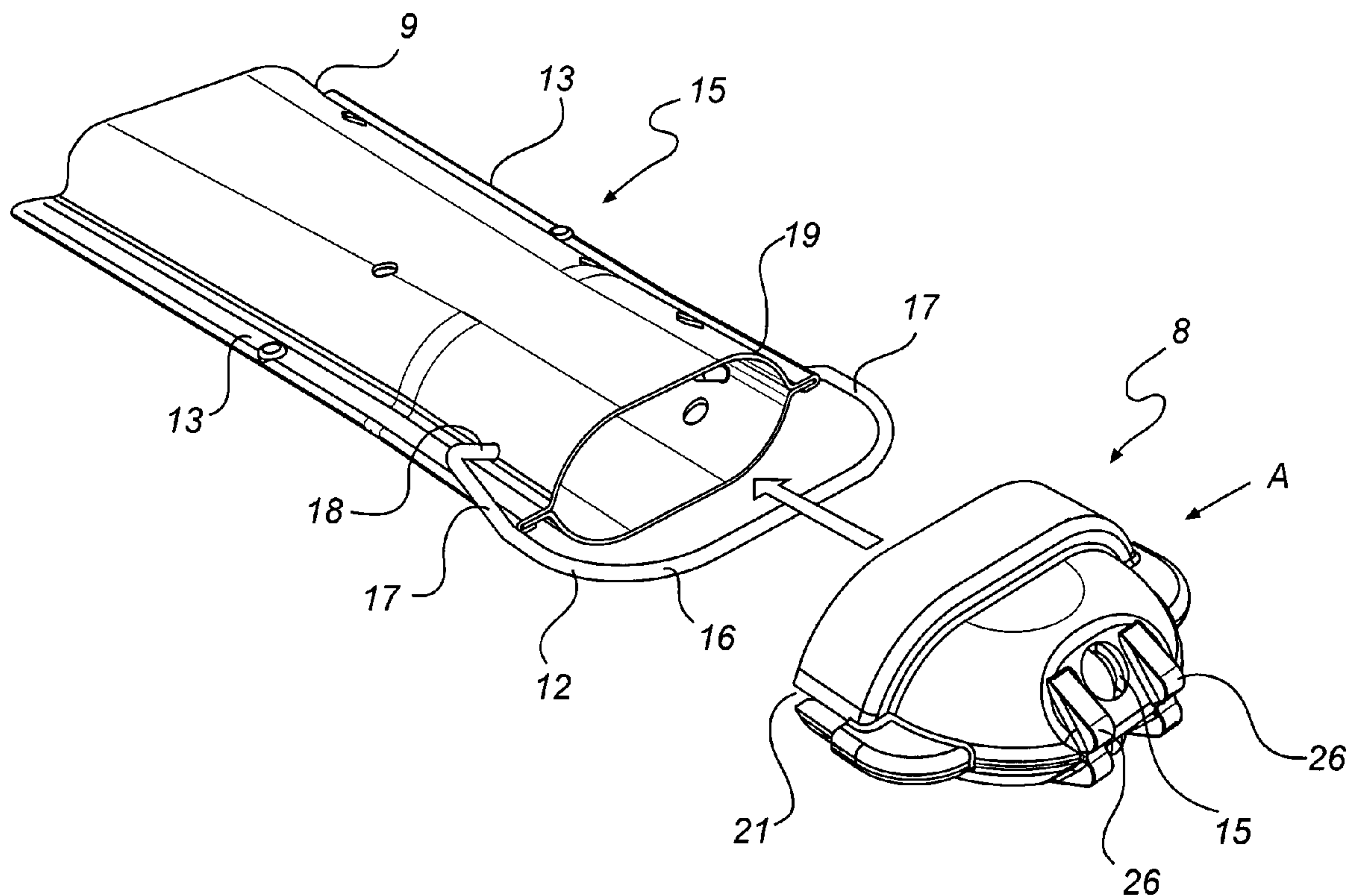




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(57) Abrégé/Abstract:

A disinfection device with a spray arm (5) which is rotatable about a shaft in a disinfection space and which is provided with outlet nozzles (15) for spraying the object that is to be disinfected. Said spray arm (5) has in its end portion a nozzle device (8), said nozzle device (8) having at least one outlet nozzle (15) which is arranged, seen in the rotary direction of the spray arm, at a peripheral end portion of the spray arm, said nozzle device (8) being detachably arranged.



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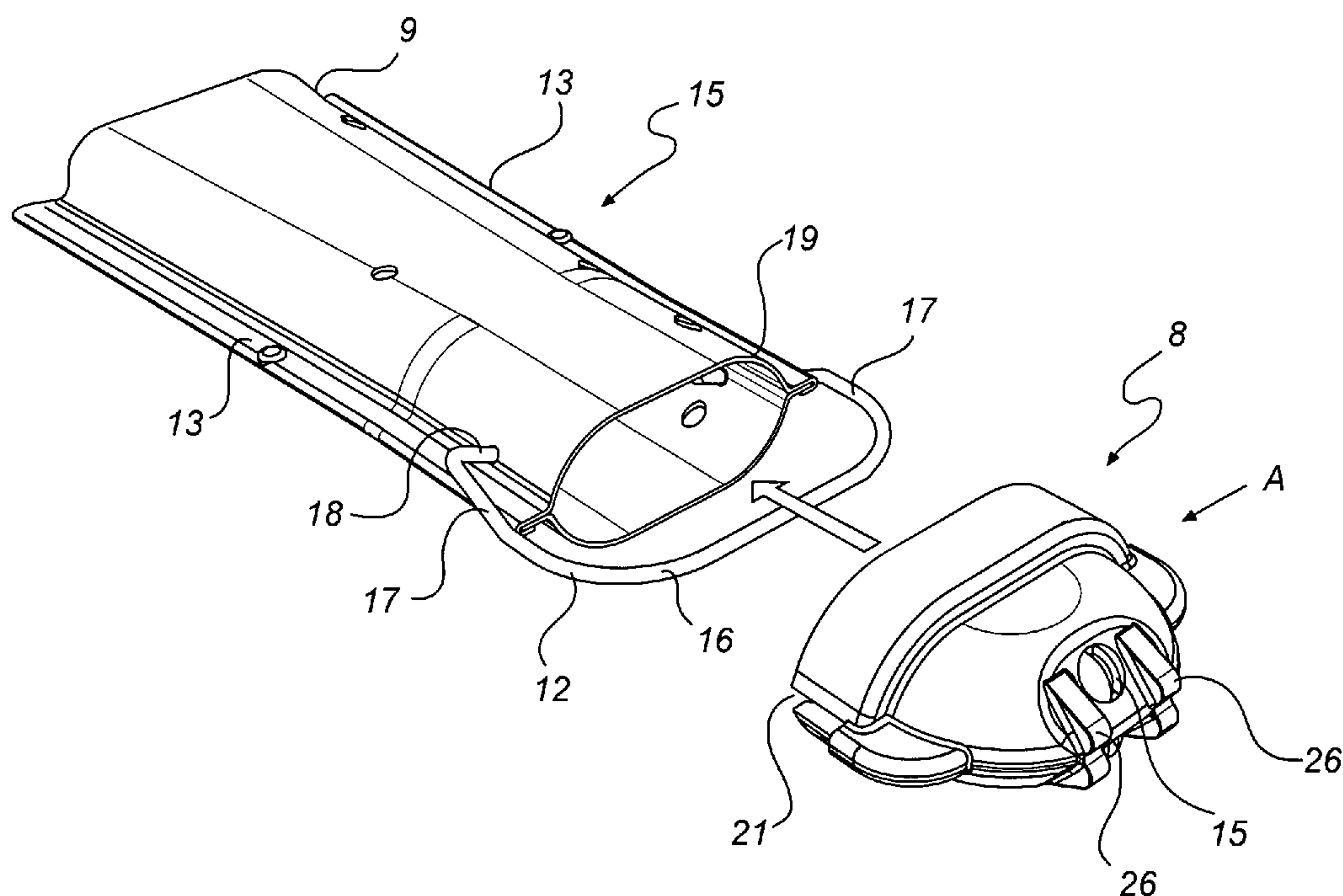
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(54) Title: SPRAY MEANS FOR DISINFECTION DEVICE



(57) Abstract: A disinfection device with a spray arm (5) which is rotatable about a shaft in a disinfection space and which is provided with outlet nozzles (15) for spraying the object that is to be disinfected. Said spray arm (5) has in its end portion a nozzle device (8), said nozzle device (8) having at least one outlet nozzle (15) which is arranged, seen in the rotary direction of the spray arm, at a peripheral end portion of the spray arm, said nozzle device (8) being detachably arranged.

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SPRAY MEANS FOR DISINFECTION DEVICE

Technical Field

The present disclosure relates to a disinfection device with a spray arm which
5 is rotatable about a shaft in a disinfection space and which is provided with at least
one outlet nozzle for spraying an object that is to be disinfected.

Background Art

Different types of cleaning machines are available on the market. One
10 category consists of disinfection devices, which exist in different sizes and shapes.
They may have the size where it is possible for the user to insert, for example, a
trolley containing a rack with one or more baskets holding the objects that are to be
disinfected. Alternatively, they can be smaller, in which case only one or more
baskets containing the objects that are to be disinfected are inserted into the
15 disinfection chamber. A common feature is, however, that heavy demands are placed
on these devices; for instance the device should be able to clean the objects in a
satisfactory and efficient manner and at the same time treat large volumes of water
and be user friendly.

An aspect of currently used disinfection devices is, for example, that the
20 desired degree of cleanliness is not always achieved. This may be the result of, for
instance, the spray means not producing a spray pattern which covers the
disinfection chamber and thus does not reach the entire disinfection chamber to the
desirable degree and all the objects that are to be disinfected. In addition, dirt and
particles may stick to the disinfection device, which means that the quality of cleaning
25 is affected.

Moreover, existing disinfection devices may have the drawback that dirt and
particles getting stuck during the disinfection process, such as residues from surgery,
may be time consuming or difficult to remove.

It is thus desirable to provide an improved disinfection device.

Summary

Illustrative embodiments may provide a disinfection device with a spray arm which eliminates at least some of the above problems.

Illustrative embodiments may achieve this and other advantages with a disinfection device with a spray arm which is rotatable about a shaft in a disinfection space and which is provided with outlet nozzles for spraying the object that is to be disinfected. Said spray arm has in its end portion a nozzle device, said nozzle device having at least one outlet nozzle which is arranged, seen in the rotary direction of the spray arm, at a peripheral end portion of the spray arm, said nozzle device being detachably arranged. By providing the nozzle device in this way, a spray arm and nozzle device that are user optimized are achieved. The nozzle device can easily be removed by the user and thus the spray arm can easily be cleaned. Accordingly, due to the detachable arrangement of the nozzle device the spray arms are cleanable.

Furthermore, a more efficient production of the spray arm is achieved. It is now possible to use the same manufacturing tools for different sizes of spray arms, since the nozzle device is assembled with the spray arm after the spray arm is produced. Accordingly, for different sizes of the disinfection devices, the same manufacturing tools can be used.

According to an illustrative embodiment, the opening of said outlet nozzle is oriented with its greatest extent transversely to the plane of rotation so that said outlet nozzle produces a spray pattern with a directional component in the longitudinal direction of the spray arm and with its greatest extent transversely to the plane of rotation. By providing the opening of said outlet nozzle in this way, an improved spray pattern is achieved. The improved spray pattern could be a flat spray pattern, but other spray patterns are possible.

Further said spray pattern has an extent that passes through the plane of rotation. By providing the opening of said outlet nozzle in this way, a further improved spray pattern is achieved. For example, it is possible for the sprays to reach spaces in a chamber of a disinfection device that otherwise are difficult to reach, such as the corners.

According to an illustrative embodiment, said outlet nozzle has an essentially slotted extent and thus produces a flat spray pattern with its orientation transversely to the plane of rotation.

According to an illustrative embodiment, said nozzle device has at least two outlet nozzles which, seen in the longitudinal direction of the spray arm, are two nozzles diverging transversely to the plane of rotation. By providing the outlet nozzles in this way, an essentially symmetrical configuration of the spray arm with the outlet nozzles, is achieved. Accordingly, the spray arm is more user optimized. It is easier for the user to attach the nozzle device with the spray arm again, after the user for example, has removed it for cleaning.

According to an illustrative embodiment, said plane of rotation is horizontal, that is, the axis of rotation of the spray arm is vertical. By providing the plane of rotation horizontally, it is possible to obtain a washer disinfector with an essentially simple configuration. Moreover, the space in the chamber can be utilized more efficiently, since the wash cart, the wash insert or wash basket is usually placed horizontally in the chamber. Further, depending on the position and configuration of the outlets of the spray arm, it is also possible to easily achieve a self-rotation of the spray arm, for instance by discharging the fluid in a rotary assisting direction.

According to an illustrative embodiment, said spray arm is a tubular sectional element and said nozzle device is a cover means which seals the peripheral end of the tubular sectional element and in which said outlet nozzle is arranged. By providing the spray arm in this way, it is possible to achieve a manufacturing of the spray arm that is easy and cost-effective.

According to an illustrative embodiment, said tubular sectional element at least in its end portion has a constant longitudinal section. By providing the tubular sectional element with a constant longitudinal section, an efficient manufacturing is achieved. Accordingly it is easy to adapt the product depending on the size of the washer disinfector and disinfection chamber.

According to an illustrative embodiment, said cover means overlaps the end portion of the tubular sectional element. By providing the cover means in this way, a

spray arm that is user-oriented is achieved. That is, when the user is going to assemble the tubular sectional element with the cover means, for instance after cleaning the spray arm, it is easy for the user to see how the parts are going to fit together.

5 According to an illustrative embodiment, the opening side, facing the tubular sectional element, of the cover means has a peripheral edge groove, whose width and extent correspond to the shape of the terminal edge portion of the tubular sectional element, which terminal edge portion thus is insertable into said groove.

10 According to an illustrative embodiment, a pivotable locking means is arranged to engage said cover means by snap action. By providing a locking means in this way, a reliable and satisfactory securing of the cover means is achieved.

15 According to an illustrative embodiment, said locking means is a U-shaped yoke which is designed, when pivoting from its unlocked position to its locked position, to pass a locking projection against spring action. By providing the locking means in this way, a locking means that is easy for the user to utilize is achieved. Accordingly, the user can smoothly remove the cover means for cleaning.

 According to an illustrative embodiment, a spring catch extends from said cover means over the tubular sectional element, and a shoulder is arranged on the tubular sectional element to be grasped by the spring catch.

20 According to an illustrative embodiment, said spring catch is designed to engage said shoulder by snap action.

 According to an illustrative embodiment, a flange projecting from the outside of the tubular sectional element and along the tubular sectional element is provided, the flange being formed with a recess whose lateral edge forms said shoulder.

25 According to an illustrative embodiment, said spring catch is formed by a projection projecting from the opening edge of the cover means and having a slot for receiving a flange portion positioned next to the end of the tubular sectional element.

30 According to another illustrative embodiment, a disinfection device has a spray arm which is rotatable about a shaft in a disinfection space and which is provided with at least one outlet nozzle for spraying an object that is to be disinfected. The

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spray arm is a tubular sectional element and has in its end portion a detachably arranged nozzle device. The nozzle device is a cover means which seals a peripheral end of the tubular sectional element and in which the at least one outlet nozzle is arranged. The at least one outlet nozzle is arranged, seen in a rotary
5 direction of the spray arm, at a peripheral end portion of the spray arm, wherein an opening of the outlet nozzle is oriented with its greatest extent transversely to a plane of rotation of the spray arm so that the outlet nozzle produces a spray pattern with a directional component in a longitudinal direction of the spray arm and with its greatest extent transversely to the plane of rotation of the spray arm.

10 Other aspects and features of illustrative embodiments will become apparent to those ordinarily skilled in the art upon review of the following description of such embodiments in conjunction with the accompanying figures.

Brief Description of the Drawings

15 A currently preferred embodiment of the present invention will now be described in more detail, with reference to the accompanying schematic drawings.

Fig. 1 is an overview showing a disinfection apparatus with a spray arm according to an illustrative embodiment.

20 Fig. 2 is a schematic perspective view showing a spray arm provided with nozzles devices according to an illustrative embodiment.

Fig. 3 is an exploded schematic perspective view showing a spray arm with a nozzle device according to Fig. 2.

Fig. 4 is a cross-sectional view showing a spray arm according to Fig. 2.

25 Fig. 5 is a schematic perspective view showing a spray arm with a nozzle device according to an alternative embodiment.

Detailed Description of a Preferred Embodiment

With initial reference to Fig. 1, there is shown a perspective view of a washer disinfectant 1 which has a housing 2 in which a disinfection chamber 3

is arranged. Examples of objects to be washed, disinfected and dried in a disinfection program are for instance surgical instruments, endoscopes, instruments for minimum invasive surgery, utensils, anaesthetic and respiratory equipment, as well as bottles, glass jars and hollowware. The chamber 3 is adapted to receive objects to be disinfected which objects may be arranged on a wash cart 4 or on an insert.

The wash cart 4 in the form of a basket rack with multiple levels is guided in the chamber 3 and may be liquid/fluid connected in an active position. In this case the chamber 3 exhibits three connecting parts 7 for supplying liquid or fluid via corresponding connecting parts at the wash cart 4. At least one spray arm 5 are rotatably and essentially horizontally arranged in the chamber 3, and in this embodiment five spray arms 5 are arranged at the upper and lower part of the chamber 3, and between the baskets at the wash cart 4. The wash cart 4 may be of different designs and functions, such as provided with injector heads or ramps adapted for the objects to be received.

A circulation pump 6 is provided for circulating the liquid being received in the chamber 3, by the circulation pipe 11 to the spray arms 5.

Fig. 2 shows a perspective view of an embodiment of a spray arm 5. In the figure the direction of rotation is as indicated by the arrow A. The spray arm 5 consist of a tubular sectional element 9 that is provided with a nozzles device 8 on each end of the spray arm 5. The nozzle device 8 is detachable arranged on the tubular sectional element 9.

In this preferred embodiment, each nozzle device 8 has two outlet nozzles 15 provided, seen in the rotary direction of the spray arm A, at the peripheral end portion of the spray arm 5.

Further, a pivotable locking means is arrange on each end of the tubular sectional element 9 and in this preferred embodiment it is a U-shaped yoke 12. The yoke 12 interact with the nozzle device 8 such that the user easily can move the yoke 12 from its locked position to its unlocked position to detach the nozzle device 8 from the element 9. In fig. 2 the nozzle device 8 is in its locked position. The locking means will be described in more detail in fig. 3.

On the tubular sectional element 9 there are provided a couple of outlets 10 that are located on top of, on the side of, and underneath of the element 9. The outlets 10 distributing the liquid in the chamber after that the liquid has been circulated by the circulation pipe 11 through the connecting parts 7 to the spray arms 5. The outlets 10 are preferably arranged and

directed such that at least one outlet or nozzle is assisting the rotation of the spray arm 5.

Further, the tubular sectional element 9 has a constant longitudinal section in both of its end portions. This is advantageously since the same manufacturing tools can be used for different size of the spray arms 5. Accordingly the same manufacturing tools can be used for different size and types of washer disinfectors.

Fig. 3 shows a part of the spray arm 5 according to fig. 2. In the figure the direction of rotation is as indicated by the arrow A. The nozzle device 8, that is a cover means, is in a disconnected position from the tubular sectional element 9.

The tubular sectional element 9 has a side edge portion 13, constituting a flange, extending in the longitudinal direction on each side of their both sides.

The yoke 12 consist of two legs 17 and an intermediate section 16 there between, that connecting the legs. The legs 17 has end portions 18 which are angled against each other and are inserted into a hole on each side of the tubular sectional element 9, and thereby constituting a pivoting hinge.

On each side of the outlet nozzles 15, a snap projection 26 is provided, which interact with the yoke 12 by snap action.

For disconnect the cover means from the tubular sectional element 9, for instance for cleaning the cover means, the user has moved the yoke 12 against spring action.

Accordingly, the user has moved the intermediate section 16 of the yoke 12 in the transverse direction and thereafter moved the cover means away from the element 9.

For connect the cover means with the tubular sectional element 9, the user will move the cover means over the terminal edge portions 19 of the tubular sectional element 9, when the yoke is turned in the transversally direction of the element 9.

Fig. 4 shows a cross-sectional view of the spray arm 5 when the locking means is in its locked position, accordingly the cover means is connected with the element 9.

The intermediate section 16 of the yoke 12 is steadily positioned in the snap projections 26. The terminal edge portions 19 of the tubular sectional element 9 are inserted in the edge groove 14 of the cover means.

The flange 13 protrudes through a gap 21 (shown in fig. 3) positioned in the side of the nozzle device 8. (not shown in the figure)

Fig. 5 shows perspective view of an alternative embodiment of the locking means. The locking means constitutes of a spring catch 24 that is provided on the cover means, and a recess 22 arranged on the flange 13 of the tubular sectional element 9. The lateral edge of the recess 22 forms a shoulder 23 and the spring catch 24 will engage the shoulder 23 for locking the cover means with the element 9.

It should be noted that different modifications of the embodiments of the invention described above are feasible within the scope of invention, as it is defined by the following claims.

For example it is possible to provide the opening of said outlet nozzle such as other spray patterns are achieved, for instance a round opening that achieves at least a partly circular spray pattern.

Furthermore, in the preferred embodiment the U-shaped yoke 12 is arranged transversal the longitudinal direction of the spray arm, i.e. in the direction of rotation. But it is also possible to arrange the yoke 12 in other directions, such as transversally the direction of rotation.

Rotations indicators is also possible to arrange in the washer device, for checking that the spray arm is rotating.

Furthermore, in the preferred embodiment the axis of rotation of the spray arm is vertical, but it is also possible to arrange the axis of rotation of the spray arm horizontally, i.e. the direction of rotation of the spray arm is transversally the direction of rotation in the preferred embodiment (shown in fig 3 by the arrow A).

**THE SUBJECT-MATTER OF THE INVENTION FOR WHICH AN EXCLUSIVE
PROPERTY OR PRIVILEGE IS CLAIMED IS DEFINED AS FOLLOWS:**

- 5 1. A disinfection device with a spray arm which is rotatable about a shaft in a disinfection space and which is provided with at least one outlet nozzle for spraying an object that is to be disinfected, said spray arm being a tubular sectional element and having in its end portion a detachably arranged nozzle device,
said nozzle device being a cover means which seals a peripheral end of the
10 tubular sectional element and in which said at least one outlet nozzle is arranged,
said at least one outlet nozzle being arranged, seen in a rotary direction of the spray arm, at a peripheral end portion of the spray arm, wherein an opening of said outlet nozzle is oriented with its greatest extent transversely to a plane of rotation of the spray arm so that said outlet nozzle produces a spray pattern with a directional
15 component in a longitudinal direction of the spray arm and with its greatest extent transversely to the plane of rotation of the spray arm.
2. A disinfection device as claimed in claim 1, wherein said spray pattern has an extent that passes through the plane of rotation.
- 20 3. A disinfection device as claimed in claim 1 or 2, wherein said outlet nozzle has an essentially slotted extent and thus produces a flat spray pattern with its orientation transversely to the plane of rotation.
- 25 4. A disinfection device as claimed in any one of claims 1-3, wherein said nozzle device has at least two outlet nozzles which, seen in the longitudinal direction of the spray arm, are two nozzles diverging transversely to the plane of rotation.
- 30 5. A disinfection device as claimed in any one of claims 1-4, wherein said plane of rotation is horizontal, that is, an axis of rotation of the spray arm is vertical.

6. A disinfection device as claimed in claim 1, wherein said tubular sectional element at least in its end portion has a constant longitudinal section.

5 7. A disinfection device as claimed in claim 1 or claim 6, wherein said cover means overlaps the end portion of the tubular sectional element.

8. A disinfection device as claimed in any one of claims 1 and 6-7, wherein an opening side, facing the tubular sectional element, of the cover means has a
10 peripheral edge groove, whose width and extent correspond to a shape of a terminal edge portion of the tubular sectional element, which terminal edge portion thus is insertable into said groove.

9. A disinfection device as claimed in any one of claims 1 and 6-8, wherein a
15 pivotable locking means is arranged to engage said cover means by snap action.

10. A disinfection device as claimed in claim 9, wherein said locking means is a U-shaped yoke which is designed, when pivoting from its unlocked position to its locked position, to pass a locking projection against spring action.

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11. A disinfection device as claimed in any one of claims 1 and 6-8, wherein a spring catch extends from said cover means over the tubular sectional element, and a shoulder is arranged on the tubular sectional element to be grasped by the spring catch.

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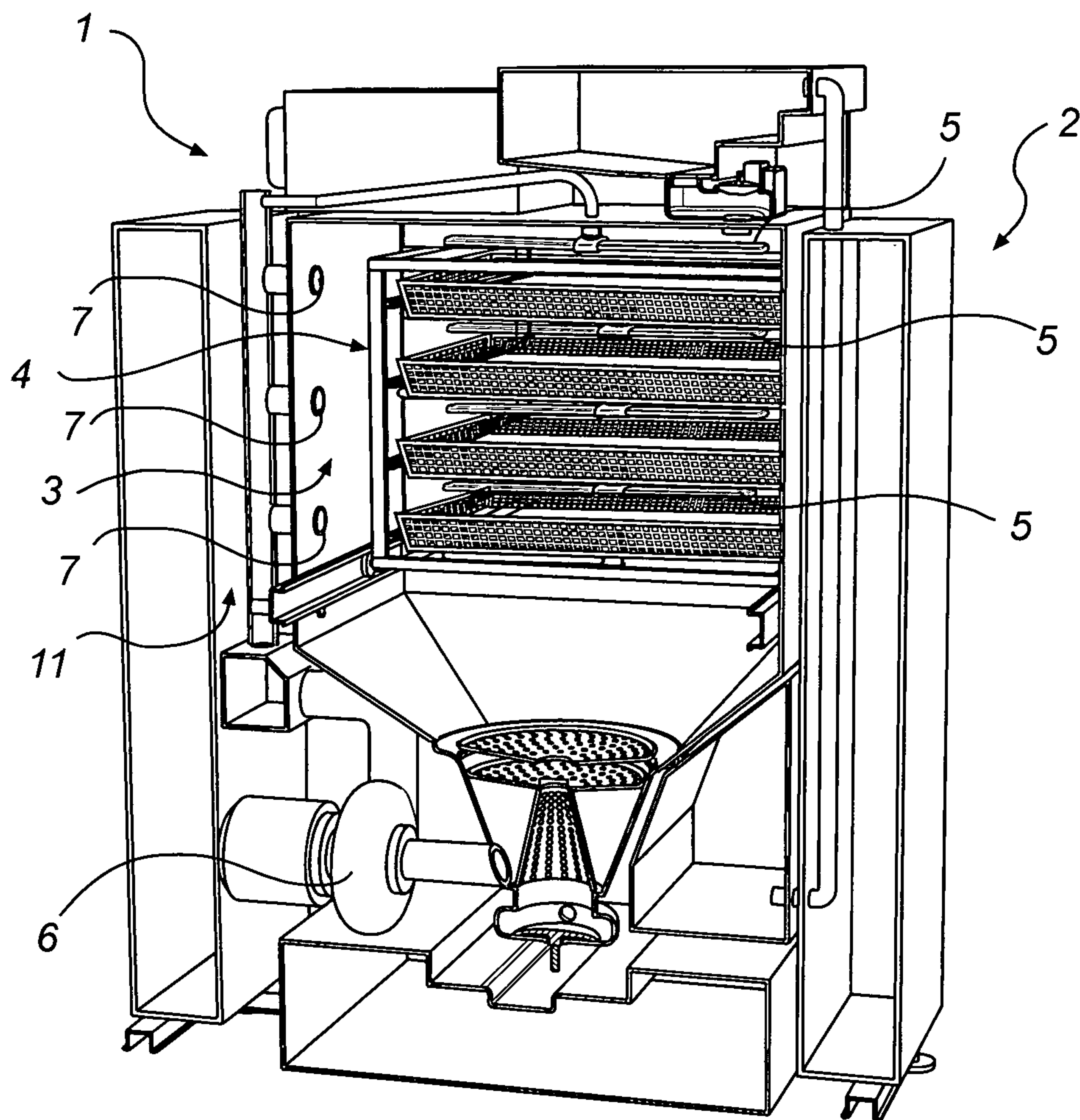
12. A disinfection device as claimed in claim 11, wherein said spring catch is designed to engage said shoulder by snap action.

13. A disinfection device as claimed in any one of claims 11-12, wherein a flange
30 projecting from an outside of the tubular sectional element and along the tubular

sectional element is provided, the flange being formed with a recess whose lateral edge forms said shoulder.

14. A disinfection device as claimed in any one of claims 11-13, wherein said
5 spring catch is formed by a projection projecting from an opening edge of the cover means and having a slot for receiving a flange portion positioned next to the end of the tubular sectional element.

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*Fig. 1*

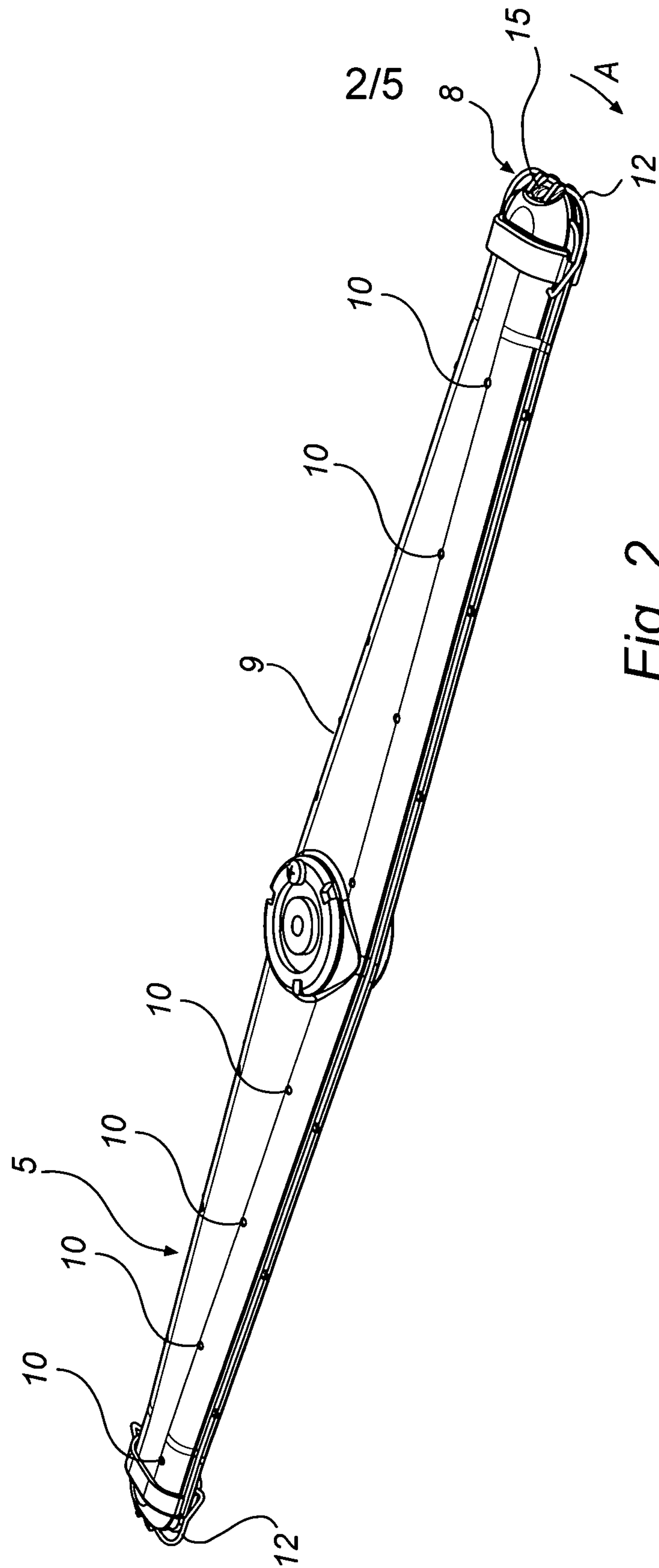


Fig. 2

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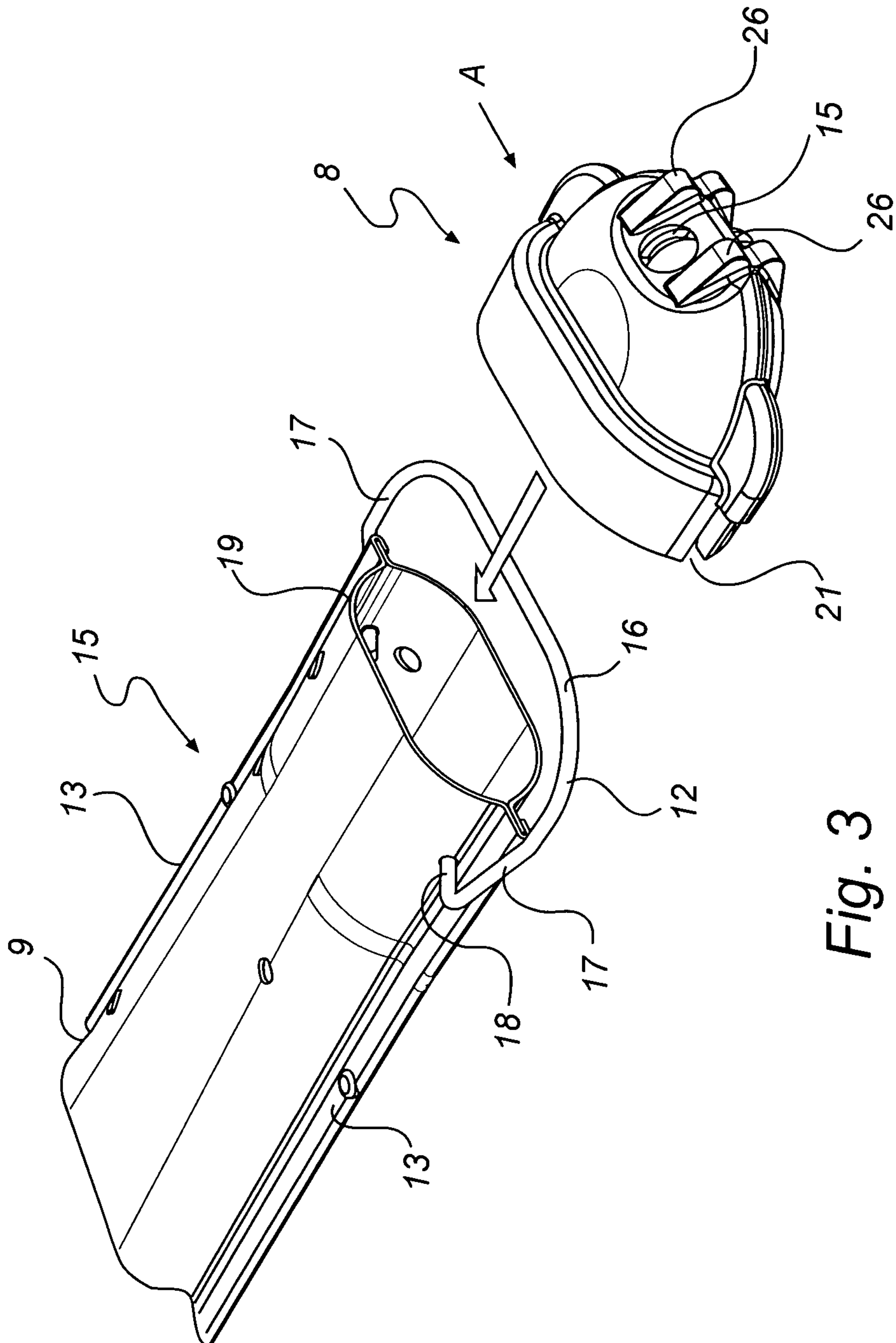


Fig. 3

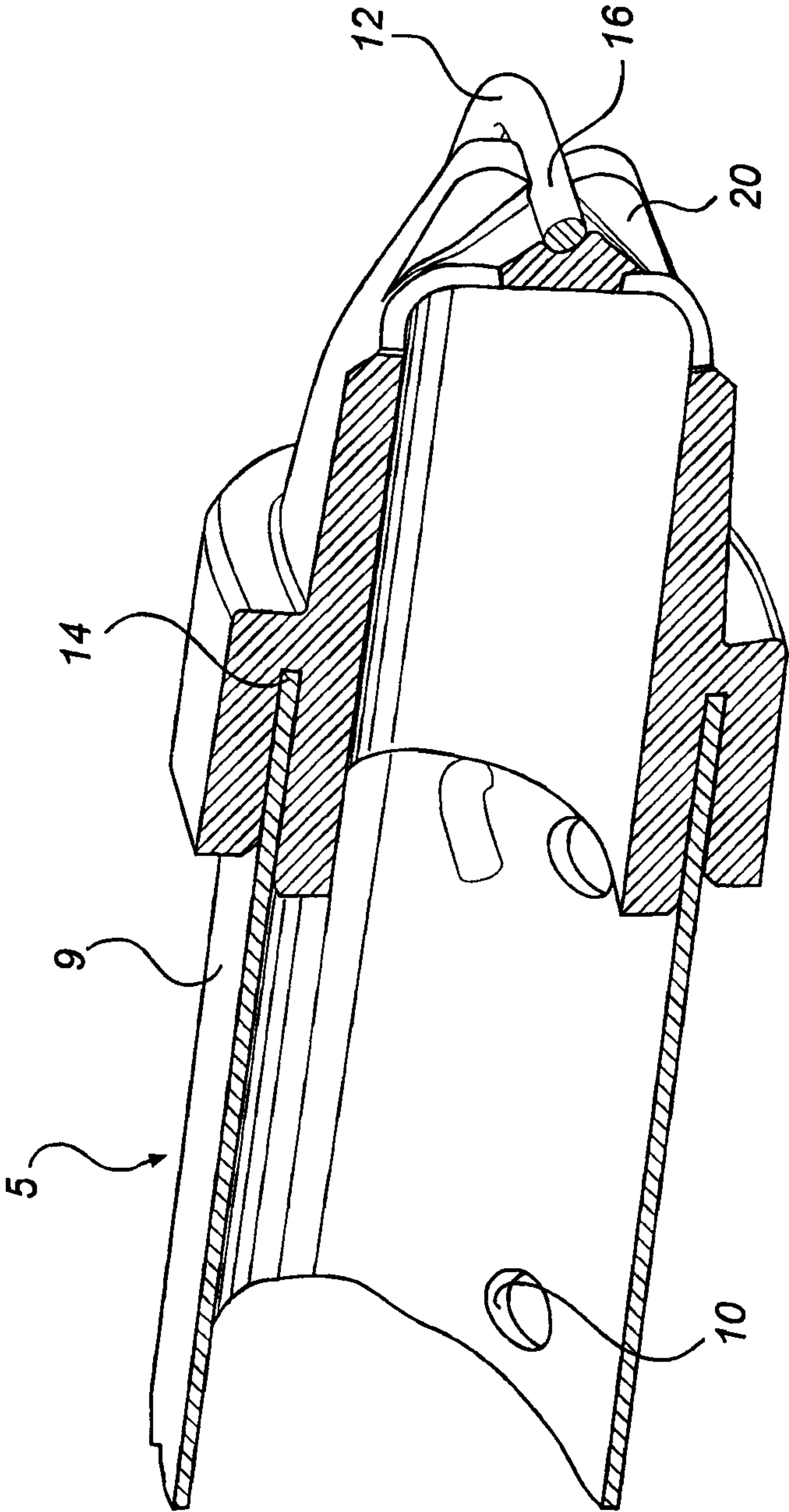


Fig. 4

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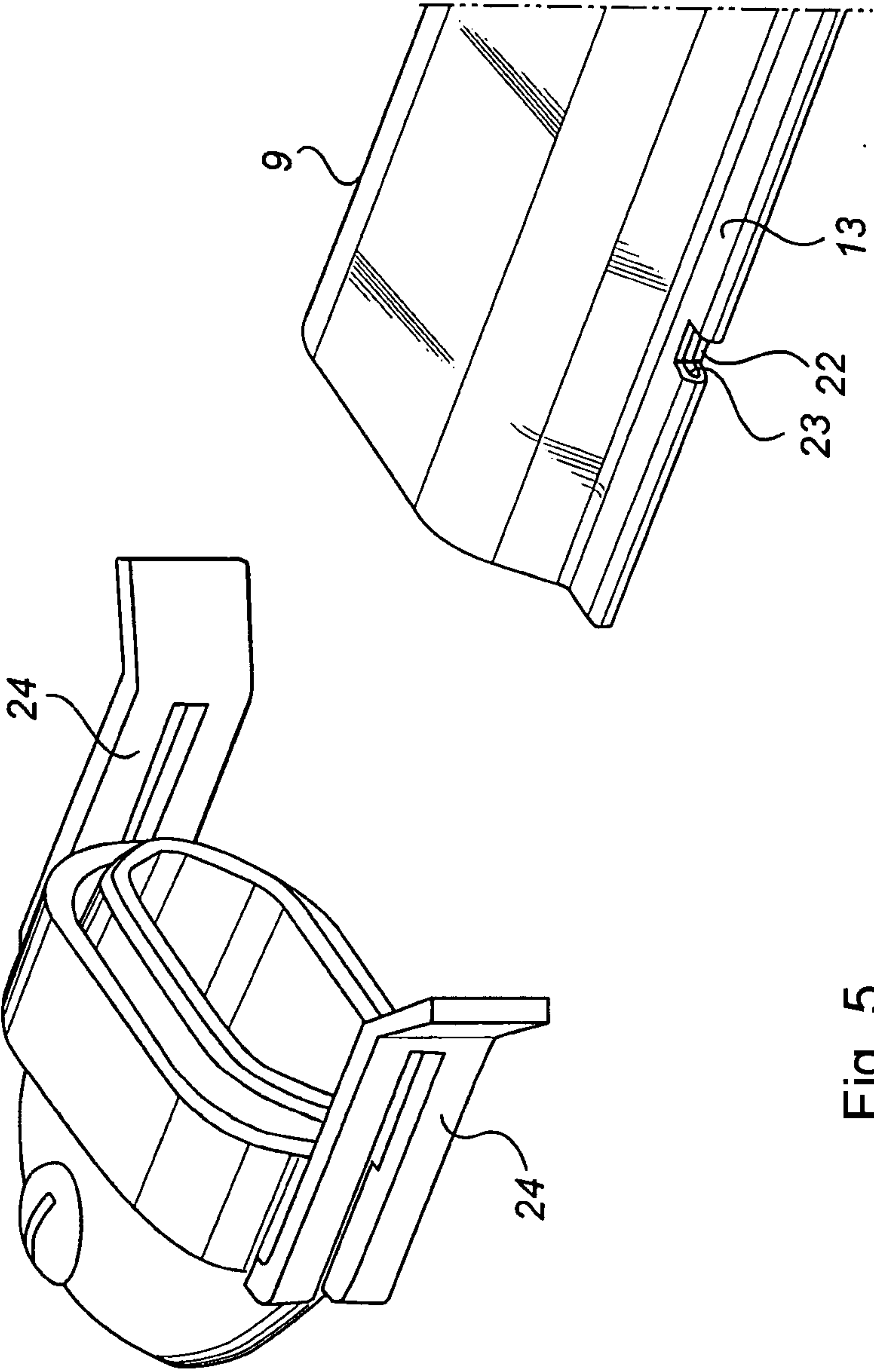


Fig. 5

