining dust.

The device may be approximately 10cm to 60cm long.

In the first embodiment the body comprises an end cap 3, distal from the attachment means and arranged with a central opening 6 for detail vacuuming.

The end cap comprises a domed top and extending sides such that the end reaches beyond the brush portions, and may be placed on or against a flat surface from a plurality of angles.

In the second embodiment the end cap comprises a generally domed disc 13, supported by sides 8 that are inserted into the body in use, such that the portions extend to substantially reach to the end of the device in use. This may allow the device to more easily clean surfaces adjacent to obstacles or end walls.

The aperture through the cap in the first embodiment can be seen in Figures 5a and 5b, the aperture 6 through then centre of the body continues through the cap, so as to allow use thereof in detail vacuuming.

In the embodiment shown in Figure 7a the hexagonal opening 4 to the body reflects the substantially triangular cross section of the body, and the longitudinal apertures are continuous to the end such that they intersect the end opening through the cap, the body may comprise internal bracing to support the shape of the body without the end cap. Additional brush portions surround the end opening between the longitudinal apertures so as to facilitate the dislodging of dust during detail vacuuming.

In the embodiment shown in Figure 7b the end cap comprises a triangular opening 46 and the end further comprises a lateral opening 48 and openings 47 arranged to traverse the end from side to side. In this way the user is afforded more variability in detail vacuuming.

The brush portions 51 are inclined away from the end cap so as to permit easier manoeuvrability in narrow spaces.

The apertures 50 flare towards the vacuum cleaner and extend up the cone so as to aid in generalised sucking after the dust has been dislodged by the portions.

In the embodiment shown in Figure 7c the end cap comprise a lateral opening 48 around the circumference of the end's cross section only, and no apertures. The end

cap may be permanently secured to the body and spaced apart therefrom so as to allow entrance of air at the lateral opening(s).

In the embodiment shown in Figure 6 the apertures 44 and bristle portions 45 are providing adjacent one another and are distributed over the elongate surface of the body.

The device is compatible with existing vacuum hoses for a secure fit.

The apertures help channel airflow and dust into the device and down the vacuum hose.

The invention has been described by way of examples only and it will be appreciated that variation may be made to the above-mentioned embodiments without departing from the scope of invention as defined by the claims, in particular but not solely combination of features of described embodiments.

CLAIMS:

1. A cleaner attachment device, comprising an elongate body with a plurality of longitudinally arranged apertures, and a plurality of longitudinally arranged resiliently deformable portions extending from the body, wherein the longitudinally arranged apertures comprise a plurality of apertures arranged helixically around an exterior surface of the body.

2. A device according to claim 1 wherein the device comprises a cleaner attachment means at a first end.

3. A device according to claim 2 wherein body is narrower in diameter than the cleaner attachment means.

4. A device according to any preceding claim wherein the resiliently deformable portions comprise a plurality of bristles.

5. A device according to any preceding claim wherein the resiliently deformable portions are elongate and substantially extending the length of the body.

6. A device according to any preceding claim wherein the portions are displaceable.

7. A device according to any preceding claim for use with a vacuum cleaner.

8. A device according to any preceding claim for use with a pressure cleaner.