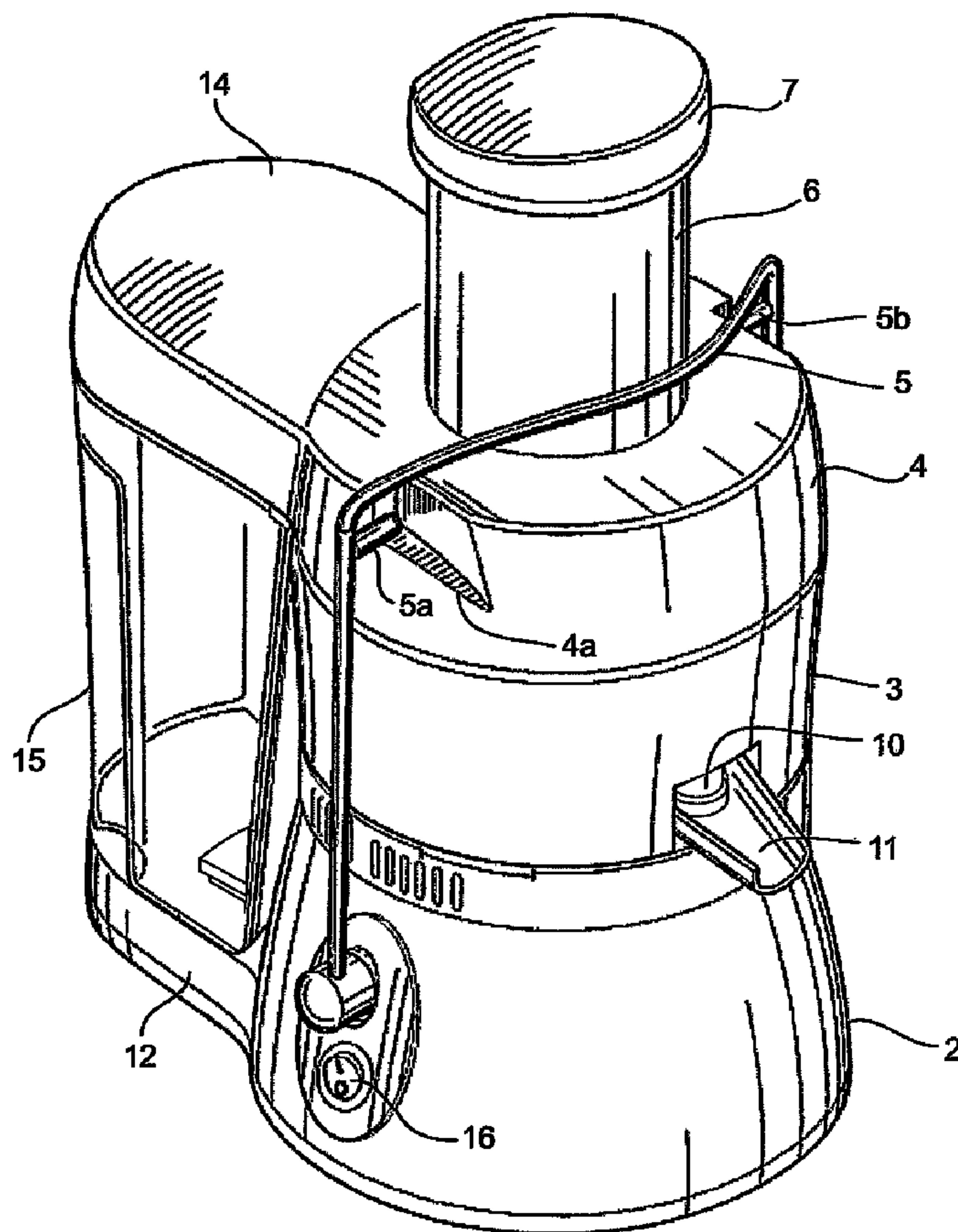




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(57) Abrégé/Abstract:

An appliance for extracting juice from food articles includes: a housing having an inlet feed tube (6) for feeding food articles into the appliance, and an outlet (10, 11) for outletting juice extract from the food articles; a pusher rod (7) for manually pushing the food

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articles through the inlet feed tube; (6) and a rotary cutter disc (8) rotatable about a central disc axis and including a plurality of cutting edges projecting from one side of the disc facing the inlet feed tube (6) for cutting the food articles into a pulp saturated with juice when a food article is pushed against the cutter disc (8) by the pusher rod (7). The cutter disc (8) includes, on the side thereof facing the inlet feed tube (6), a projecting pinching surface (20) projecting outwardly of the cutter disc (8) and located eccentrically with respect to the central disc axis such that when only a thin sliver of food article remains between the pusher rod (7) and cutter disc (8), the projecting pinching surface (20) presses the thin sliver against the pusher rod (7) sufficiently to effect a slight rotation of the thin sliver with respect to the cutter disc (8), and thereby to better assure the complete cutting up of the food article into pulp saturated with juice.

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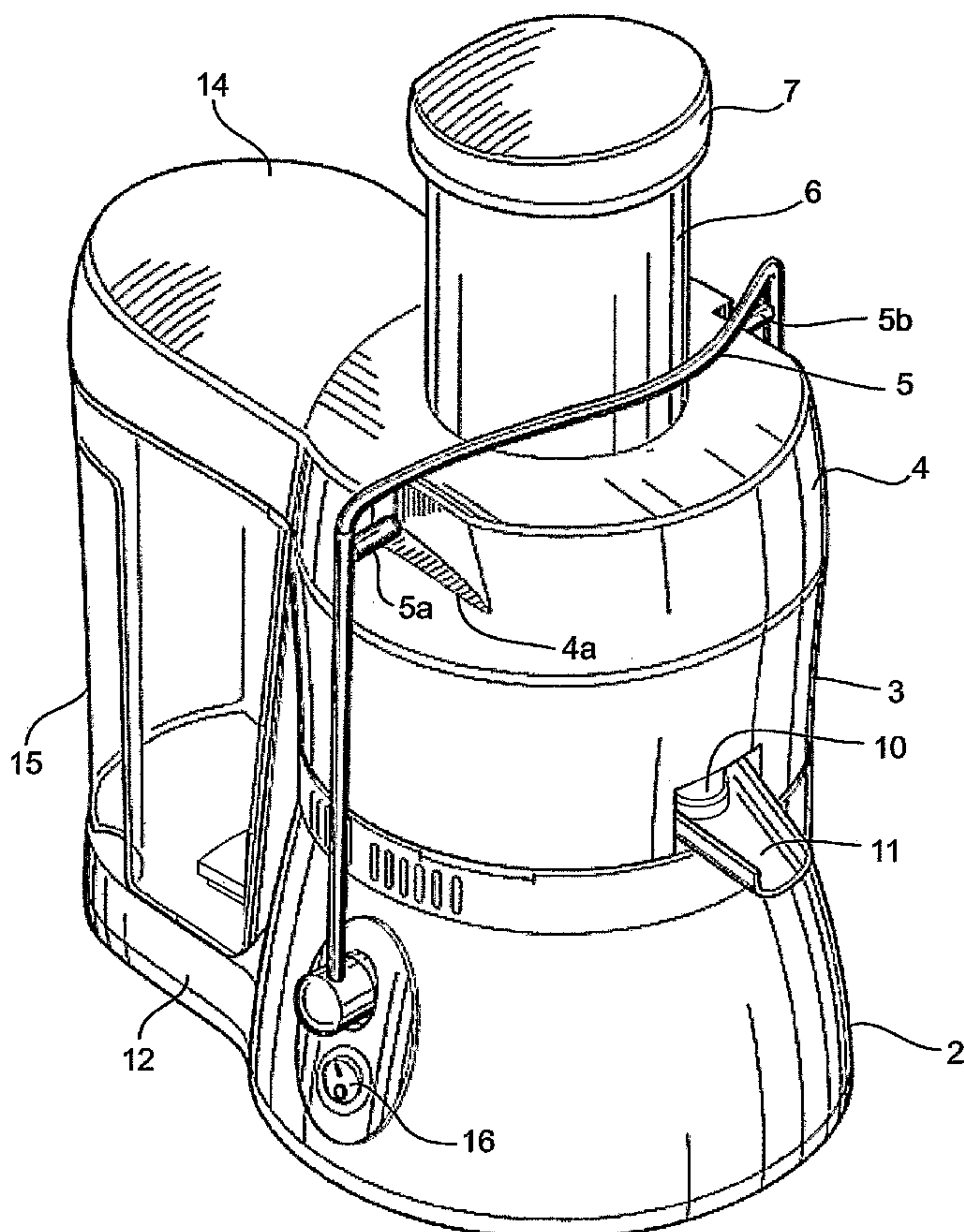
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(57) Abstract: An appliance for extracting juice from food articles includes: a housing having an inlet feed tube (6) for feeding food articles into the appliance, and an outlet (10, 11) for outletting juice extract from the food articles; a pusher rod (7) for manually pushing the food articles through the inlet feed tube (6) and a rotary cutter disc (8) rotatable about a central disc axis and including a plurality of cutting edges projecting from one side of the disc facing the inlet feed tube (6) for cutting the food articles into a pulp saturated with juice when a food article is pushed against the cutter disc (8) by the pusher rod (7). The cutter disc (8) includes, on the side thereof facing the inlet feed tube (6), a projecting pinching surface (20) projecting outwardly of the cutter disc (8) and located eccentrically with respect to the central disc axis such that when only a thin sliver of food article remains between the pusher rod (7) and cutter disc (8), the projecting pinching surface (20) presses the thin sliver against the pusher rod (7) sufficiently to effect a slight rotation of the thin sliver with respect to the cutter disc (8), and thereby to better assure the complete cutting up of the food article into pulp saturated with juice.

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FOOD PROCESSING APPLIANCE PARTICULARLY USEFUL AS
JUICE EXTRACTOR

FIELD AND BACKGROUND OF THE INVENTION

The present invention relates to a food processing appliance, and particularly to a
5 juice extractor appliance for extracting juice from various types of food articles. The
invention is especially useful with respect to the types of appliances described in U.S.
Patents 5,924,357, 6,202,547, 6,412,404, 6,397,736, 6,742,447, and 6,862,982, and is
therefore described below with respect to such types of appliances.

The above-cited patents describe a food processor appliance for processing food
10 articles, comprising: a housing having an inlet feed tube for feeding food articles into the
appliance; a pusher rod for manually pushing the food articles through the inlet feed tube;
and a rotary cutter disc rotatable about a central disc axis and including a plurality of
cutting edges for cutting a food article into pieces when the food article is pushed against
the cutter disc by the pusher rod. Such appliances, when used for extracting juice from
15 the food articles, further include an outlet for outletting juice extracted from the food
articles, and a separator within the housing for separating the juice from the pulp and for
directing the juice via an outlet tube to the outlet. The pulp is moved by centrifugal
forces out of the housing into a receptacle supported laterally of the housing and may be
used in other food preparations.

20 Such appliances, however, suffer from one or more of the following drawbacks.
One drawback is that when such appliances are used for extracting juice from various
types of food articles such as fruit, vegetables, and the like, the rotation of the cutter disc
generally cuts the food article into a pulp saturated with juice until a thin sliver of the
food article remains, which firmly adheres to the cutting edges of the cutter disc and
25 rotates with the cutter disc. When this occurs, it is usually necessary, after each use of the
appliance, to remove the cutter disc and to clean away the thin sliver of food article
remaining on the cutter disc.

Another drawback in appliances of the latter type is that if the receptacle is
removed, there is a danger that a person may insert the person's fingers into the housing
30 and into engagement with the rotary cutter disc. A further drawback in such appliances is

that small seeds, such as grape seeds, may be passed with the pulp into the receptacle, thereby degrading the pulp for use in other food preparations.

OBJECTS AND BRIEF SUMMARY OF THE INVENTION

An object of the present invention is to provide an appliance of the type described
5 above having advantages in one or more the above respects.

According to one aspect of the present invention, there is provided a food
processing appliance for processing food articles comprising: a housing having an inlet
feed tube for feeding food articles into the appliance; a pusher rod for manually pushing
the food articles through the inlet feed tube; and a rotary cutter disc rotatable about a
10 central disc axis and including a plurality of cutting edges for cutting the food articles
into pieces when the food article is pushed against the cutter disc by the pusher rod; the
cutter disc including, on the side thereof facing the inlet feed tube, a projecting pinching
surface projecting outwardly of the cutter disc and located eccentrically with respect to
the central disc axis such that when only a thin sliver of food article remains between the
15 pusher rod and cutter disc, the projecting pinching surface presses the thin sliver against
the pusher rod sufficiently to effect a slight rotation of the thin sliver with respect to the
cutter disc, and thereby to better assure the complete cutting up of the food article fed into
the inlet feed tube.

An appliance constructed in accordance with the foregoing feature thus
20 effectively cuts up the food article more completely, without leaving the thin sliver
adherent to the cutter disc. This not only increases the juice yield, but also, probably more
important, reduces or eliminates the need for cleaning the cutter disc after each use of the
appliance.

Several embodiments of the invention are described below for purposes of
25 example. In one embodiment, the projecting pinching surface is in the form of a dimple
formed in the side of the cutter disc opposite to that facing the inlet feed tube at the
eccentric location such as to produce the projecting pinching surface on the side of the
cutter disc facing the inlet feed tube. In other described embodiments, the projecting
pinching surface is in the form of one or more rounded projections formed in the side of
30 the cutter disc facing the inlet feed tube at the eccentric location.

The invention is particularly useful in appliances which further comprise a separator within the housing for separating the juice from the pulp and for directing the juice via an outlet tube to the outlet; and a spout movably mounted with respect to the outlet tube to a non-blocking position permitting the flow of juice to the spout, or to a
5 blocking position blocking the flow of juice to the spout.

According to another aspect of the present invention, the spout is pivotably mounted about a horizontal axis, and includes a blocking element at one end engageable with the outlet tube in the blocking position of the spout, and disengageable from the outlet tube in the non-blocking position of the spout. In one described preferred
10 embodiment, the blocking element is an elastomeric cap receivable over the end of the outlet tube, and in another described embodiment it is an elastomeric plug receivable within the end of the outlet tube.

According to a still further aspect of the present invention, there is provided an appliance of the foregoing type wherein the appliance further comprises a lateral
15 extension extending laterally of the housing for receiving a receptacle to collect the pulp after the juice has been separated therefrom; the lateral extension including a sensor for sensing a receptacle thereon and effective to enable rotation of the rotary cutter disc only when a receptacle is sensed on the lateral extension. This feature provides a certain measure of protection against possible injury to a person's fingers when the receptacle is
20 removed, since the removal of the receptacle prevents operation of the rotary cutter disc.

According to another aspect of the present invention, the latter protective feature against accidental entry of a person's fingers is effected by providing the appliance with a cover formed on its under surface with a plurality of circumferentially-spaced baffles defining passageways permitting the passage of pulp from the housing into the receptacle,
25 but blocking the entry of a person's fingers or other foreign objects into the housing when the receptacle is removed.

According to a still further aspect of the present invention, the separator includes, on its outer rim engageable by the cover, a plurality of radially-extending circumferentially-spaced ribs defining, with the cover, passageways permitting the
30 passage of pulp from the housing into the receptacle, but blocking the passage of seeds,

pits, and the like in the food articles into said receptacle. The pulp received within the receptacle is thus free of seeds and may therefore be used in other food preparations.

According to a still further aspect of the present invention, the rotary cutter disc includes a first group of cutting edges housing having an inlet feed tube for feeding food articles into the appliance; a pusher rod for manually pushing the food articles through the inlet feed tube; and a rotary cutter disc rotatable about a central disc axis and including a plurality of cutting edges for cutting the food articles into pieces when the food article is pushed against the cutter disc by the pusher rod; the cutter disc including: a first group of cutting edges located in a central circular region of the rotary cutter disc; a second group of cutting edges located in an outer peripheral region of the rotary cutter disc around the central circular region; and a third group of cutting edges of linear form extending radially of the cutter disc and spaced circumferentially around and outwardly of the second group of cutting edges. This feature, particularly when taken together with the other features, has been found to more effectively and thoroughly cut-up such food articles as grapes, and for separating the juice from the pulp thereof.

According to a still further aspect of the present invention, the rotary cutter disc may further include an annular array of grinding projections, and a cover, attachable over the upper end of the housing, may be provided on its undersurface with annular array of grinding projections cooperable with the grinding projections of the rotary cutter disc, to enable the appliance also to be used for grinding coffee beans, soy beans, and the like.

Further features and advantages of the invention will be apparent from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

Fig. 1 is a front perspective view illustrating one form of juice extractor appliance constructed in accordance with the present invention;

Fig. 2 is a rear perspective view of the appliance of Fig. 1;

Figs. 3 and 4 are side elevational views from the opposite sides of the appliance of Fig. 1;

Fig. 5 is a rear elevational view of the appliance of Fig. 1;

Fig. 6 is a front elevational view of the appliance of Fig. 1 showing, in broken lines, the rotary cutter disc for cutting the food articles into a pulp saturated with juice, and the separator basket for separating the juice from the pulp;

5 Figs. 7 and 8 diagrammatically illustrate the location of the rotary cutter disc with respect to the inlet feed tube;

Figs. 9 and 10 are plan and side views, respectively, of the rotary cutter disc in the appliance of Figs. 1 – 8;

10 Figs. 11 and 12 are perspective and side views, respectively, illustrating another construction of rotary cutter disc which may be used;

Fig. 13 is an exploded perspective view illustrating the construction of the juice outlet;

Fig. 14 is a perspective view illustrating the normally-closed position of the juice outlet blocking the flow of juice therefrom;

15 Fig. 15 is a corresponding view but showing, in broken lines, the open position of the juice outlet permitting the flow of juice therefrom;

Fig. 16 is a view similar to that of Fig. 15, but illustrating a modification in the outlet spout;

Fig. 17 illustrates the underside of the upper cover in the appliance of Figs. 1–15;

20 Fig. 18 is a view similar to that of Fig. 16, but illustrating a modification in the construction of the upper cover to prevent insertion of a person's fingers into the housing when the pulp-receiving receptacle is removed, such as to expose the person's fingers to the rotary cutter blade;

25 Fig. 19 is a perspective view illustrating another food processing appliance constructed in accordance with the present invention for use both as a juice extractor and also as a grinder for grinding coffee beans, soy beans, and the like;

Fig. 20 is a top view of the appliance of Fig. 18 with the upper cover removed;

Fig. 21 is a bottom view of the upper cover in the appliance of Fig. 18;

30 Fig. 22 illustrates a hand-held funnel which may be used with the appliance of Fig. 18 when the appliance is used for grinding coffee-bean or soy-beans;

Fig. 23 illustrates one construction of rotary cutter disc in the appliance of Figs. 19–21;

and Fig. 24 illustrates another construction of the rotary cutter disc for use in the appliance of Figs. 19–21.

5 It is to be understood that the foregoing drawings, and the description below, are provided primarily for purposes of facilitating understanding the conceptual aspects of the invention and various possible embodiments thereof, including what is presently considered to be a preferred embodiment. In the interest of clarity and brevity, no attempt is made to provide more details than necessary to enable one skilled in the art, using
10 routine skill and design, to understand and practice the described invention. It is to be further understood that the embodiments described are for purposes of example only, and that the invention is capable of being embodied in other forms and applications than described herein.

DESCRIPTION OF PREFERRED EMBODIMENTS

The Embodiment of Figs. 1–18

The appliance illustrated in Figs. 1–18 is primarily useful as a juice extractor. It includes a housing constituted of a lower base 2 and an upper base 3 closed by an upper cover 4. A locking bar 5 is pivotally mounted to the lower base 2 and includes roller elements 5a, 5b seatable within recesses 4a, 4b in cover 4 for selectively locking the
20 cover in place, or unlocking it to enable access into the interior of the housing.

The upper cover 4 is integrally formed with an inlet feed tube 6 for introducing food articles into the housing by means of a manual pusher member or rod 7. As shown in Fig. 6, a rotary cutter disc 8 is rotatably mounted within the housing and is driven by an electrical motor M within the lower base 2 for cutting the food articles received
25 through the feed tube 6 into a pulp saturated with the juice to be extracted. As further shown in Fig. 6, the housing further includes a separator basket 9 which separates the juice from the pulp and directs the juice to an outlet tube 10 overlying a spout 11, for outletting the extracted juice into a receptacle (not shown) to be placed under the spout. Base 2 and cover 4 further include lateral extensions, 12 and 14, respectively, for
30 removably supporting another receptacle 15 to receive the pulp in the separator basket 8

after extraction of the juice therefrom. The appliance is controlled by a manual switch 16 in the lower base 2.

Insofar as described above, such appliances are well known and further details are available from commercially-available articles and/or from the above-identified U.S.

5 patents.

As indicated above, one of the drawbacks in the known juice extractor appliances of this type is the need for frequent cleaning of the rotary cutter disc 8 because of the presence of a thin sliver of the food article remaining adherent to the cutter disc after each use of the appliance. Thus, as the food article introduced via the inlet feed tube 6 is
10 pressed by pusher rod 7 into engagement with the cutter disc 8, the food article is restrained against rotation with the cutter disc by the pusher rod so that the cutter disc effectively cuts the food article into a pulp saturated with the juice. However, when but a thin sliver of the food article remains, the pressure applied by the pusher rod pressing the food article against the cutter disc is insufficient to prevent rotation of the remnant thin
15 sliver with the cutter disc, so that the thin sliver remains attached to and rotates with the cutter disc. This not reduces the amount of juice capable of being extracted from the food article, but more importantly, increases the need for frequent cleaning of the cutter disc after each use of the appliance.

The present invention, according to one aspect, provides an improved cutter disc
20 construction which reduces or eliminates this problem. The invention also provides several other important improvements to appliances of this type.

The improvement regarding the construction of the cutter disc for eliminating the thin sliver of the food article remaining on the cutter disc will first be described particularly with reference to Figs. 6 – 12.

25 As shown particularly in Figs. 7 and 8, the cutter disc 8 is preferably eccentrically mounted with respect to the feed tube 6. That is, the cutter disc 8 is driven by motor M via a drive shaft 16 about a rotary axis RA which is laterally displaced from the axis FTA of the feed tube 6. Such eccentric mounting of the cutter disc is frequently used in juice extractor appliances of this type to avoid the problem of the “dead region” of the food
30 article centrally of the cutter disc. Such “dead region” of the food article may not be cut up by the cutter disc if the rotary axis of the cutter disc is coaxial with the axis of the feed

tube. However, an eccentric mounting of the cutter disc with respect to the feed tube is not essential in the present case, when using the cutter discs illustrated in Figs. 9 – 12, since such cutter discs are provided with cutting edges in the center area to avoid this “dead region” problem.

5 Thus, Fig. 9 illustrates cutter disc 8 as including a plurality of cutting edges projecting from the side of the cutter disc facing the inlet feed tube 6 for cutting the food articles into a pulp saturated with juice when the food article is pushed against the cutter disc by the pusher rod 7. The cutter disc is mounted to shaft 16 via a plurality of fasteners received within openings 17 formed in the cutter disc.

10 Figs. 9 and 10 illustrate the rotary axis RA as passing through the center of the cutter disc. As shown particularly in Fig. 9, the cutting edges formed in the face of the cutter disc 8 include a first group 8a located in a central circular region 18, and a second group 8b located in an outer peripheral region 19 around the central circular region 18. As will also be seen from Fig. 9, the central circular region 18 of the cutter disc is
15 eccentric with respect to the rotary axis RA of the cutter disc.

As further seen in Fig. 9, the second group of cutting edges 8b formed in the outer peripheral region 19 are located in a plurality of lines radiating from the center circular region 18. The first group of cutting edges 8a formed in the center circular region 18 are in the form of extensions of two pairs of such lines which intersect within the central
20 circular region 18. It will be seen from Fig. 9 that the cutting edges 8a in the central circular region 18 are of substantially the same size and shape as the cutting edges 8b in the outer peripheral region 19.

In accordance with one aspect of the present invention, the side of cutter disc 8 facing the inlet feed tube 6 is formed with a projecting pinching surface, best seen at 20
25 in Fig. 10 (and also in Fig. 9) projecting outwardly of the cutter disc and located eccentrically with respect to the center disc axis, i.e., the rotary axis RA, of the cutter disc. Thus, when a food article is pressed by the pusher rod 7 into firm engagement with the cutter disc, its cutting edges will cut the food article into a pulp saturated with the juice; and when the food article is reduced to a thin sliver which would normally adhere
30 to the cutting disc by the cutting edges, the projecting pinching surface 20 of the cutter disc will “pinch” the thin sliver between it and the pusher rod, i.e., will press the sliver

against the pusher rod, sufficient to effect a slight rotation of the thin sliver with respect to the cutter disc effective to detach the thin sliver from the cutter disc so as not to rotate with it. Thus, the rotation of the cutter disc will also cut up this thin sliver to thereby complete the cutting up of the food article without leaving a sliver remnant on the cutter
5 disc.

In cutter disc 8 illustrated in Figs. 9 and 10, the projecting pinching surface 20 is in the form of a dimple formed in the side of the cutter disc opposite to that facing the inlet feed tube 6 at an eccentric location with respect to the rotary axis RA of the cutter disc. As shown in Fig. 10, the so-formed dimple produces the pinching surface 20 which
10 projects outwardly of the cutting edges of the cutting cutter disc, to thereby effect the above-described "pinching" of the food article when but a thin sliver remains.

Figs. 11 and 12 illustrate a variation in the construction of the cutter disc, therein designated 108. Cutter disc 108 is also formed with openings 117 for mounting it to the motor drive shaft (motor 16, Figs. 7, 8), and with cutting edges formed as a first group
15 located in a central circular region 118, and a second group located in the outer peripheral region 119 of the cutter disc around the central circular region.

The cutter disc illustrated in Figs. 11 and 12 is also formed, on the side thereof facing the inlet feed tube 6, with a projecting pinching surface, therein designated 120, projecting outwardly of the cutting edges and located eccentrically with respect to the
20 central disc axis, i.e., rotary axis RA, of the cutting disc. In this case, however, the pinching surface 120 is in the form of a rounded or semi-spherical projection formed in the side of the cutter disc 108 facing the inlet feed tube. Pinching surface 120 in the cutter disc of Figs. 11 and 12 will thus act, in the same manner as described above with respect to pinching surface 20 in the cutter disc of Figs. 9 and 10, to pinch free the thin
25 sliver of food normally formed and adherent to the cutter disc. If desired, this "pinching effect" may be increased by flattening the outer surfaces of the rounded projections 120.

In the cutter disc illustrated in Figs. 11 and 12, the cutting edges formed in the outer peripheral region 119 are also located in a plurality of lines radiating from the central circular region 118. However, the cutting edges in the central circular region 118
30 are of larger size than those in the outer peripheral region 119. In addition, the cutting edges within the central circular region 118 are constituted of but six cutting edges

divided into three pairs, each pair being located in a line radiating from the center of the central circular region 118.

In addition, although the cutter disc 8 illustrated in Figs. 9 and 10 includes but a single projecting pinching surface 20, cutter disc 108 in Figs. 11 and 12 includes three
5 such projecting pinching surfaces 120 located symmetrically around the central circular region 118. It will be appreciated that the cutter disc of Figs. 9 and 10 could also be provided with a plurality of such projecting pinching surfaces, e.g., as in Figs. 11 and 12, and that the cutter disc of Figs. 11 and 12 could be provided with a single pinching surface as in Figs. 9 and 10.

10 Fig. 2 illustrates another improvement in the illustrated juice extractor appliance. Thus, as shown in Fig. 2, the lateral extension 12 of the appliance base 2, for receiving the container 15 for the pulp separated by screen 9, includes a platform 130 on which the receptacle 15 is placed, and a sensor, in the form of a microswitch 131, which is actuated when the receptacle is placed on the platform. Microswitch 131 senses the presence of a
15 receptacle 15 on platform 130 and is effective to enable the operation of the electrical motor M for operating the appliance. Thus, if no receptacle is sensed in its proper position on platform 130, the appliance will be disabled from operation. This feature provides protection against accidental injury when receptacle 15 is not in place by a person inserting fingers under the lateral extension 14 of the upper cover 4.

20 A further improvement in the illustrated appliance is seen in Figs. 13-16 which illustrate the juice outlet of the appliance for outletting juice extracted from the food articles. Thus, as shown in Fig. 13, the outlet includes the spout 11 underlying the juice outlet tube 10, briefly described above. In this case, however, the spout 11 is pivotally mounted to housing section 3 about a horizontal axis by a pair of pins 141, 142, each of
25 which is fixed by a fastener 143, 144 to housing section 3 under the juice outlet tube 10. The inner end of spout 11 carries a blocking element in the form of an elastomeric cap 145, in alignment with the juice outlet tube 10.

Spout 11 is pivotal either to a blocking position (shown in full lines in Fig. 14) to cause cap 145 to engage the end of the juice outlet tube 10 to block the flow of juice
30 therefrom, or to an unblocking position (shown in broken lines in Fig. 15) to unblock the flow of juice from outlet tube 10. Thus, when the appliance is not being operated, spout

11 would be in its upper blocking position illustrated in Fig. 14, and when the appliance is to be used for extracting juice from food articles, the spout would be pivoted to its lower unblocking position illustrated in Fig. 15.

It will also be seen from Fig. 13, that spout 11 may easily be removed from the
5 appliance for cleaning, repair or replacement purposes.

Fig. 16 illustrates a variation in the construction of spout 11, wherein the blocking element, therein designated 145', is in the form of an elastomeric plug receivable within the outlet tube 10, rather than in the form of a cap receivable over the end of the outlet tube.

10 As indicated earlier, another drawback in juice extractor appliances of this type is the danger of a person inserting fingers into the appliance housing in the region of the rotary cutter disc 8 should the pulp-receiving receptacle 15 be removed. Thus, as shown in Fig. 16, the upper cover 4 is formed on its under surface with an arcuate baffle 31
15 between the upper cover and the lateral extension 14. Baffle 31 extends from one side of cover 4 but terminates short of the opposite side so as to define an open passageway 32 between the cover and the lateral extension 14 for the movement of the pulp from within the housing into the pulp-receiving receptacle 15 by centrifugal force. Thus, in the known construction, if receptacle 15 is removed, it is possible for someone to insert his or
20 her fingers through passageway 32 into the interior of the housing and in the region of the rotary cutter disc 8, during the operation of the appliance. As described above, providing the lateral extension 12 of the housing with a sensor 130 (Fig. 2), to disable the operation of the appliance in the event the pulp-receiving receptacle 15 is removed, reduces this danger when the cover 4 is of the construction illustrated in Fig. 17.

Fig. 18 illustrates a modification in the upper cover, therein designated 104, which
25 may be provided to prevent this possibility of personal injury. Thus, as shown in Fig. 18, in addition to baffle 131 between cover 104 and the lateral extension 114, the under surface of the upper cover 104 is formed with a plurality of inclined, circumferentially-spaced baffles 133 defining narrow passageways 132 for the passage of the pulp into the pulp-receiving receptacle 15, but blocking the introduction of a person's fingers into the
30 housing in the event the receptacle is removed.

The Embodiment of Figs. 19–24

Figs. 18–29 illustrate an appliance, similar to that of Figs. 1–18, but adapted for use not only for exacting juice from fruits and vegetables, but also for grinding beans, such as coffee beans, soy beans, and the like. In order to facilitate understanding, those elements which are basically the same as in the appliance of Figs. 1–18, are identified by the same reference numerals, whereas those elements which have been substantially modified or added for adapting the appliance for grinding functions are identified by reference numerals beginning with “200”.

One slight change in the appliance of Figs. 19–21 is that the feed tube, therein designated 206, is slightly inclined, rather than being substantially vertical, as shown in appliance of Figs. 1–18. Such an inclined feed tube facilitates the introduction of beans and the like to be ground, as will be described more particularly below. Also, the axis (inclined) of the feed tube passes centrally of the rotary cutter disc 208, rather than eccentrically as in Figs. 1–18.

Another important difference in the appliance of Figs. 19–21 is that its upper cover 204 and its rotary cutter disc 208 include cooperable grinding projections for grinding the beans or other such food items introduced via the inlet feed tube 206. These grinding projections are best seen in Fig. 20 illustrating the upper end of the appliance housing when the upper cover 204 is removed, and in Fig. 21 illustrating the under surface of the upper cover 204.

Fig. 20, being a top view with the upper cover 204 removed, illustrates the rotary cutter disc 208 and the separator basket 209, both serving the same functions as described above with respect to Figs. 1–18. Thus, rotary cutter disc 208 cuts the food articles received through the feed tube 206 into a pulp saturated with the juice to be extracted, and separator basket 209 separates the juice from the pulp. The juice is directed to the outlet spout 11 (Fig. 19), and the pulp is directed to the pulp-receiving receptacle 15.

Rotary cutter disc 208 may be of the same construction as described above with respect to Figs. 1–18, as particularly illustrated in Figs. 9–12, to effectively cut-up the food articles completely without leaving the thin sliver adherent to the cutter disc, as described above with respect to Figs. 1–18. In the appliance illustrated in Figs. 19–21, however, cutter disc 208 also includes an annular array of grinding projections 210

around its outer periphery. The annular array of grinding projections 210 is rotated with the cutter disc and cooperates with a corresponding annular array of projections fixedly carried by the upper cover 204 to grind the food articles, e.g. coffee beans, soy beans, etc., introduced via the feed tube 206. Two preferred constructions of rotary cutter disc 5 208 are described below with respect to Figs. 23 and 24.

Another modification is in the separator basket 209 illustrated in Fig. 20, wherein its outer rim 230 is integrally formed with a plurality of radially-extending, circumferentially-spaced ribs 231. Ribs 231 also cooperate with the upper cover 204 to define passageways 232 which permit the passage of pulp from the separator basket 209 10 into the pulp receiving receptacle 15, but block the passage of seeds, pits, or the like in the food articles, e.g. grape seeds in grapes being juiced.

The under surface of the upper cover 204 is illustrated in Fig. 21. As shown, its feed tube 206 extends inwardly of its under surface and carries, at its inner end, an annular array of grinding projections 240 aligned with grinding projections 210 of the 15 rotary cutter disc 208 when the upper cover 204 is secured to the housing by locking bar 5. Thus, the annular array of the fixed grinding projections 240 carried by cover 204 cooperate with the annular array of rotating grinding projections 210 on rotary cutter disc 208 to grind the coffee beans, soy beans, and the like, introduced into the appliance via the feed tube 206. The ground product is received within separator basket 209 and is 20 rotated thereby at the high speed of rotation of the rotary cutter disc 208, so as to be thrust outwardly by centrifugal force, through the spaces 232 between the ribs 231 in the outer rim of the separator basket, and into the receptacle 15.

Thus, when the appliance of Figs. 19-21 is to be used for extracting juice from grapes or other fruit containing seeds, the pulp produced within separator basket 209 will 25 be moved by centrifugal forces through the spaces 232 between the ribs 231 on the outer rim of the separator basket into the receptacle 15, whereas the seeds will be blocked by the ribs 231 so as to be retained within the separator basket. The pulp received within the receptacle 15 will not therefore be degraded by the seeds, and accordingly can be better used in other food preparations.

30 The manner of using the appliance illustrated in Figs. 19-21 will be apparent from the above description. Thus, the appliance may be used for extracting juice from food

articles in the same manner as described above with respect to Figs. 1–18. In addition, the appliance of Figs. 19–21 may also be used for grinding beans, such as coffee beans, soy beans, etc., by introducing the beans into the feed tube 206, whereupon the beans are ground between the rotary grinding projections 210 of the rotary cutter disc 208, and the fixed grinding projections 240 of the upper cover 204. The ground product is moved by centrifugal forces through the passageways 232 between ribs 231 on the outer rim 230 of the separator basket 209 into the receptacle 15.

Fig. 22 illustrates a hand funnel, generally designated 250, which may be used to facilitate the use of the appliance of Figs. 19–21 for grinding beans. Funnel 250 illustrated in Fig. 22 includes a funnel section 251 decreasing in diameter from its open upper end 252 to its lower open end 253, and an outlet section 254 of cylindrical configuration integrally formed with the lower end 253 of the funnel section 251 so as to direct the beans or other such food articles into the open end of the feed tube 206. Funnel section 251 includes a handle 255 to facilitate manipulating the funnel.

Fig. 23 more particularly illustrates one preferred construction of rotary cutter disc 208. As shown in Fig. 23, the rotary cutter disc includes the first group of cutting edges 208a in the central region, and the second group of cutting edges 208b in the outer peripheral region, as described above particularly with respect to Figs. 11 and 12. In this case, however, rotary cutter disc 208 includes only a single rounded protuberance 220 eccentrically located with respect to the center of the cutter disc, for performing the “pinching” function described above with respect to Figs. 11 and 12, which facilitates the complete cutting of the food article without leaving a sliver to be removed.

Rotary cutter disc 208 illustrated in Fig. 23 also includes the annular array of grinding projections 210 cooperable with the fixed grinding projections 240 of the cover 204, for grinding beans and the like, as described above with respect to Figs. 20 and 21. As shown in Fig. 23, grinding projections 210 are in the form of radially-extending, circumferentially-spaced, ridges or ribs located around and outwardly of the cutting edges 208b.

Fig. 24 illustrates a modification in the construction of the rotary cutter disc 208, wherein the grinding projections are in the form of an annular array of dot-shaped protuberances, as shown at 210'. It will be appreciated that when this type of rotary cutter

disc is used, the fixed grinding projections carried by the upper cover, as illustrated at 240 in Fig. 20, may be of a similar construction.

Cutter disc 208 illustrated in both Figs. 23 and 24 include a third group of cutting edges, shown at 208c. This third group of cutting edges 208c are of linear form, extending radially of the cutter disc, and are spaced circumferentially around and outwardly of the second group of cutting edges 208b. In the cutter discs illustrated in Figs. 23 and 24, there are six of such radially-extending cutting edges 208c, but it will be appreciated that a smaller number or larger number of such cutting edges could be provided. It has been found that the provision of these additional cutting edges 208c more effectively cuts certain food articles, such as grapes, into juice-saturated pulp. It will be appreciated that the earlier described rotary cutter discs, such as illustrated in Figs. 9-12, could be provided with similar cutting edges.

While the invention has been described with respect to several preferred embodiments, it will be appreciated that these are set forth merely for purposes of example, and that many other variations, modifications and applications of the invention may be made.

CLAIMS:

1. A juice extractor appliance for extracting juice from food articles, comprising:
 - a housing having an inlet feed tube for feeding food articles into the appliance, and an outlet for outletting juice extract from such food articles;
 - a pusher rod for manually pushing the food articles through said inlet feed tube;
 - a cutter disc rotatable about a central disc axis and including a plurality of cutting edges projecting from one side of the disc facing said inlet feed tube for cutting the food articles into a pulp saturated with juice when the food article is pushed against said cutter disc by said pusher rod;
 - a separator within said housing for separating the juice from the pulp and for directing the juice via a feed tube to said outlet; and
 - a lateral extension extending laterally of said housing for receiving a receptacle to collect the pulp after the juice has been separated therefrom;
 - said lateral extension including a sensor for sensing a receptacle thereon and effective to enable rotation of the cutter disc when a receptacle is sensed on said lateral extension.
2. The appliance according to claim 1, wherein said sensor is a microswitch controlling a drive for said cutter disc.
3. The appliance according to claim 1, wherein said outlet includes a spout movably mounted with respect to an outlet tube to a non-blocking position permitting the flow of juice to said spout, or to a blocking position blocking the flow of juice to said spout;
 - said spout being pivotably mounted and including a blocking element at one end engageable with said outlet tube in the blocking position of the spout, and disengageable from said outlet tube in the non-blocking position of the spout.
4. The appliance according to claim 3, wherein said blocking element is an elastomeric cap engageable with, and disengageable from, the end of said outlet tube.

5. The appliance according to claim 1, wherein said cutter disc includes, on the side thereof facing said inlet feed tube, a projecting pinching surface projecting outwardly of said cutting edges and located eccentrically with respect to said central disc axis such that when only a thin sliver of food article remains between said pusher rod and cutter disc, said projecting pinching surface presses the thin sliver against said pusher rod to effect a slight rotation of said thin sliver with respect to said cutter disc, and thereby to better assure the complete cutting up of the food article fed into said inlet feed tube.

6. The appliance according to claim 5, wherein said projecting pinching surface is in the form of a dimple formed in the side of the cutter disc opposite to that facing said inlet feed tube at said eccentric location such as to produce said projecting pinching surface on the side of the cutter disc facing said inlet feed tube.

7. The appliance according to claim 5, wherein said projecting pinching surface is in the form of a projection formed in the side of said cutter disc facing said inlet feed tube at said eccentric location.

8. The appliance according to claim 5, wherein said cutter disc includes a plurality of said projecting pinching surfaces located eccentrically with respect to said central disc axis.

9. The appliance according to claim 5, wherein said plurality of cutting edges include a first group of cutting edges located in a central circular region of the cutter disc, and a second group of cutting edges located in an outer peripheral region of the cutter disc around said central circular region;

said projecting pinching surface being located in said central circular region eccentrically with respect to said central disc axis.

10. The appliance according to claim 9, wherein said central disc axis of the cutter disc is displaced laterally with respect to the axis of said inlet feed tube.

11. The appliance according to claim 9, wherein said second group of cutting edges are located in a plurality of lines radiating from said central circular region.

12. The appliance according to claim 11, wherein said first group of cutting edges are in the form of extensions of at least two of said lines of cutting edges of said second group and of substantially the same size as those of said second group.

13. The appliance according to claim 11, wherein said first group of cutting edges are of larger size than those of the said second group.

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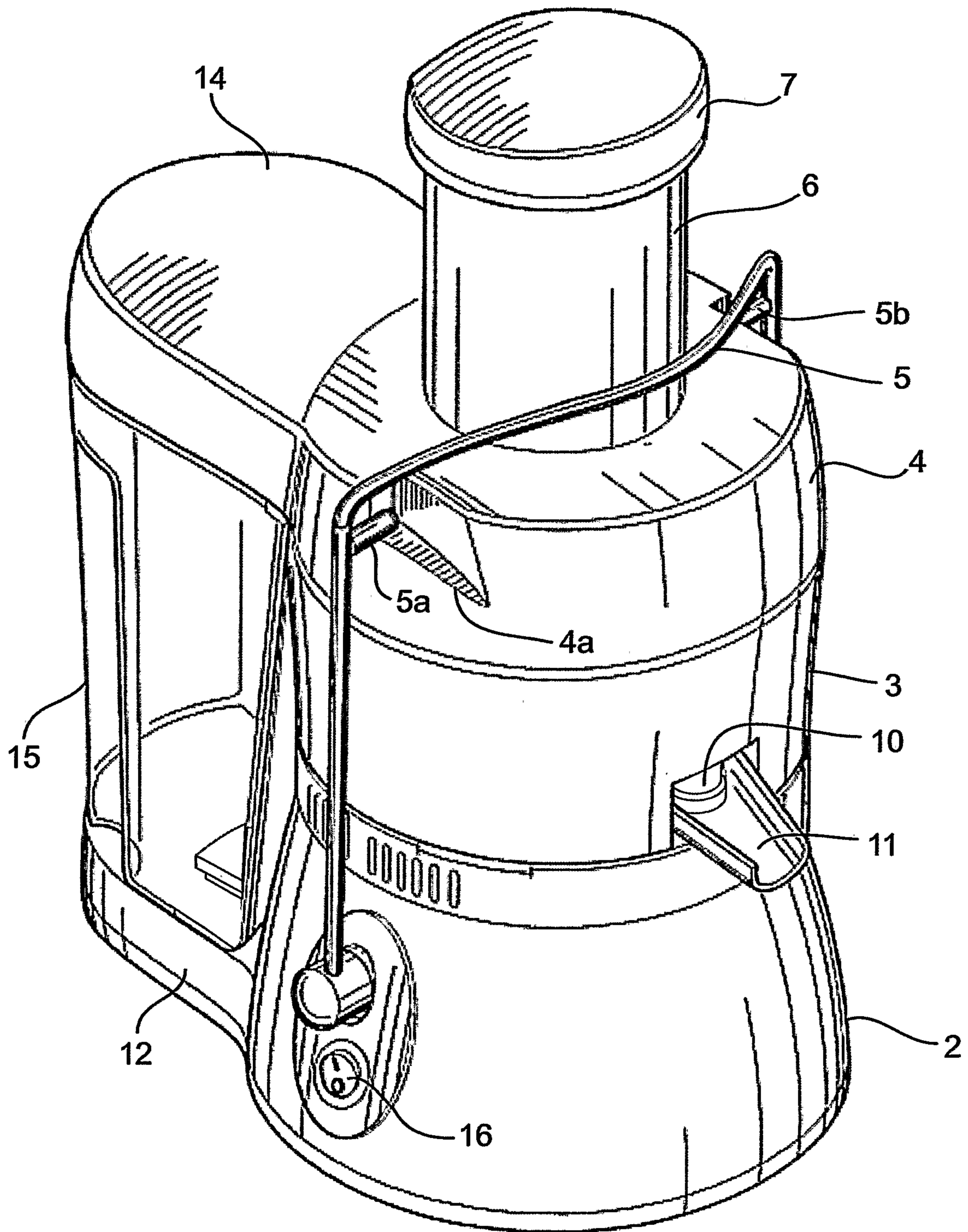


Fig. 1

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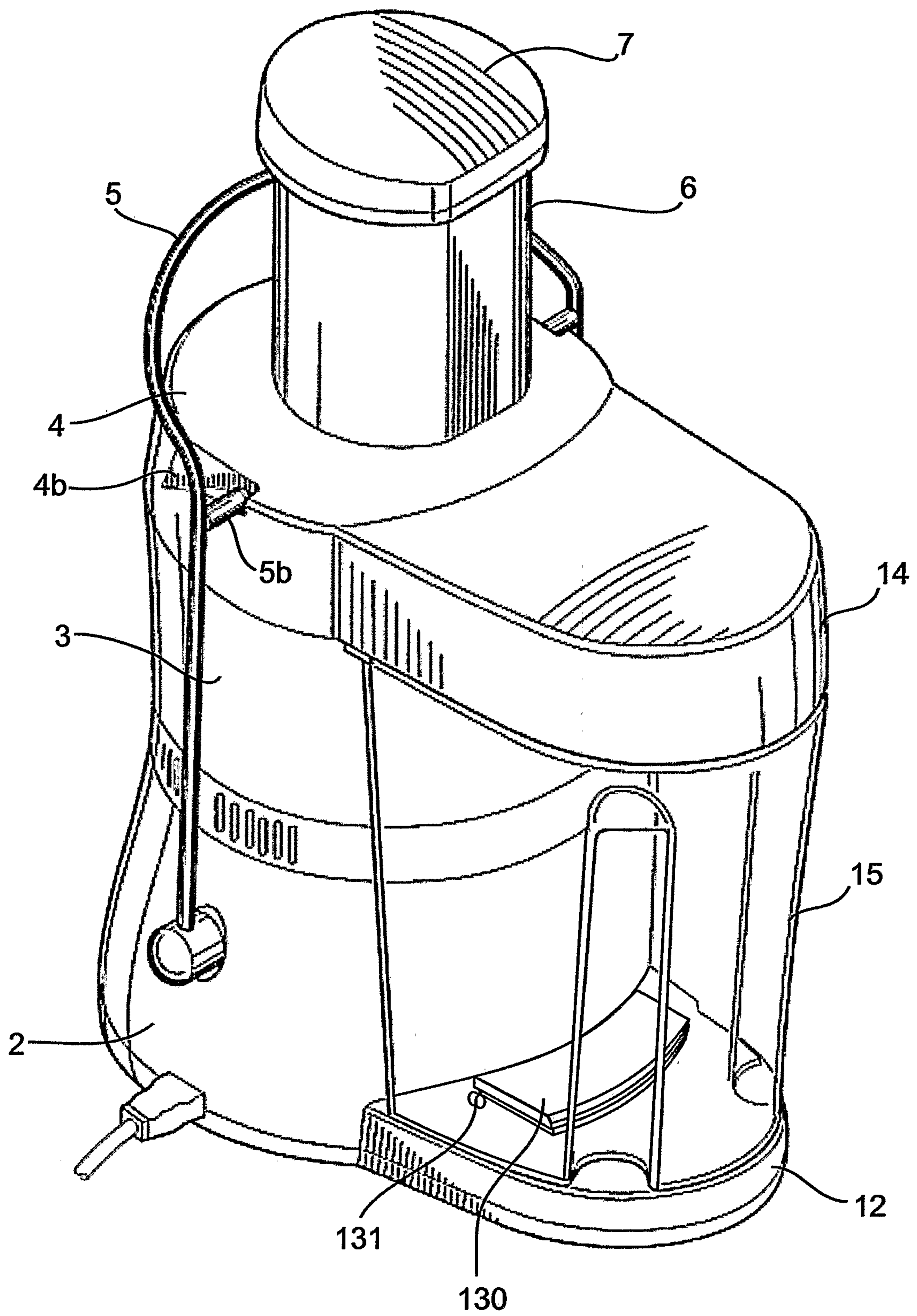


Fig. 2

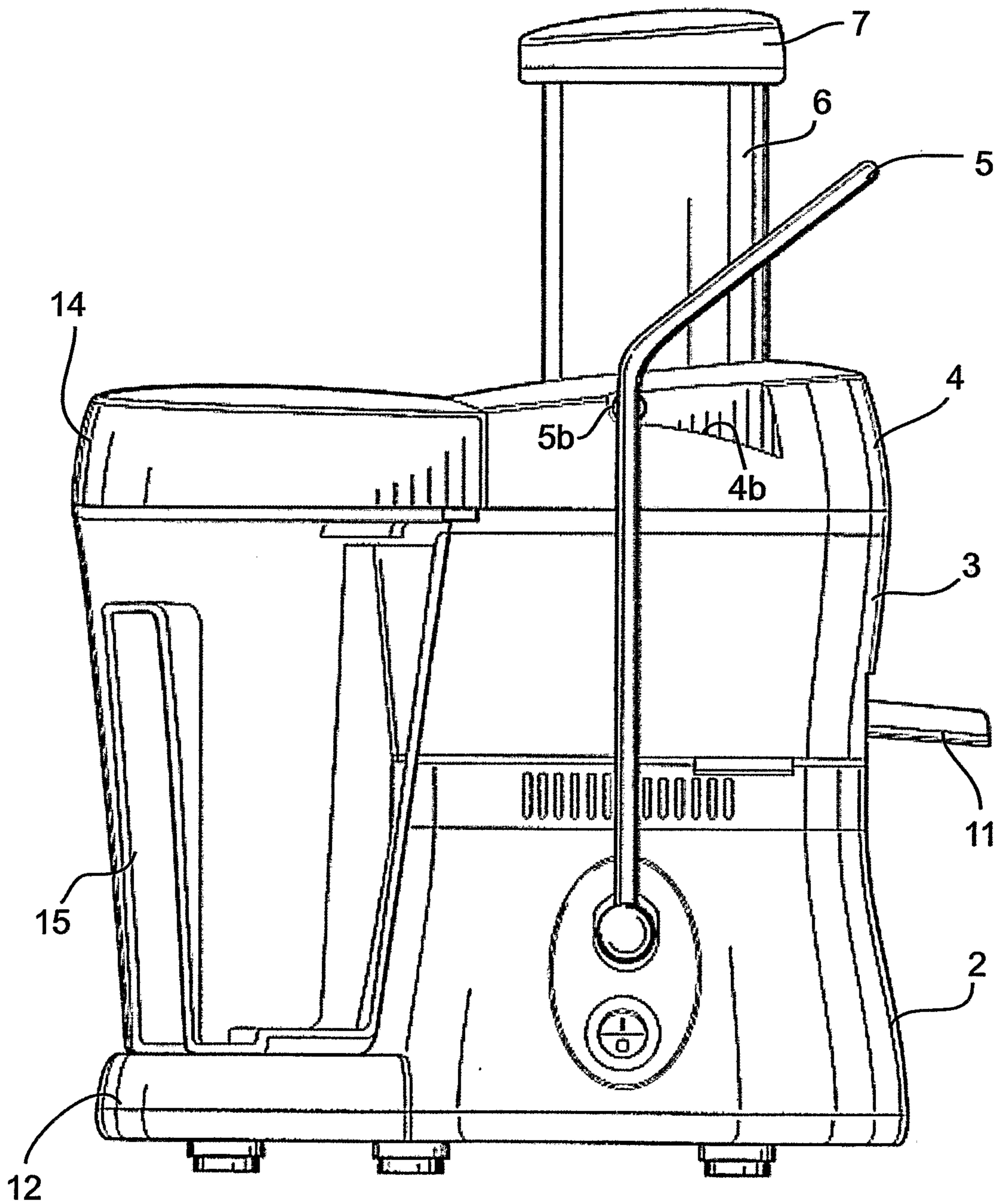


Fig. 3

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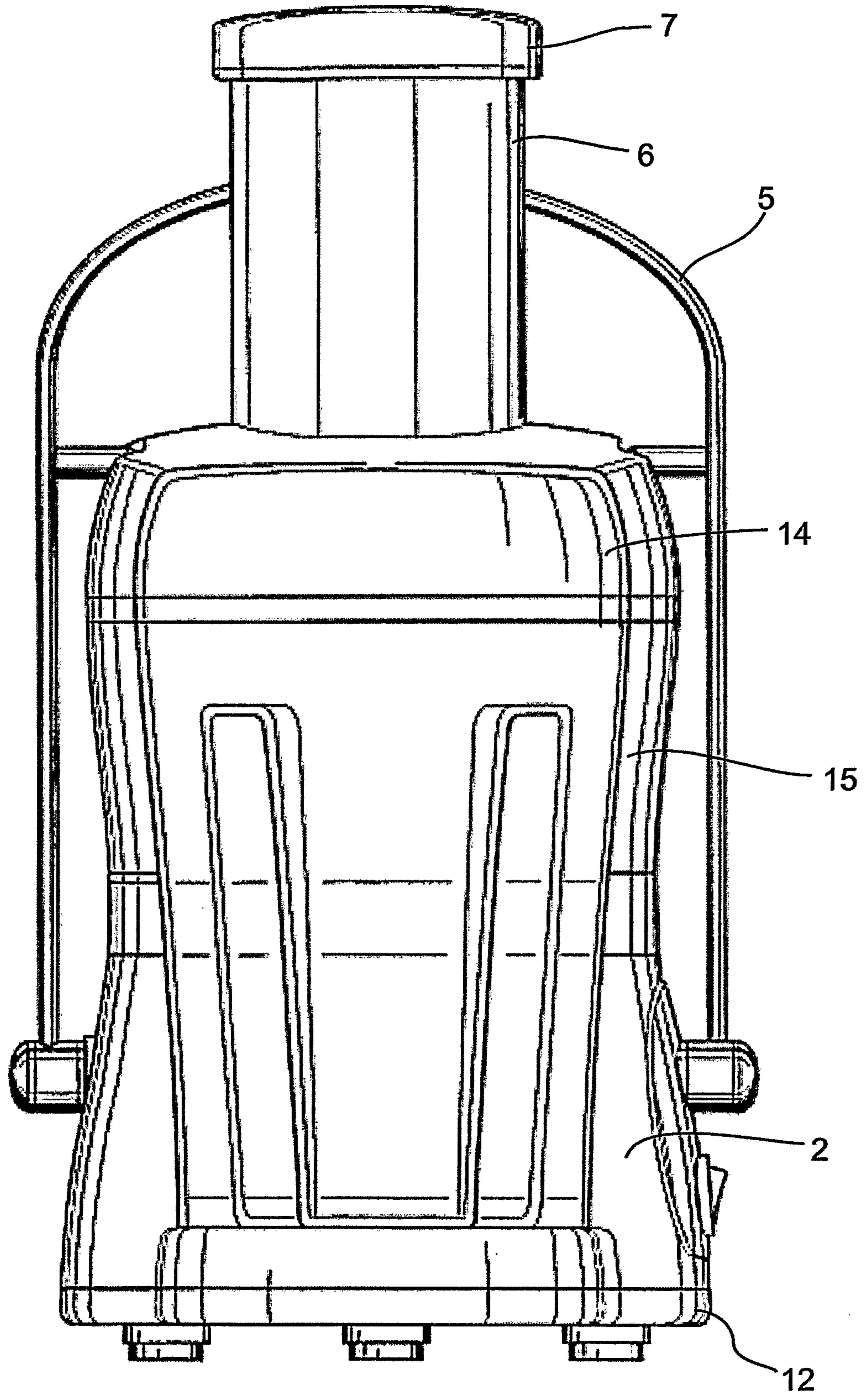


Fig. 5

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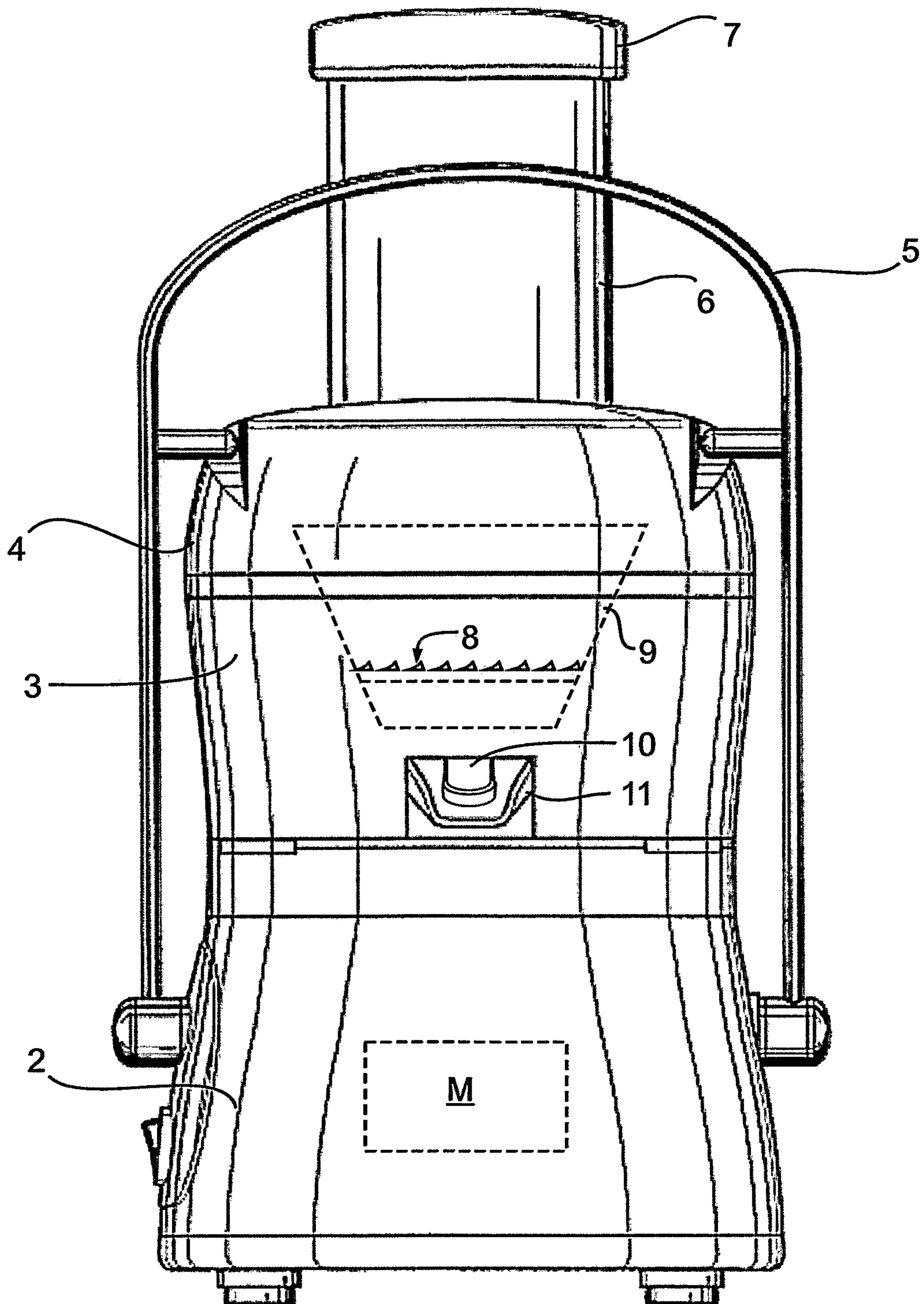


Fig. 6

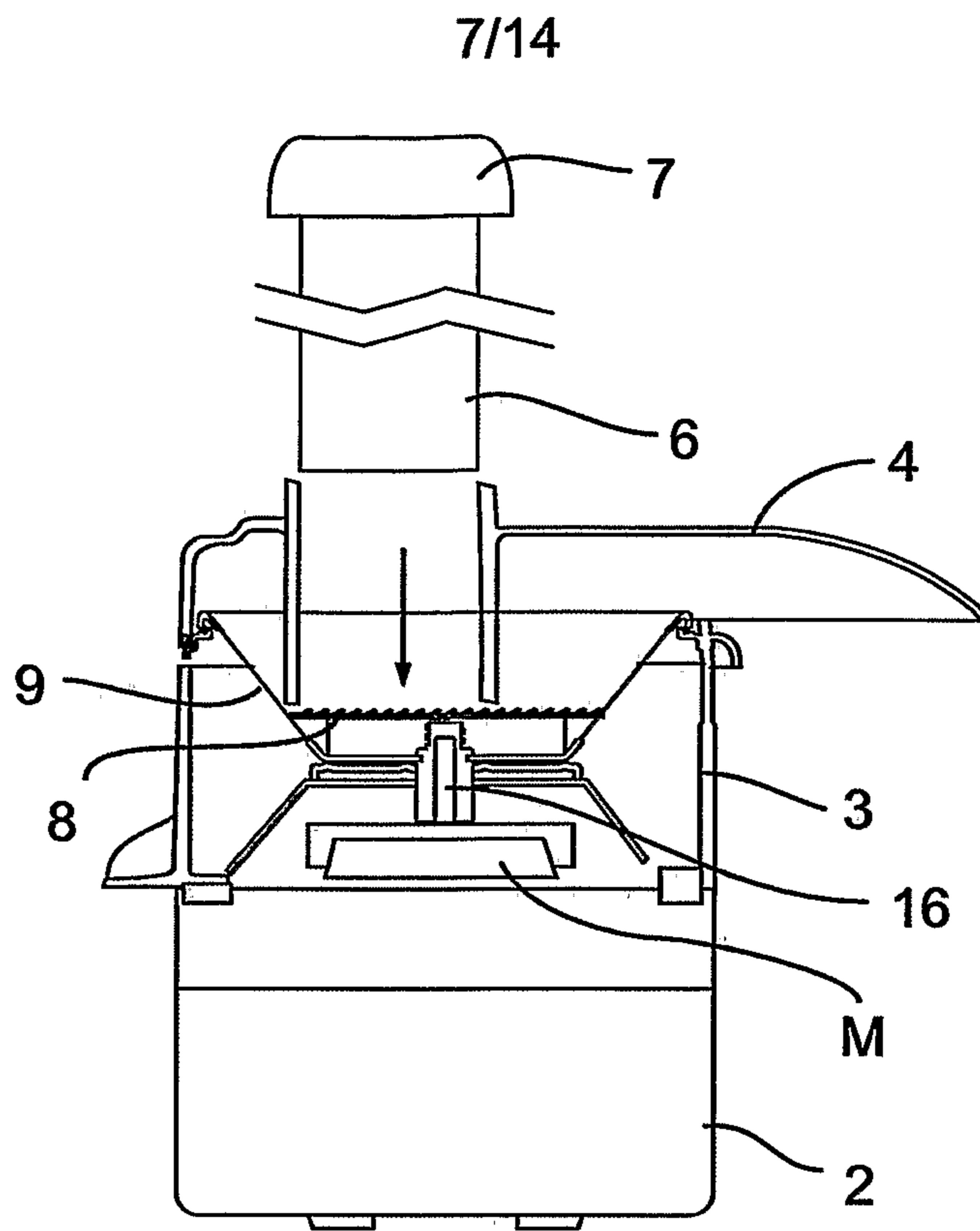


Fig. 7

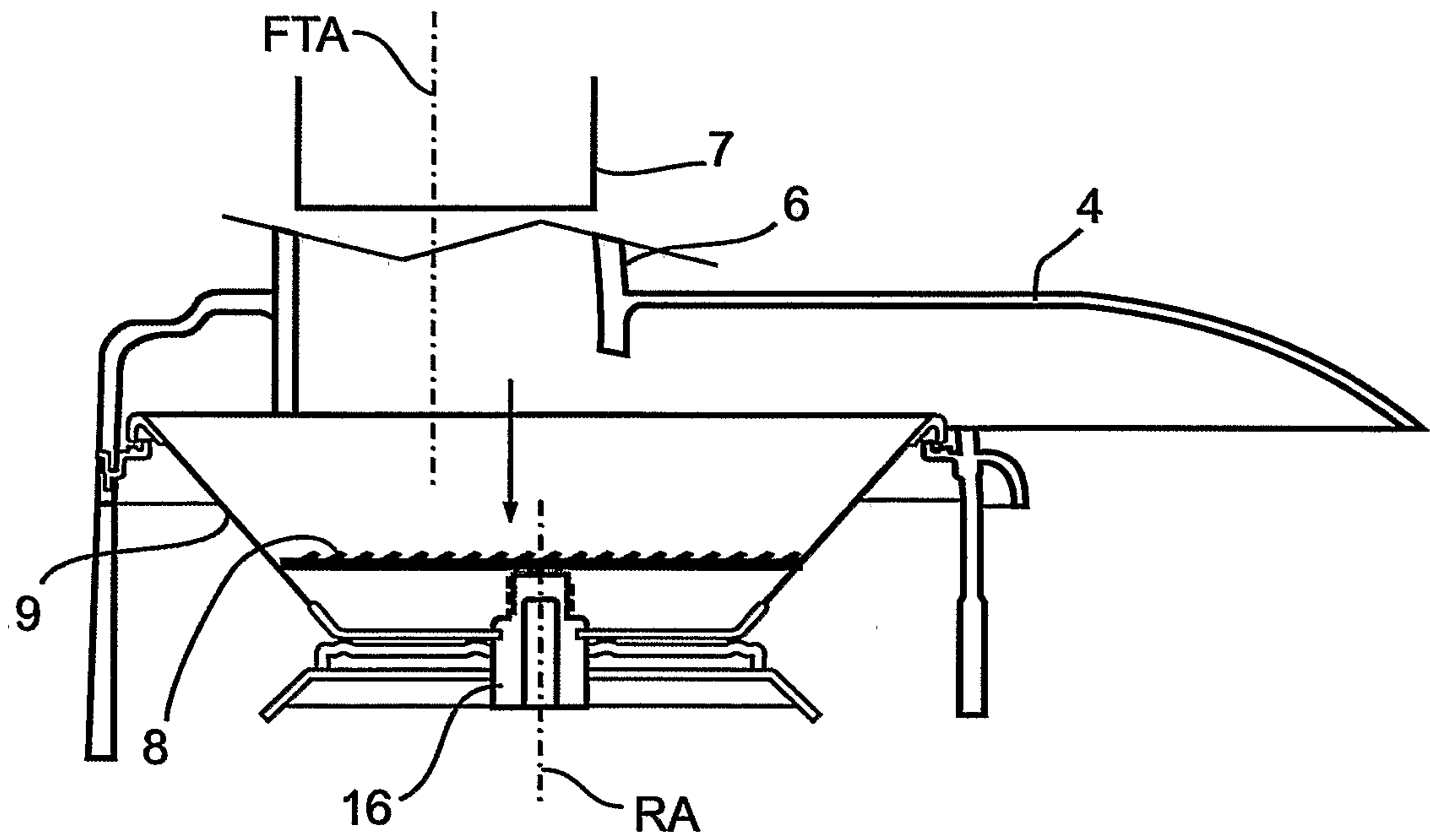


Fig. 8

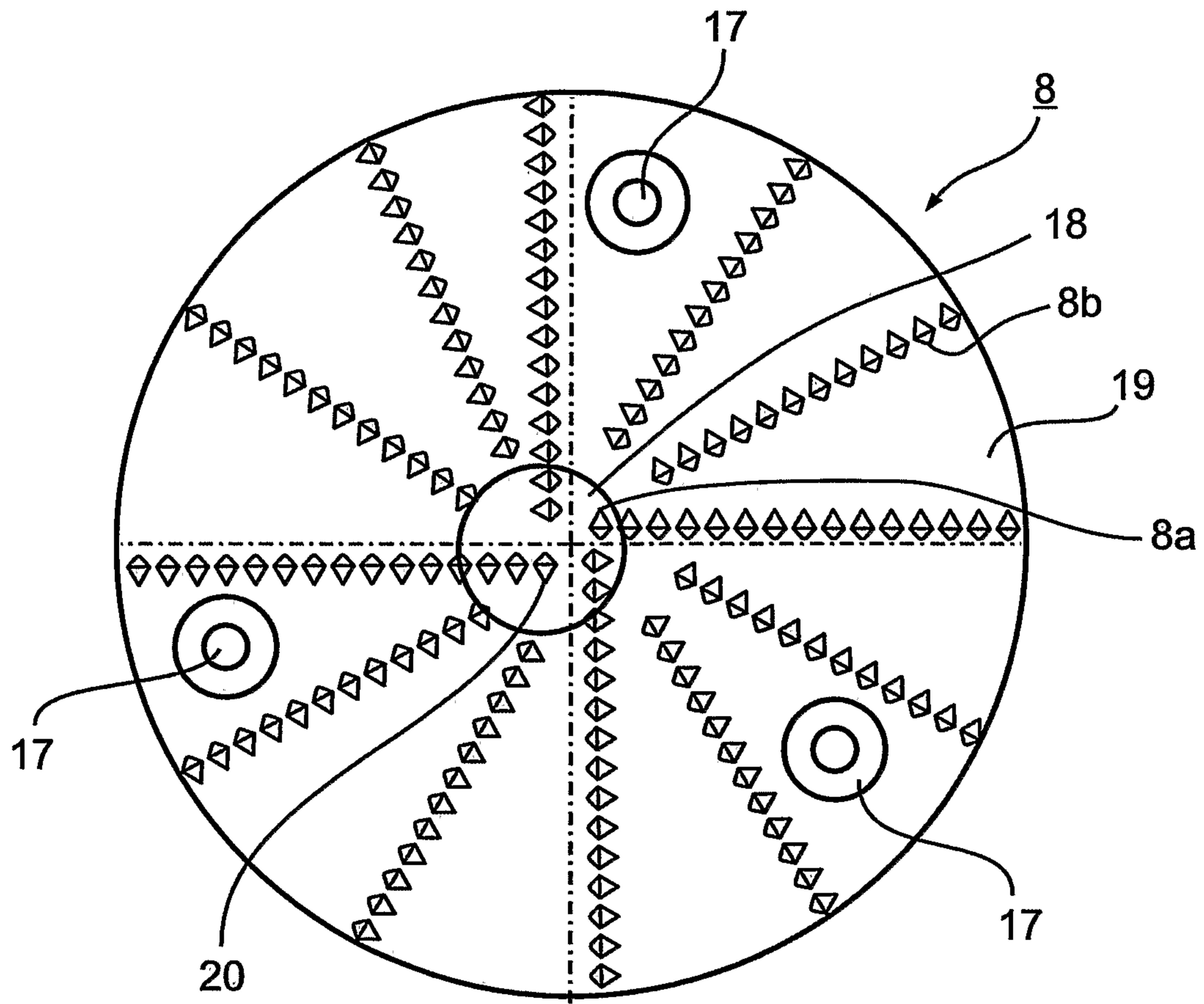


Fig. 9

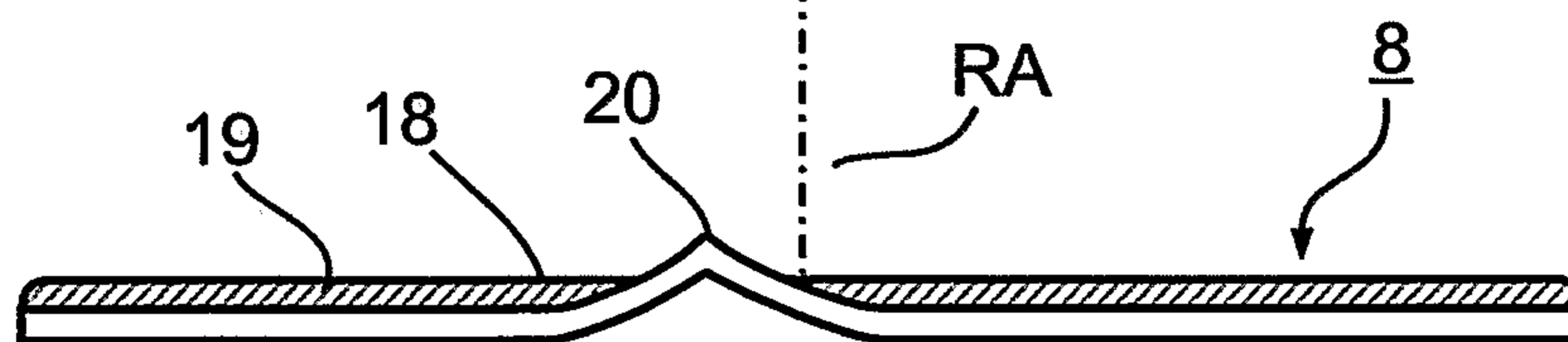


Fig. 10

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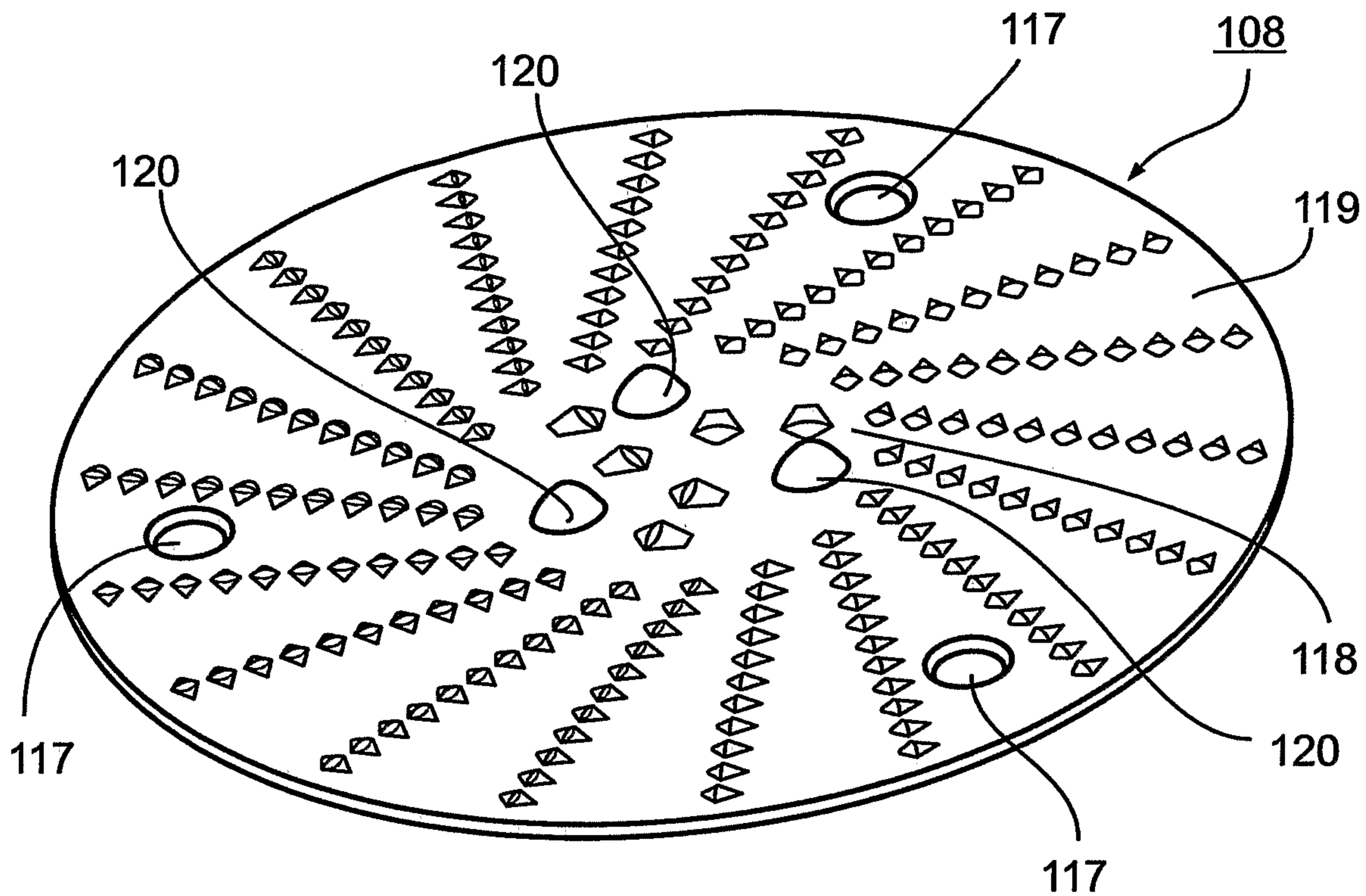


Fig. 11

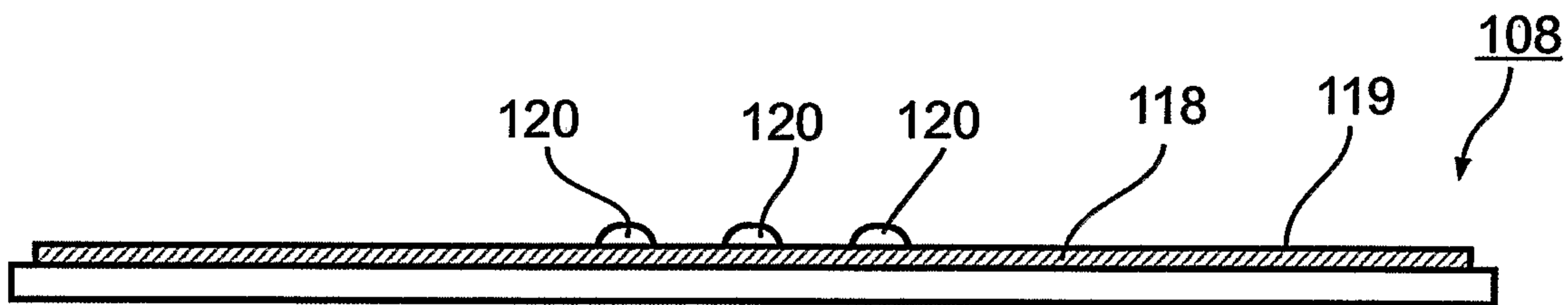


Fig. 12

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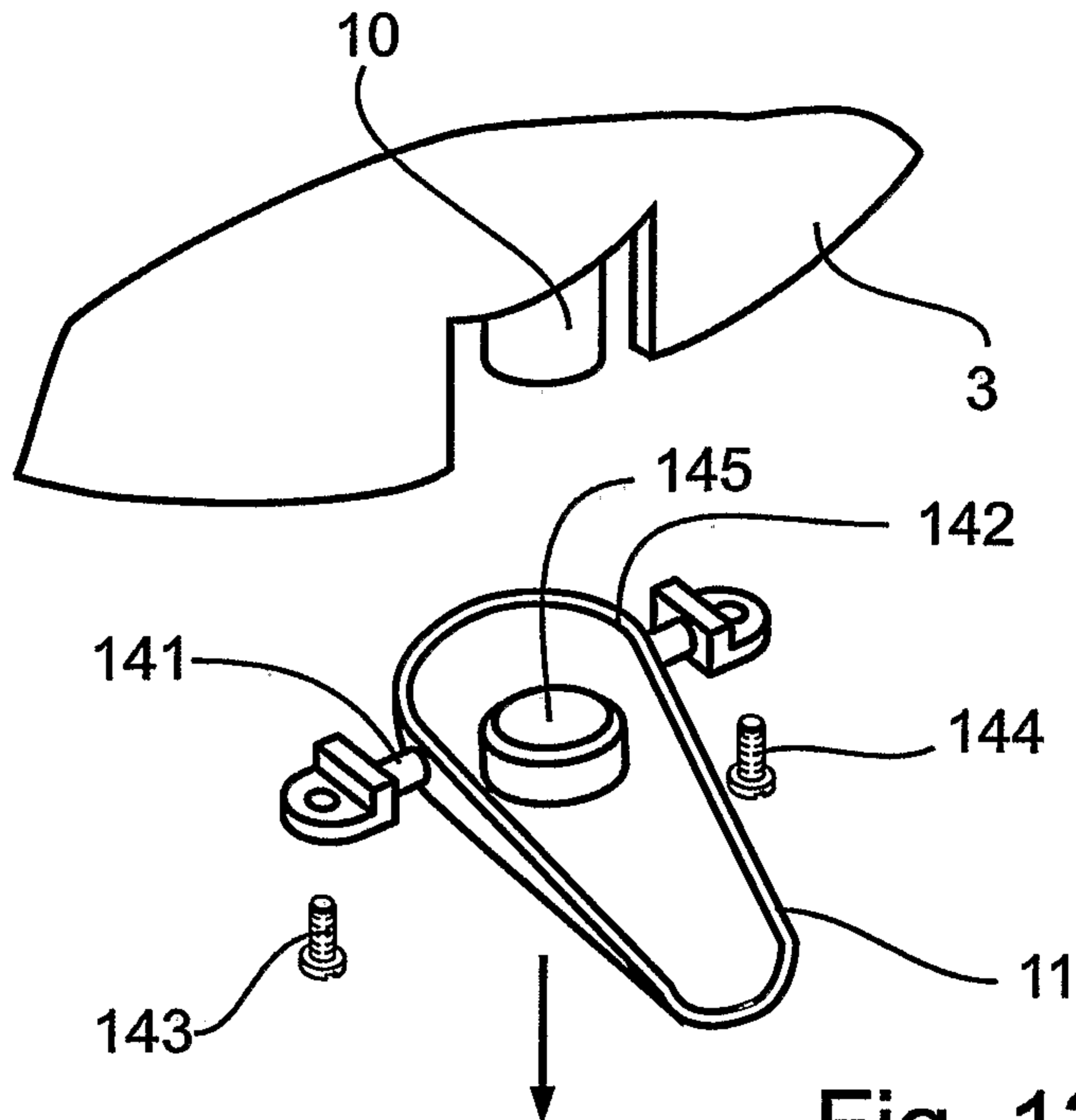


Fig. 13

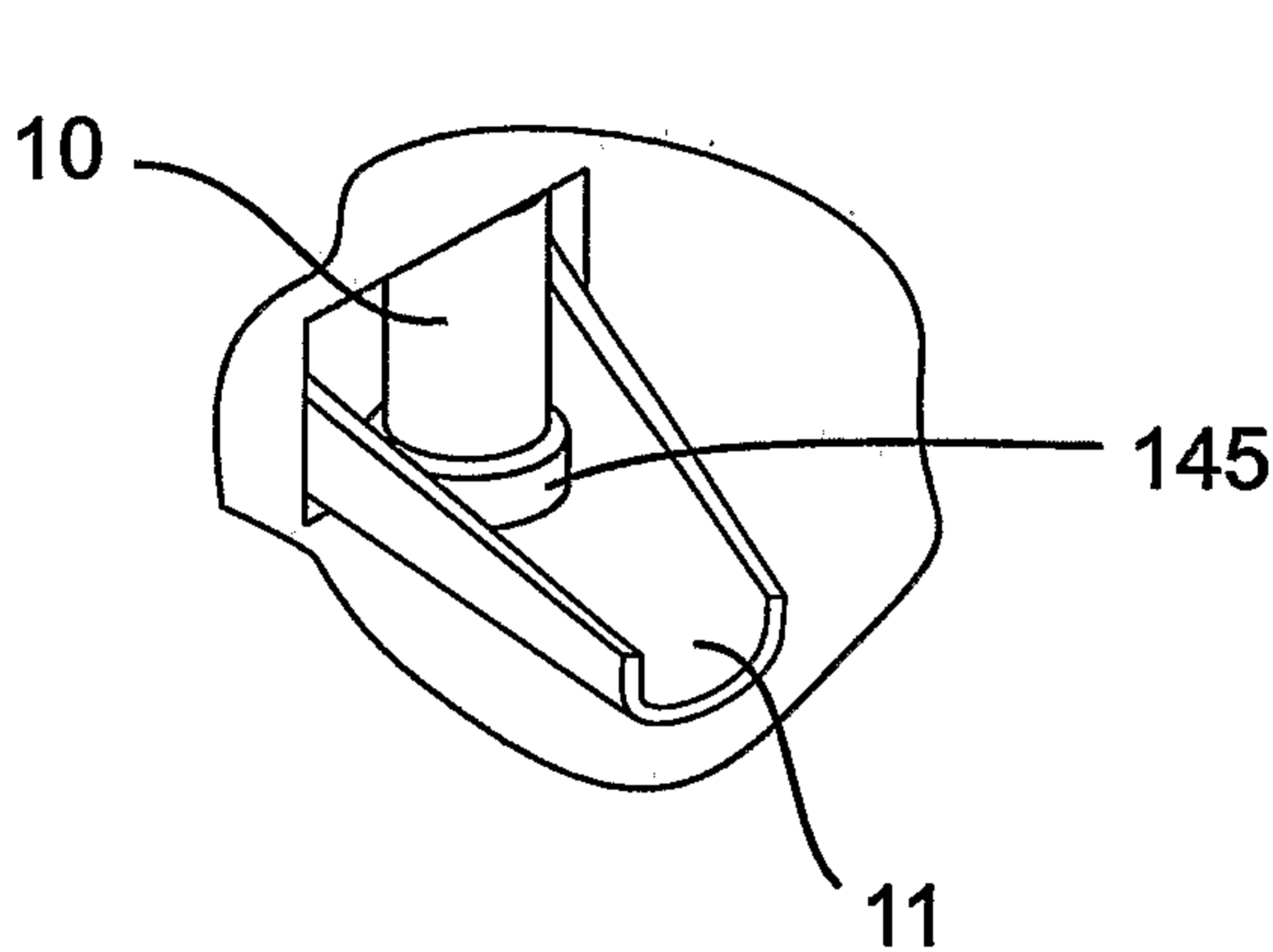


Fig. 14

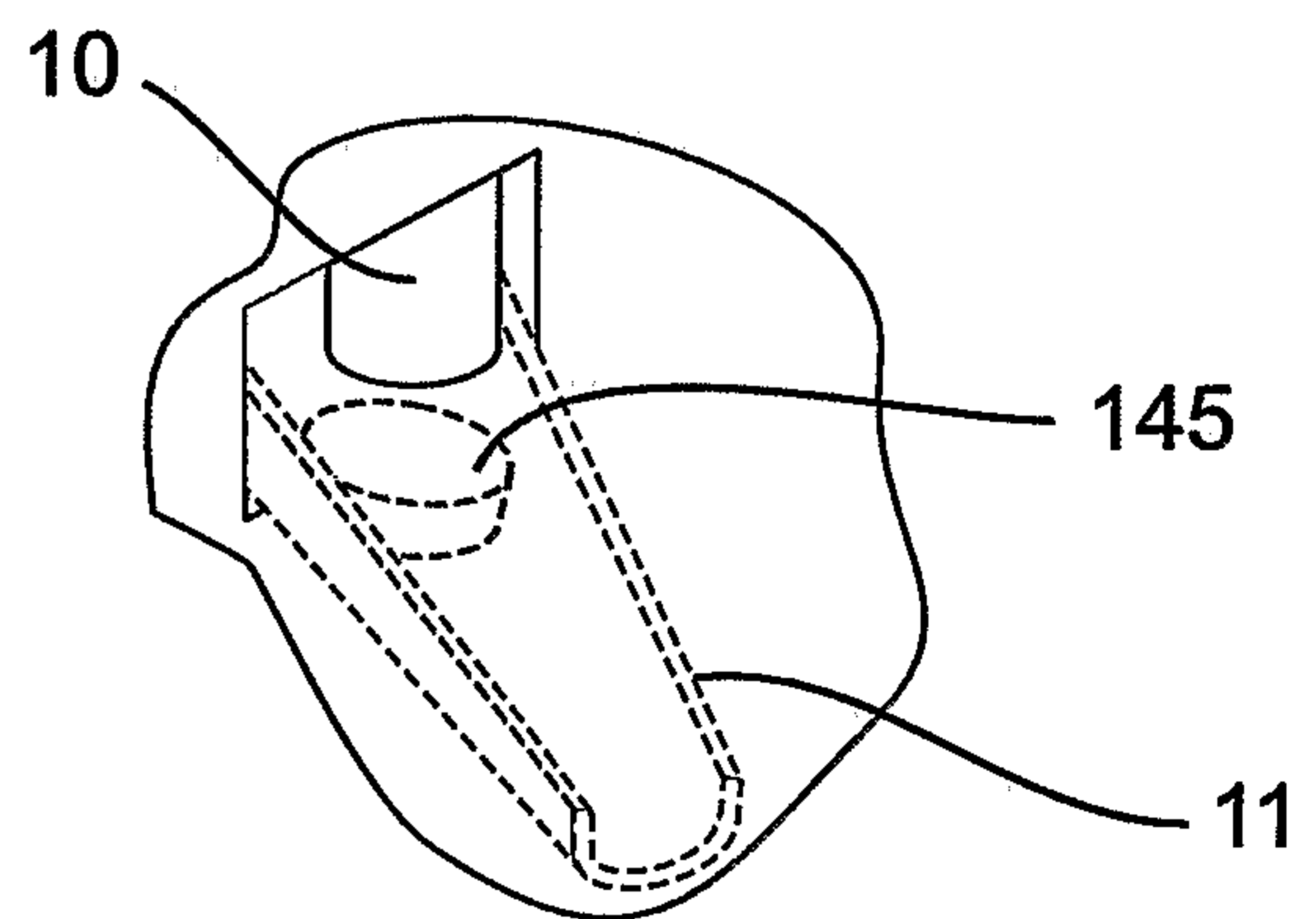


Fig. 15

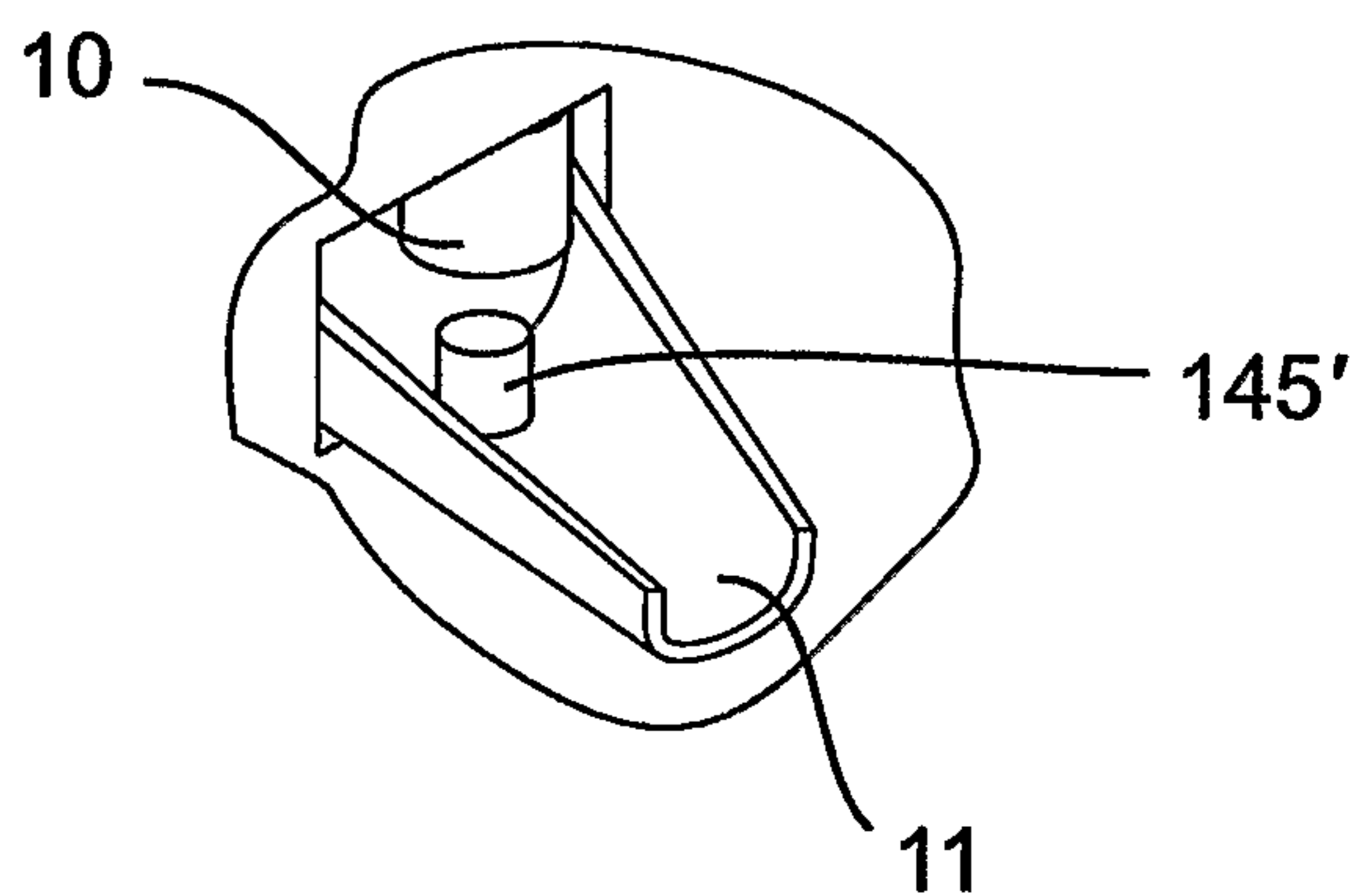


Fig. 16

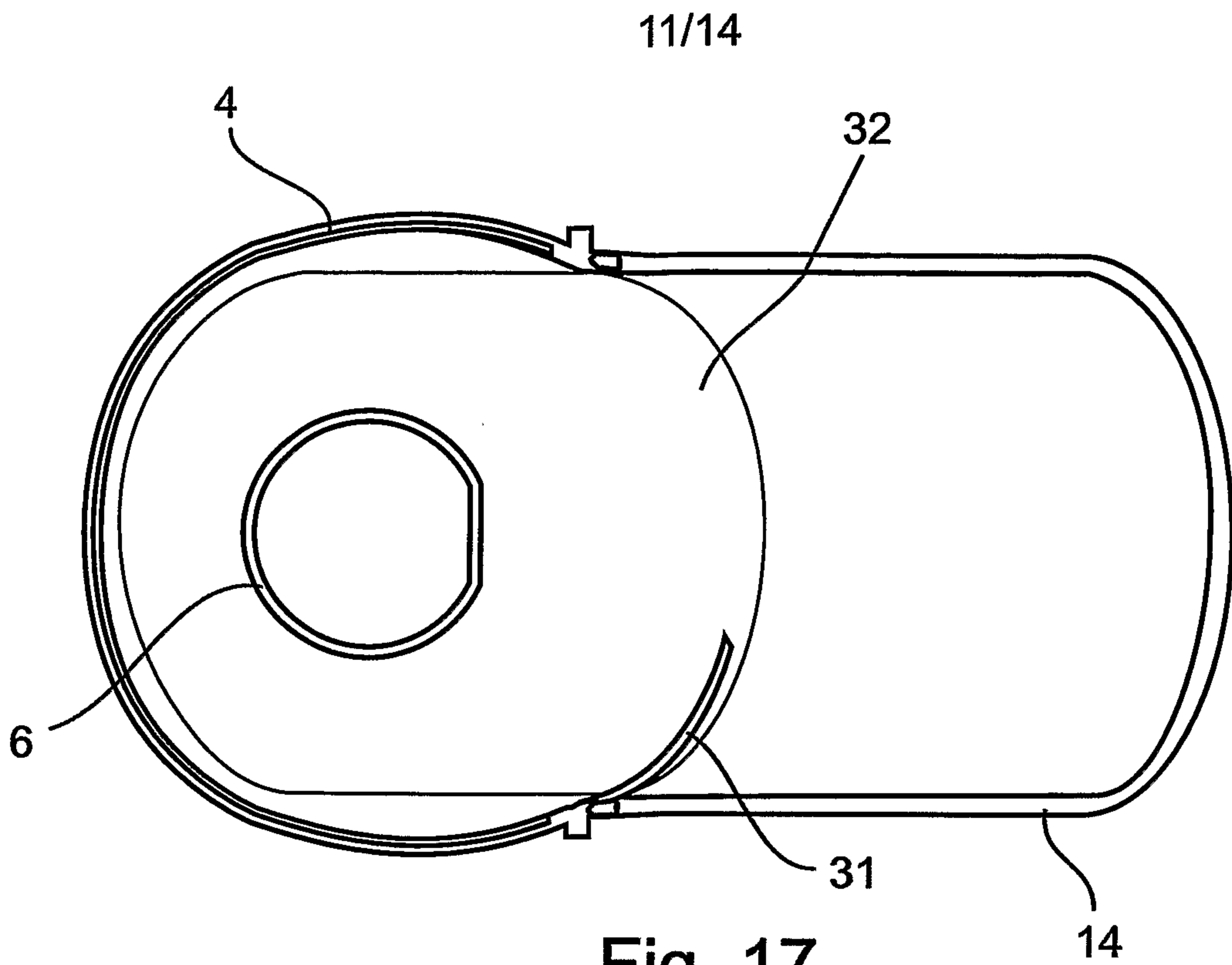


Fig. 17

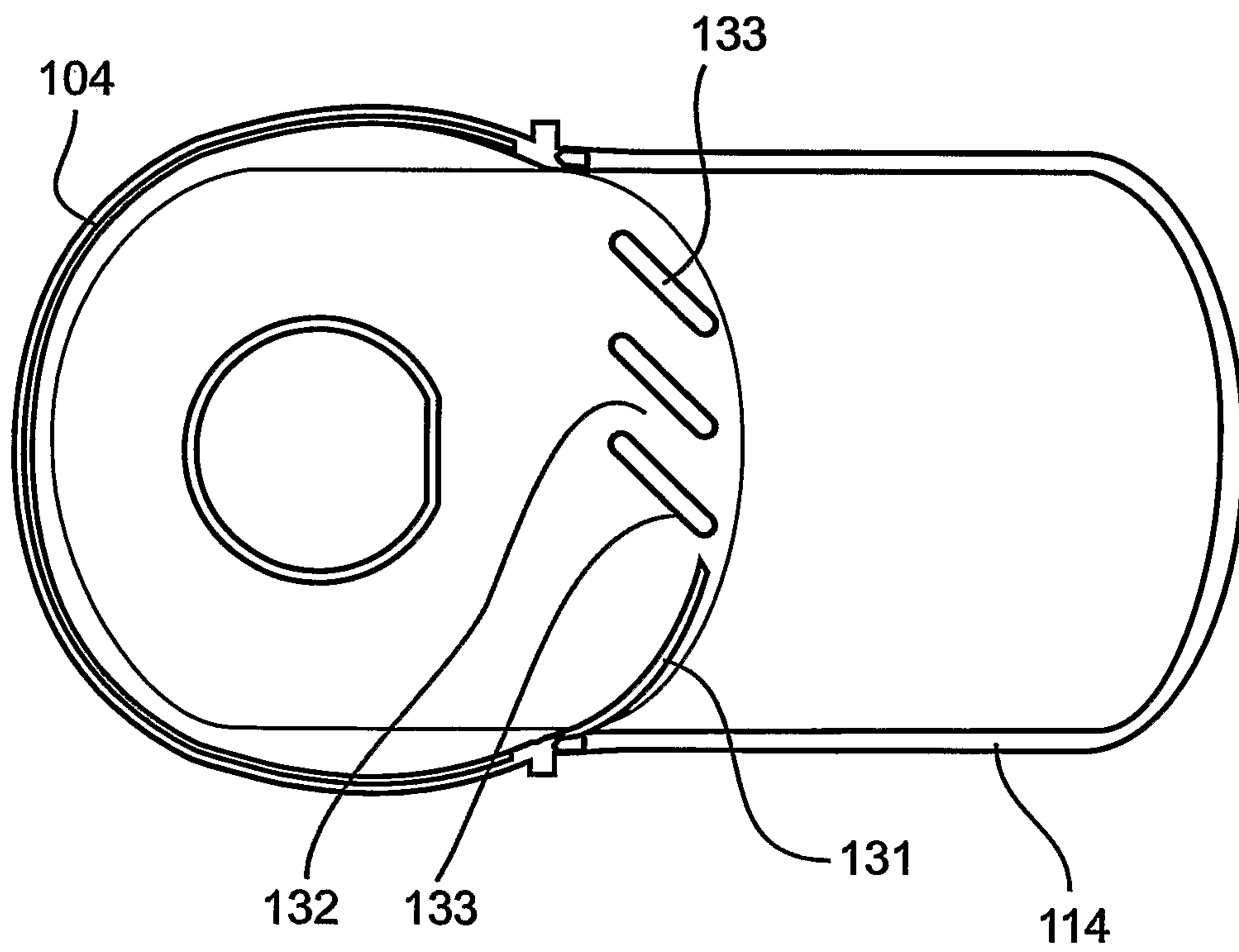


Fig. 18

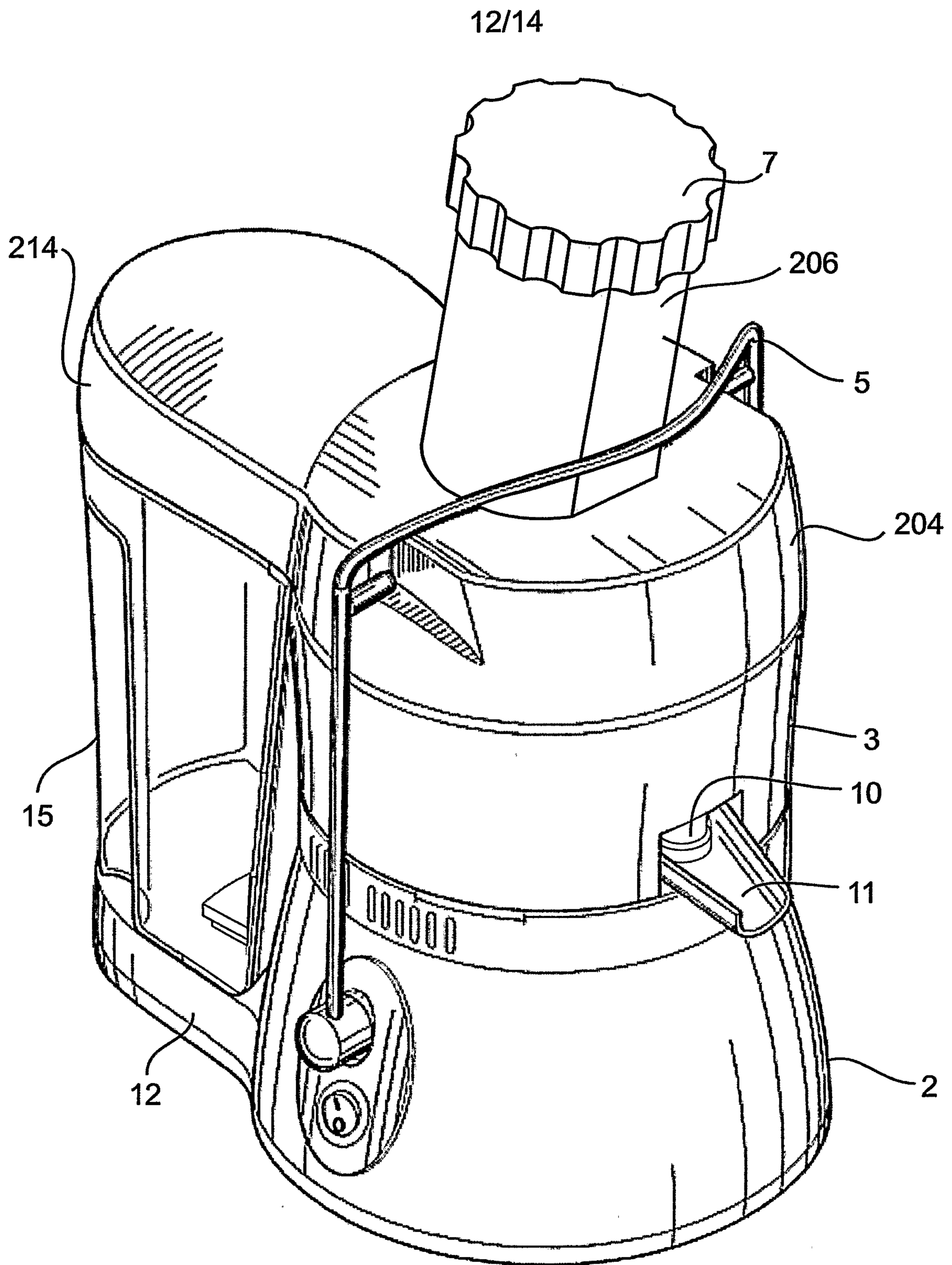


Fig. 19

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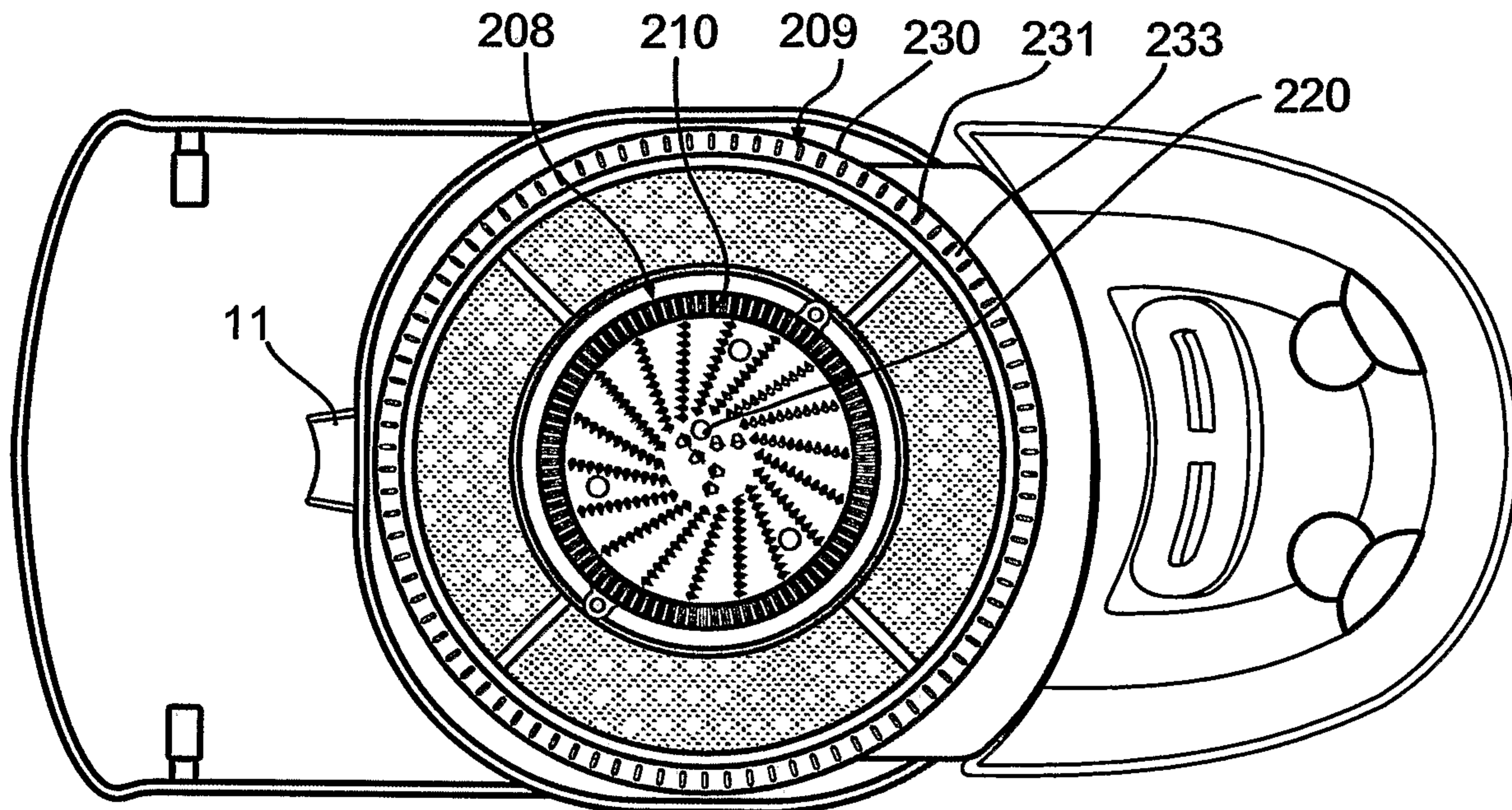


Fig. 20

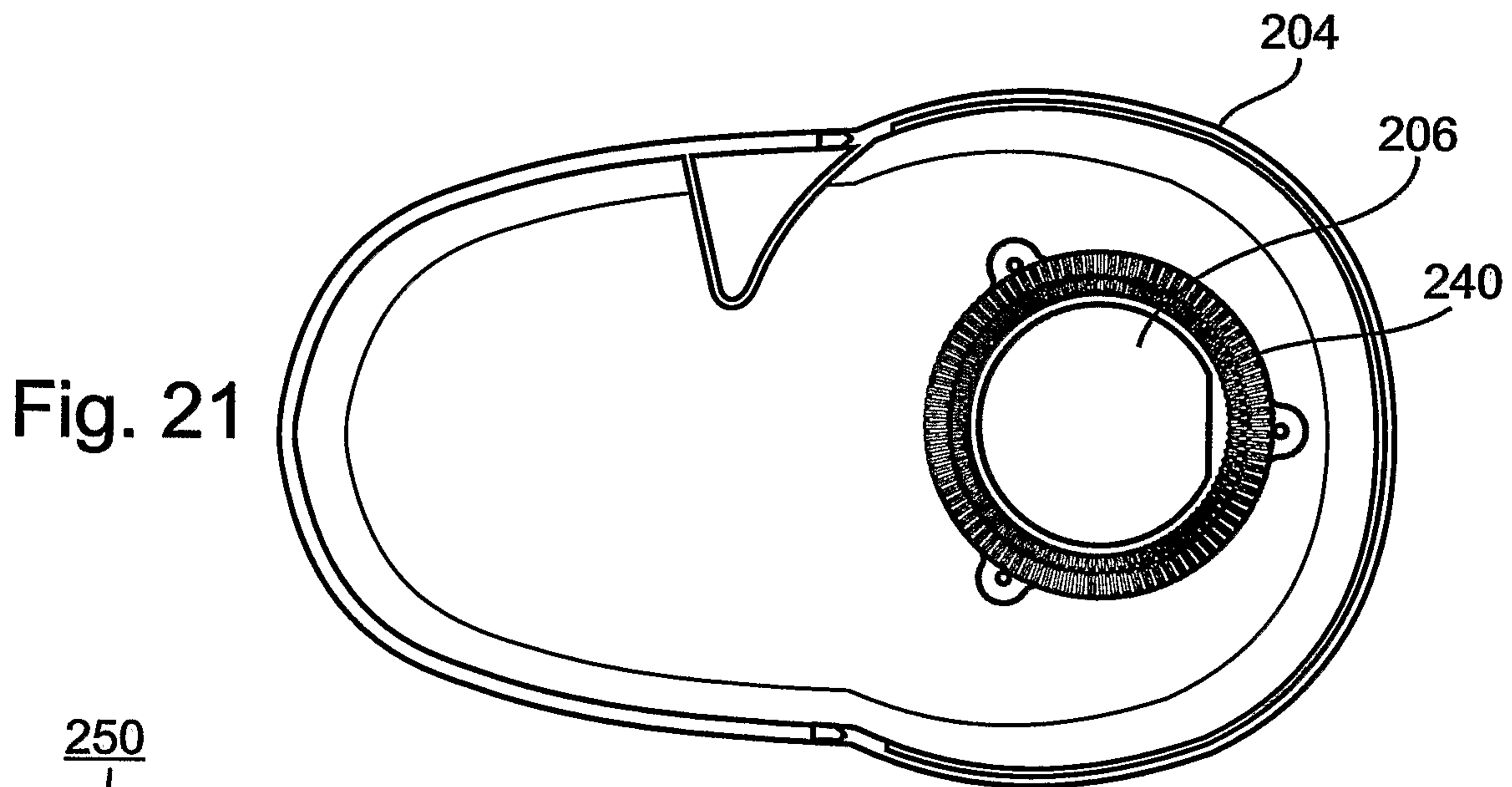


Fig. 21

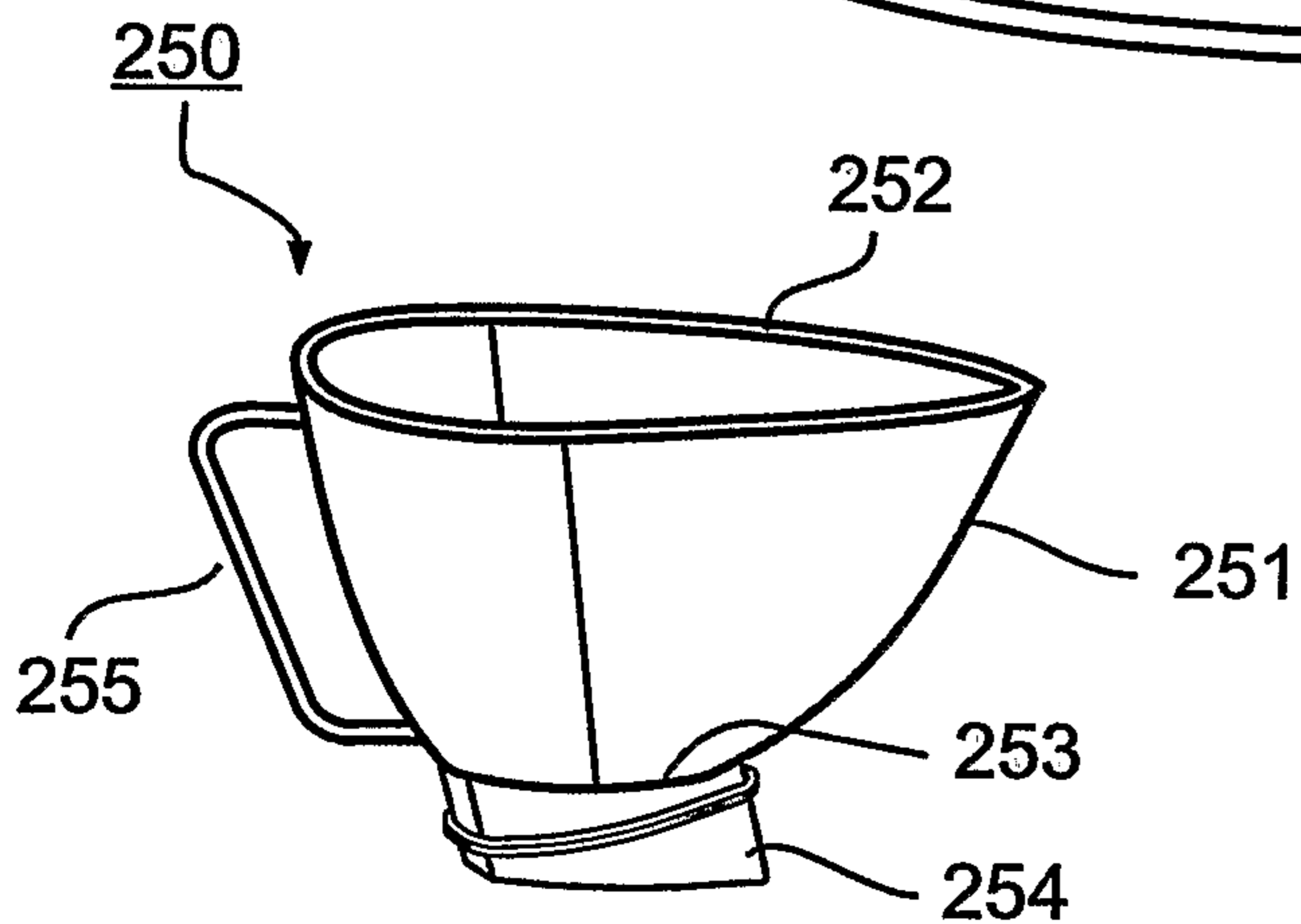


Fig. 22

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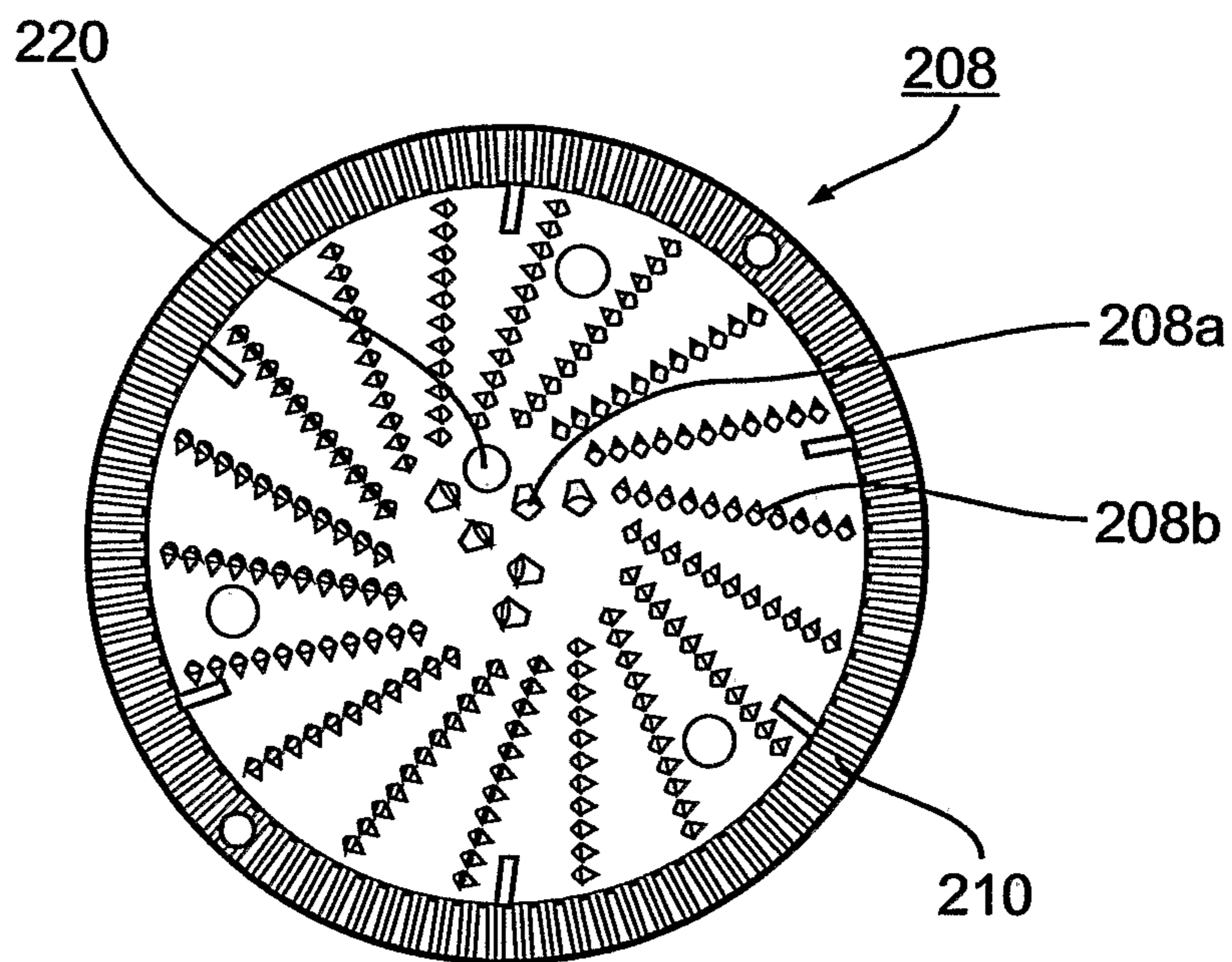


Fig. 23

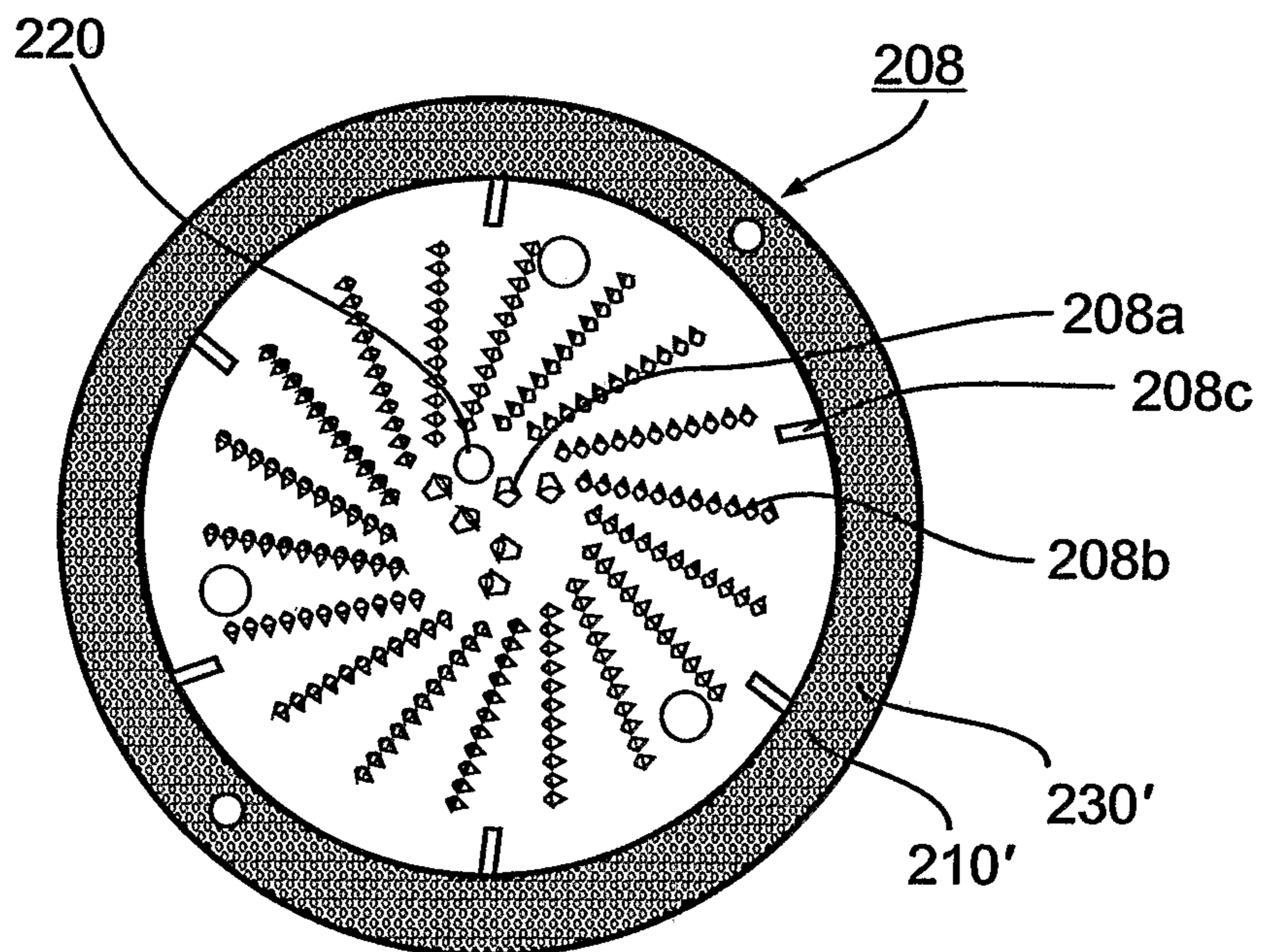


Fig. 24

