Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2636679 A1 2008/12/12

(21) 2 636 679

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2008/07/02

(41) Mise à la disp. pub./Open to Public Insp.: 2008/12/12

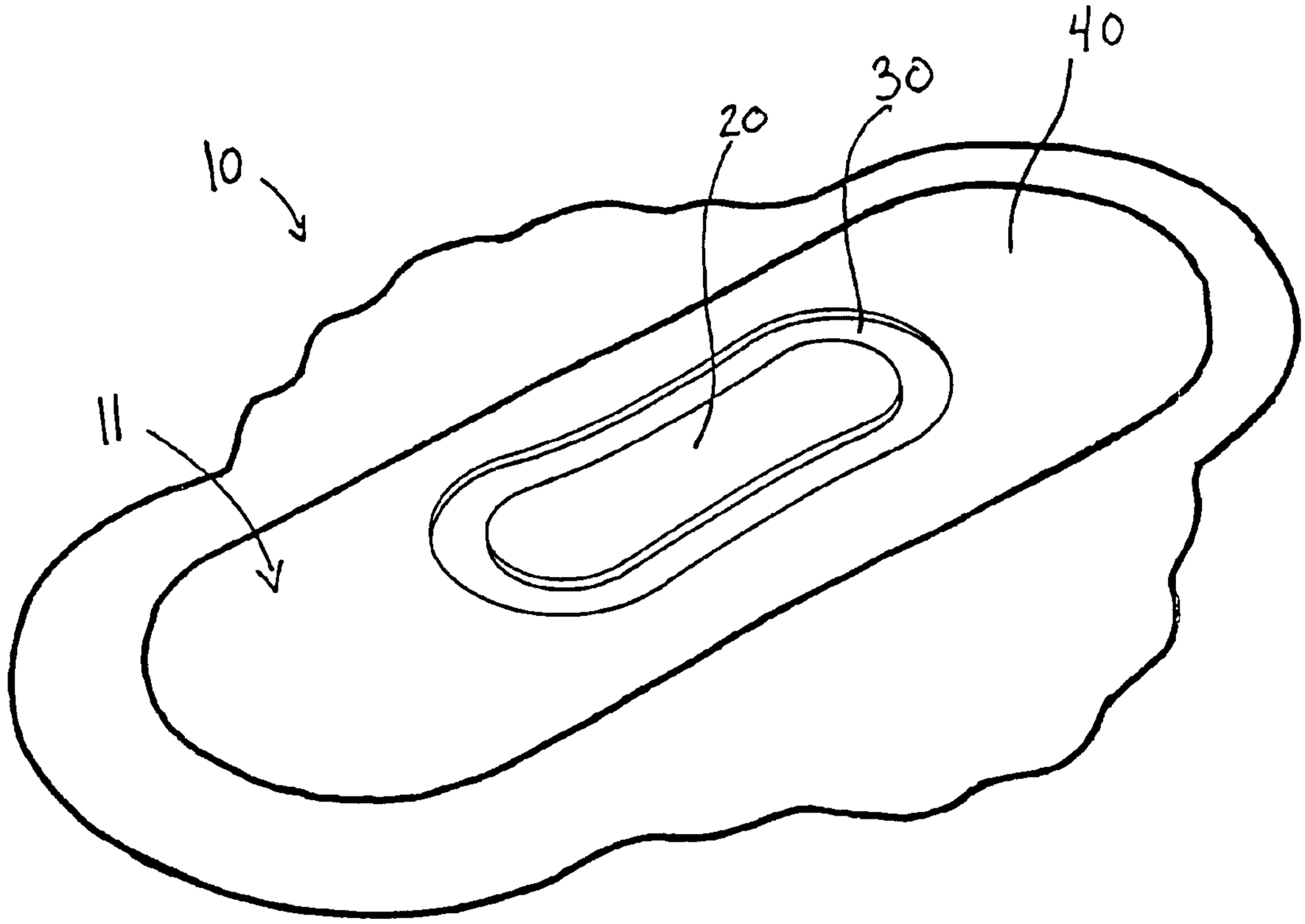
(51) Cl.Int./Int.Cl. *A61F 13/536* (2006.01)

(71) Demandeur/Applicant:
FEMPRO I INC., CA

(72) Inventeurs/Inventors:
CARDIN, JEANNINE, CA;
GEORGI, HELMUT, CA

(74) Agent: ROBIC

(54) Titre : SERVIETTE HYGIENIQUE AVEC ZONES D'EPAISSEURS ET DE DENSITES DIFFERENTES
(54) Title: SANITARY NAPKIN HAVING ZONES OF DIFFERENT HEIGHTS AND DENSITIES



SANITARY NAPKIN HAVING ZONES OF DIFFERENT HEIGHTS AND DENSITIES

FIELD OF THE INVENTION

The present invention relates generally to absorbent articles and more particularly to the field of sanitary napkins.

BACKGROUND OF THE INVENTION

Sanitary napkins of the prior art generally have a planar surface presenting little relief. This is even more frequent for ultra-thin sanitary napkins. When worn, these napkins often become shapeless by the pressure exerted by the thighs on the product, among other things. The outcome of this being that the napkin is no more in contact with the body of the user. When a sudden flow occurs, the blood is not captured instantly and can be conveyed in non desired locations of the napkin. This can cause leakages in the front, the rear or the sides of the napkin.

Therefore, one goal in the field of sanitary napkins is to produce sanitary napkins that can optimally fit the wearer's body while at the same time being able to rapidly absorb the menstrual flow. Another goal is to be able to direct or guide the menstrual flow in order to limit any leakages.

Many attempts have been made in the prior art, to develop sanitary napkins with improved absorbency. Some of these attempts disclose sanitary napkins with heightened zones. Among these, there is a first method which consists in adding an absorbing mousse to form a bump. This implies a complex fabrication method. Other drawbacks are the availability, the quality, and the cost of the absorbing mousse as a raw material.

There are also US2006/0189954, US2006/0259002A1, US6448466B1, and US6791005B2 which disclose a method where additional absorbing matter, which is often made of cellulose fibres, is added in different places of the napkin, to form a bump. These methods add steps to the fabrication process and/or do not allow for controlling the density of the bump.

Also a strongly marked bump makes the napkin more difficult to manufacture. Indeed, the bump prevents the napkin from being folded and from being packaged in an individual envelope. Even if the napkin is not folded, the stacking of this type of napkins, in a bag, for selling, becomes compromised.

US2006/0142725A1, US6114597, US6293931B1, US6423043B1, US6866658B2, US6887225B2, EP0983759B1 and CA2386018 present napkins having a mechanical device for raising a part of the absorbent mattress of the napkin. The addition of such a device in the fabrication process is complex and the way it works or operates is not very well documented in the prior art. Furthermore, the comfort of such a napkin is questionable.

US2006/0259022A1, US6425890B1, US6610902B1 and US6656170B2 present a napkin having a rigid bump. Even though this method allows the napkin to preserve its bump when worn, this can also be very uncomfortable.

WO2006/084304A1 and WO2006/110067A1 present a napkin having a third segment to form the bump. Again, this type of napkins can be uncomfortable to some consumers.

In the art, the absorbent mattress is commonly composed of cellulose fibres, to which super absorbent powder can be added. The napkin is then formed by projection of the fibres in a cavity or a mould of predetermined shape and thickness or by fibres dosage on a conveyor in a continuous or an intermittent manner. The absorbent mattress thus formed moves on the fabrication line and is usually calendered with smooth rollers so as to give it a smaller thickness and to give it more firmness.

There is also known in the art that additional rollers can create canals of diverse shapes used as barrier and for directing the menstrual flow. The canals generally formed have a maximal width of 3mm and a maximal depth of 10mm. Various designs of such canals are present in the industry.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an improved sanitary napkin that

overcomes at least one of the aforesaid drawbacks of the prior art.

In accordance with the present invention, that object is achieved with a sanitary napkin suitable for use in a crotch portion of an undergarment, the sanitary napkin comprising a main body made of an absorbent material extending on a longitudinal axis for laying on an upper side of said crotch portion of the undergarment, the main body comprising:

- a central zone where the absorbent material has a given density and a given thickness;

- a transition zone, surrounding the central zone, where the absorbent material is denser and less thick than in the central zone, the transition zone being obtained by compression of the sanitary napkin; and

- an external zone surrounding the transition zone where the absorbent material is less dense and thicker than in the transition zone.

Thanks to the fact that the central zone has an increased height and a reduced density as compared to the transition zone and to the external zone, the napkin in the central zone provides a better contact with the wearer's body and the menstrual flow absorbed thereon rapidly flows out toward the transition zone. On its side, the transition zone which has an increased density and reduced height relative to the central zone and external zone acts as a canal directing the menstrual flow forward or rearward, thereby limiting leakages via the sides of the napkin.

In accordance with another aspect of the invention, an apparatus for producing a sanitary napkin as defined previously is provided. The apparatus comprises:

- a calender having a first roller and a second roller to laminate the sanitary napkin, the first roller having an external surface provided with a recess of desired shape surrounded by a projection;

whereby the central zone and transition zone of the sanitary napkin are shaped by means of the recess and projection respectively.

As can be appreciated, this apparatus can give to the absorbent mattress various thicknesses and accordingly different densities allowing the menstrual flow to be directed in strategic locations of the napkin, in order to avoid leakages.

Further features and advantages of the present invention will be better understood upon reading of preferred embodiments thereof with reference to the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a napkin according to a first preferred embodiment of the invention.

Figure 2 is a top view of the napkin of figure 1.

Figure 3 is a perspective view of a napkin according to a second preferred embodiment of the invention.

Figure 4 is a top view of the napkin of figure 3.

Figure 5 is a top view of a calender design for the high density zone (transition zone) of the napkin of figure 1 or 3.

Figure 6 is a schematic side view of an apparatus for making a napkin, according to the invention.

Figure 7 is a schematic exploded perspective view of the apparatus of figure 6.

Figure 8 is a side view of the female roller of the apparatus of figure 7.

Figure 9 is a front view of the female roller of figure 8.

Figure 10 is a side view of a male roller of the apparatus of figure 7.

Figure 11 is a front view of the male roller of figure 10.

Figure 12 is a schematic exploded perspective view of the apparatus for making the napkin of figure 3.

Figure 13 is a side view of the male roller of the apparatus of Figure 12.

Figure 14 is a front view of the male roller of figure 13.

DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

In the present description, it should be understood that the expression "sanitary napkins" is used to designate any sanitary product adapted to be positioned in the crotch section of an undergarment irrespectively of its construction, its level of absorbency or its shape, including panty liners.

Referring to figures 1 to 4, the present invention provides a sanitary napkin 10 suitable for use in a crotch portion of an undergarment. The sanitary napkin 10 comprises a main body 11 made of an absorbent material extending on a longitudinal axis for laying on an upper side of the crotch portion of the undergarment. The sanitary napkin 10 can have a layer of permeable material, a layer of impermeable material and a layer of an absorbent material sandwiched between the layer of permeable material and the layer of impermeable material. The absorbent material or absorbent mattress can be made, for example, of cellulose fibres and/or of super absorbent powder. The main body 11 of the sanitary napkin 10 comprises a central zone 20 where the absorbent material has a given density and a given thickness. The main body 11 also has a transition zone 30, surrounding the central zone 20, where the absorbent material is denser and less thick than in the central zone 20, the transition zone 30 being obtained by compression of the sanitary napkin. The main body 11 further has an external zone 40 surrounding the transition zone 30 where the absorbent material is less dense and thicker than in the transition zone.

As can be appreciated, the central zone which has a reduced density and an increased height with respect to the transition zone and the external zone and which is located directly under the vagina when the napkin is worn, allows a better contact with the vulva's wearer and a better scattering or flow of the blood towards the transition zone. In other words, thanks to the fact that the central zone has a low density, the blood does not remain in the central zone but rather flows outwardly toward the transition zone which has an increased density.

Still referring to figures 1 to 5, the sanitary napkin according to the invention can be made without changing the usual fabrication method, which is known in the sanitary napkin field.

The present invention uses the fact that blood crosses rapidly zones of low density, but spreads and stays in zones of high densities.

As shown in figures 1 and 2, heightened zones 20, or bumps, allow to increase the contact between the napkin and the female body and to rapidly absorb the menstrual flow. These bumps 20 have a lower density. This allows to absorb blood rapidly and to bring it to the bottom of the napkin 10. It is advantageous to surround this low density zone 20 with a high density zone 30. Indeed, as soon as the flow reaches this high density zone 30, this one will stay and travel therein.

Furthermore, if the high density zone 30 is also surrounded by a lower density zone 40, the flow tends to stay in the calendered zone 30 having a higher density. In this case, the exterior zone 40, having a lower density, acts as a barrier to stop the blood from leaking from the front, the rear or the sides of the napkin 10.

As shown in figures 3 and 4, according to another embodiment of the invention, it is possible to add other zones 50 of increased height and of lower density in the front and the rear of the absorbent mattress. These bumps 50 further limit the risks of leakage from the front or the rear of the napkin 10 and increase the area of the napkin which is in contact with the female body, particularly in the area between the buttocks. This category of products is preferred for night time products.

Preferably, the napkins 10 according to the preferred embodiments of the invention have the following dimensions, given for exemplification only. As it will be seen below, the invention can also be applied to maxi napkins

Napkin of Figures 1 and 2: ultra thin napkins

Zone	Thickness
central zone 20	More than 4.0mm

transition zone 30	Less than 2.0mm
external zone 40	Less than 2.7mm, more than 2.0mm

Napkin of Figures 1 and 2: maxi napkins

Zone	Thickness
central zone 20	More than 7.0mm
transition zone 30	Less than 2.5mm
external zone 40	Less than 6.0mm

Napkin of Figures 3 and 4: ultra thin napkins

Zone	Thickness
central zone 20	More than 4.0mm
transition zone 30	Less than 2.0mm
external zone 40	Less than 2.7mm, more than 2.0mm
other zones of increased height 50	More than 2.7mm, preferably more than 4.0mm

Napkin of Figures 3 and 4: maxi napkins

Zone	Thickness
central zone 20	More than 7.0mm
transition zone 30	Less than 2.5mm
external zone 40	Less than 6.0mm
other zones of increased height 50	More than 6.0mm, preferably more than 7.0mm

As apparent to an expert in the art, different configurations of heights could provide similar results and the invention is not intended to be limited to the dimensions given hereinabove. As also apparent to an expert in the art, the zones could have many different shapes and are not limited to the shapes shown in the figures.

When the napkin is calendered, the transition zone 30 is heavily compressed. It is thus possible to observe a hardening, or boarding, of the absorbent mattress in this zone. Indeed, the cellulose fibres being highly compressed can return to their initial cardboard

form. This boarding creates rigidity in the napkin, which in turn can be uncomfortable for certain users. In order to avoid the boarding phenomenon and its disadvantages, it is possible to add a pattern 60 to the calendering rollers 100, 102, shown in figures 6, 7, 8 and 12, which breaks the tensions in the transition zone 30 of the mattress and which gives it more suppleness. Figure 5 shows an example of a pattern 60 applied to the transition zone 30.

As apparent to an expert in the art, the pattern shown in figure 5 could differ as long as it brings similar advantages.

Referring now to figures 6 to 14, the present invention also provides an apparatus for producing a sanitary napkin 10 as defined previously. The apparatus comprises a calendar or having a first roller 100, 102 (also referred as a female roller) and a second roller 150, 152 (also referred as a male roller) to laminate the sanitary napkin, the first roller 100, 102 having an external surface 130 provided with a recess 120, 122 of desired shape surrounded by a projection 110. The central zone 20 and transition zone 30 of the sanitary napkin 10 are shaped by means of the recess 120, 122 and projection 110 respectively, whereas the external zone 40 is obtained by the external surface 130 of the first roller 100, 102. As can be appreciated, the more the projection 110 is high as compared to the level of the external surface 130, the more the transition zone 30 on the sanitary napkin will be calendered and thus, the more dense it will be; and the more the recess 120, 122 is deep as compared to the level of the external surface 130, the less the central zone 20 will be calendered and thus, the thicker and less dense the central zone 20 will be.

The second roller 150, 152, can be smooth or can have projections 160, 162, 164 extending on its external surface 170. The rollers 100 and 150 or 102 and 152 are spaced from each other according to the heights and densities desired, so as to produce with the help of the recess 120, 122 and the projection 110, the sanitary napkin having zones of different heights and densities when a napkin is passed between the rollers with its permeable layer facing the first roller 100, 102. The role of the projections 160, 162, 164 on the male roller will be discussed further below.

Figures 6, 7 and 12 show the fabrication process of the absorbent mattress as well as the

calendering step of the process.

Different views of the calender rollers 100, 102, 150, 152 are shown in figures 7 to 11. When the napkin passes between a male roller 150, 152 and a female roller 100, 102 or between a female roller 100, 102 and a smooth roller, not shown, the absorbent mattress is calendered to different heights in predetermined locations according to the projections 110, 160, 162, 164 and recesses 120, 122 of the rollers.

The desired heights of the napkin are obtained when the mattress is calendered. The cavities 120 in the rollers allow the bumps 20, 50 to be obtained on the napkin, whilst the projections 110 of the rollers allow thinner zones to be obtained on the final product.

The calendering rollers 100, 102 of the invention have recesses or cavities 120 of a predetermined shape which allow creating bumps 20, 50 on the mattress.

The rollers used for manufacturing the napkin 10 shown in figures 1 and 2 are shown in more details in figures 7 to 11. The female roller 100, 102 is preferably installed under the conveyer belt which conveys the napkins or can be installed over the conveyer belt, as shown in figure 7. A male roller or a smooth roller is preferably installed over the conveyer belt in order to allow applying a sufficient pressure on the product in order to obtain the desired pattern and zones but it can be installed under the conveyer belt as shown in the figures. Apparatuses having different configurations of conveyer belts, rollers and means for holding and rotating the rollers, for compressing sanitary napkins are well known in the art and will not be discussed herein.

If a smooth roller is used, the napkin 10 generally presents a bump on its underneath surface 180, figure 6. One could prefer to avoid such underneath bump. In order to minimize this phenomenon, a male roller 150, 152 having a projection 160, 162, 164 can be used. This male roller 150, 152 is designed to fit together with its female 100, 102 counterpart. The male roller 150, 152 has projections 160, 162, 164 corresponding to the areas where bumps are desired on the products. Figure 10, 11, 13 and 14 show examples of male rollers.

Figures 7 to 11 show an embodiment of the apparatus and the rollers of the invention, for

producing the napkin shown in figures 1 and 2, while figures 12 to 14 show an embodiment of the apparatus and the rollers of the invention, for producing the napkin shown in figures 3 and 4.

Although preferred embodiments of the present invention have been described in detail herein and illustrated in the accompanying drawings, it is to be understood that the invention is not limited to these precise embodiments and that various changes and modifications may be effected therein without departing from the scope or spirit of the present invention as defined in the appended claims.

CLAIMS:

1. A sanitary napkin suitable for use in a crotch portion of an undergarment, the sanitary napkin comprising a main body made of an absorbent material extending on a longitudinal axis for laying on an upper side of said crotch portion of the undergarment, the main body comprising:

- a central zone where the absorbent material has a given density and a given thickness;

- a transition zone, surrounding the central zone, where the absorbent material is denser and less thick than in the central zone, the transition zone being obtained by compression of the sanitary napkin; and

- an external zone surrounding the transition zone where the absorbent material is less dense and thicker than in the transition zone.

2. An apparatus for producing a sanitary napkin as defined in claim 1, comprising:

- a calender having a first roller and a second roller to laminate the sanitary napkin, the first roller having an external surface provided with a recess of desired shape surrounded by a projection;

whereby the central zone and transition zone of the sanitary napkin are shaped by means of the recess and projection respectively.

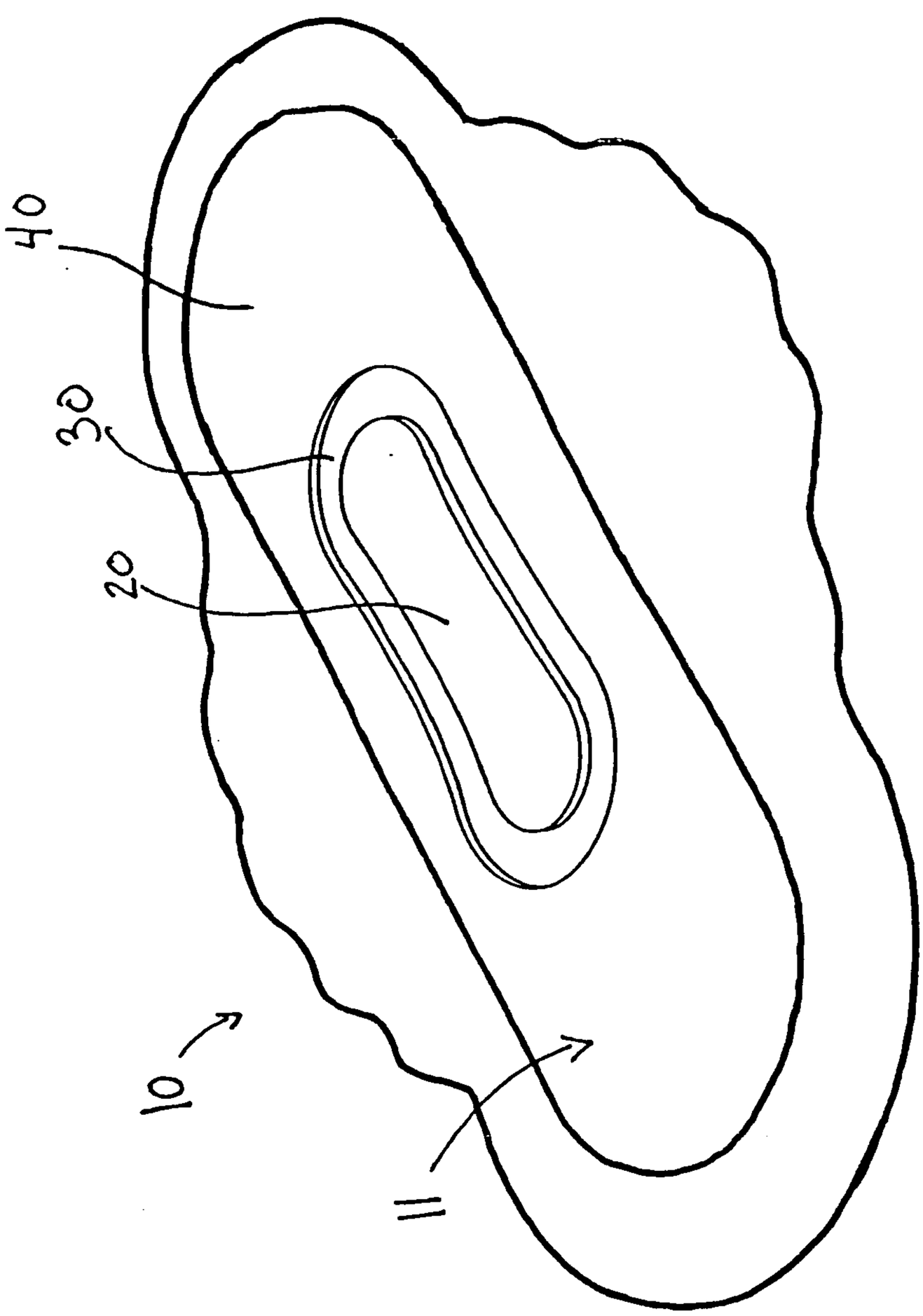


FIG. 1

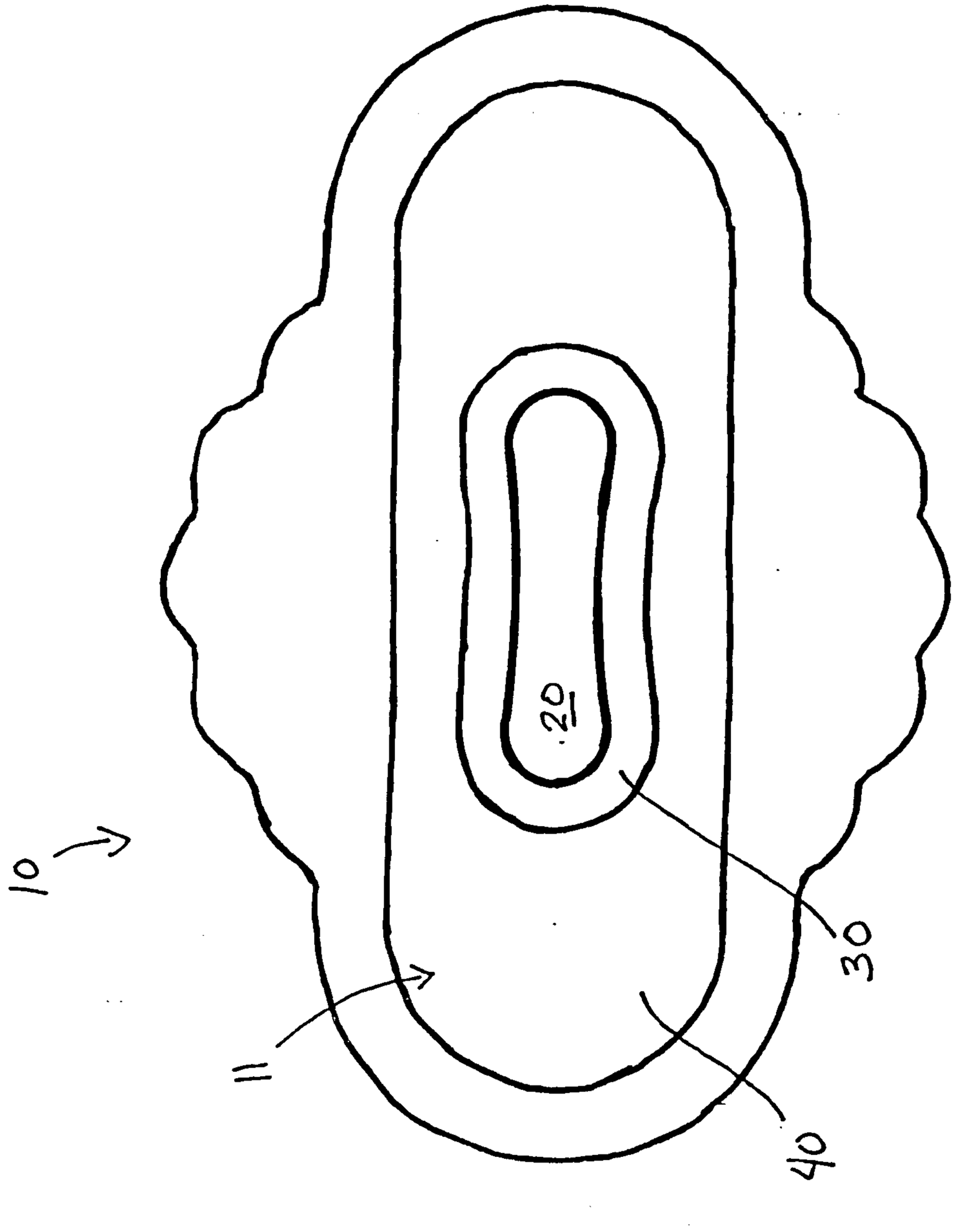


FIG. 2

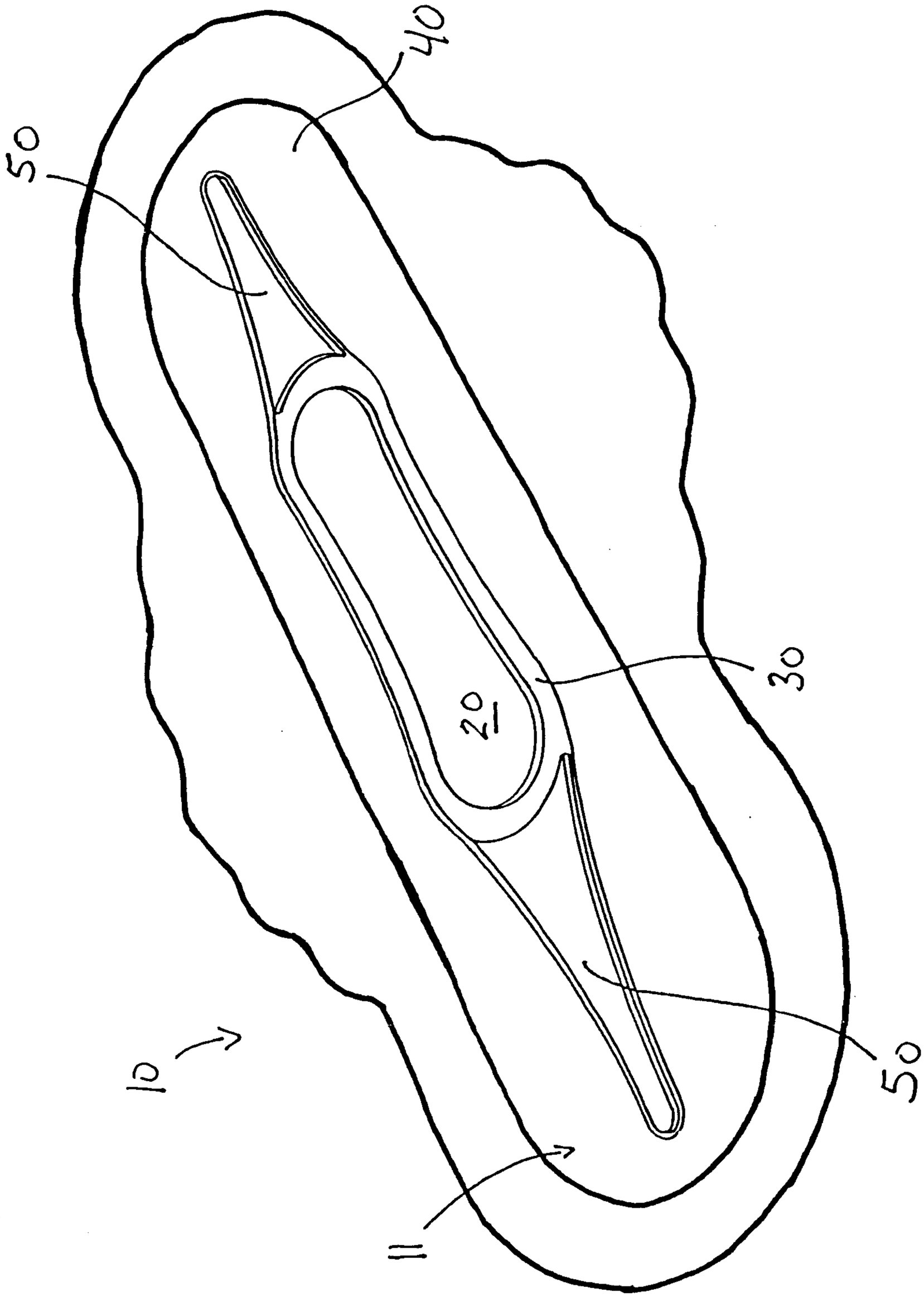


FIG. 3

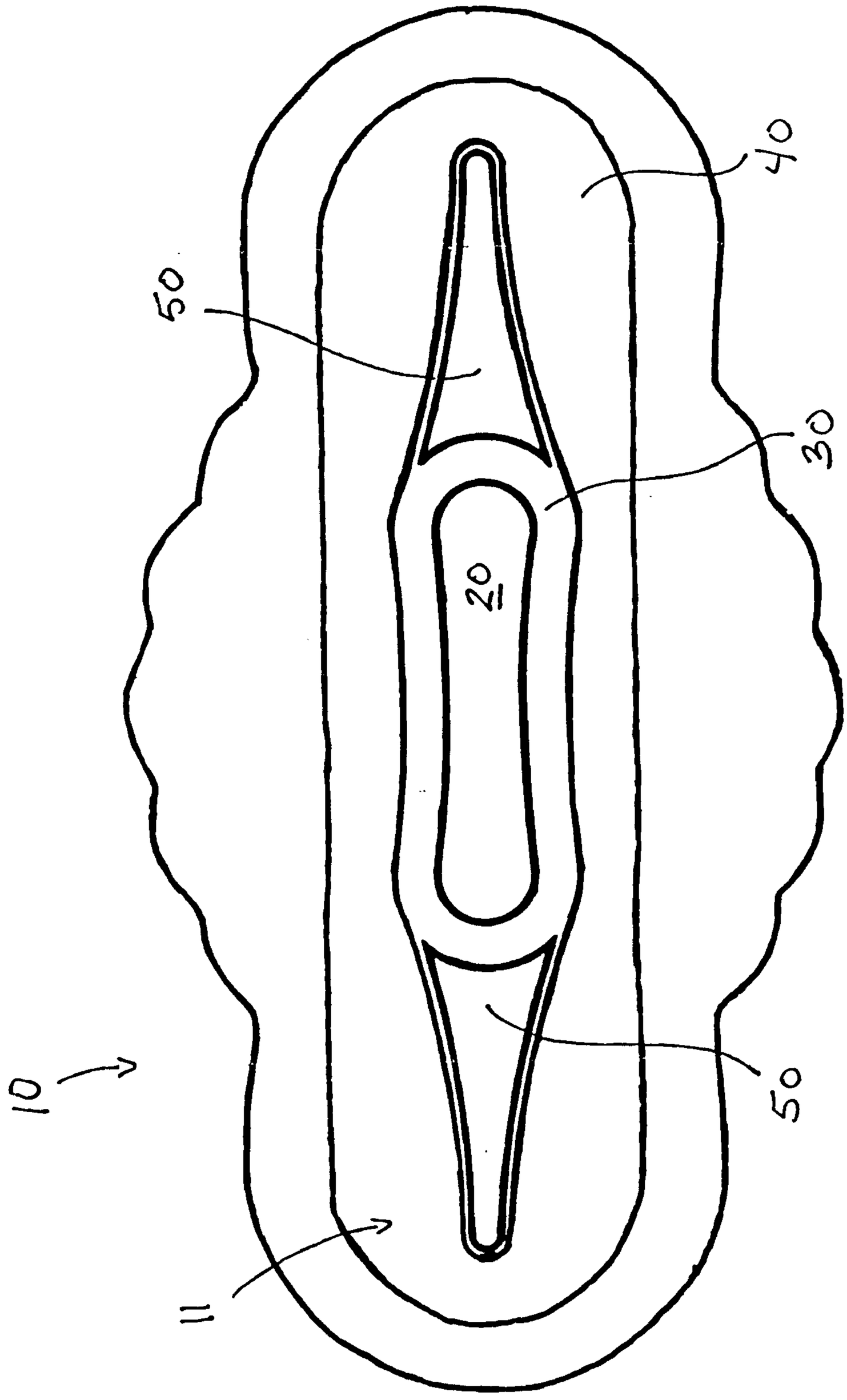


FIG. 4

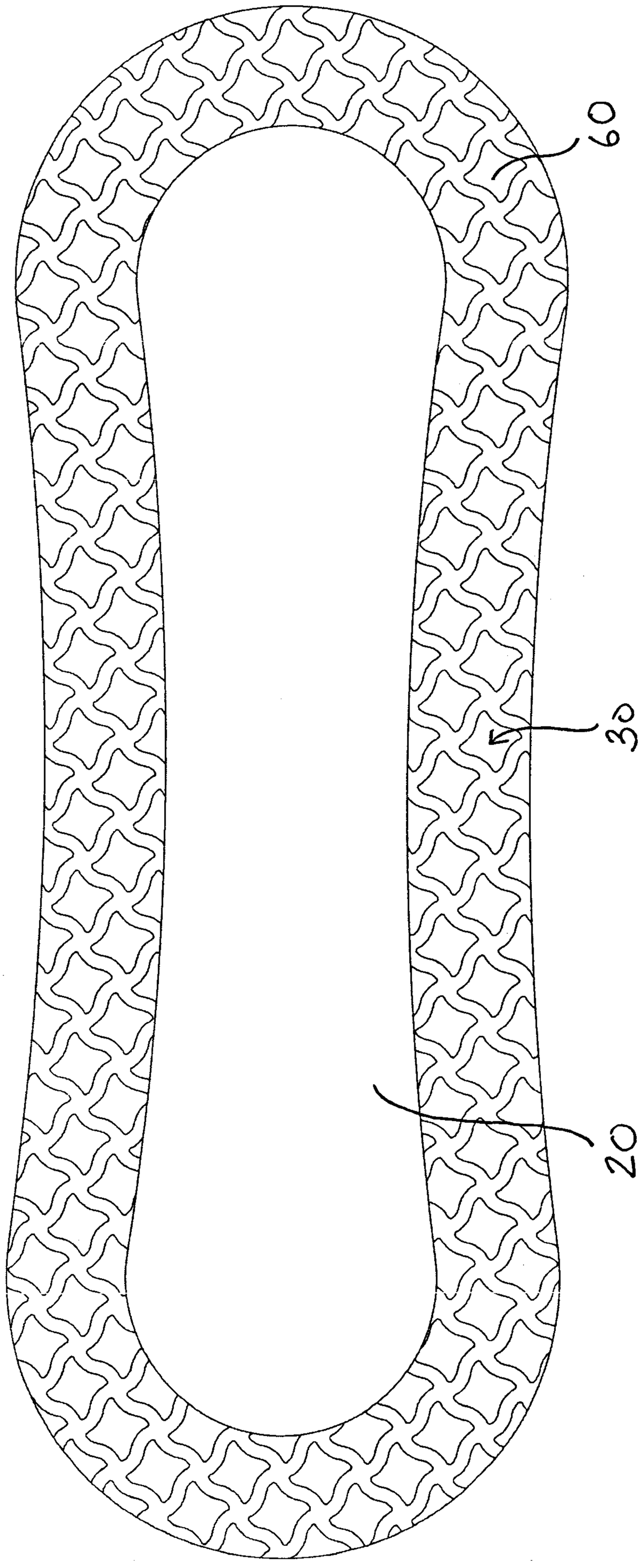


FIG. 5

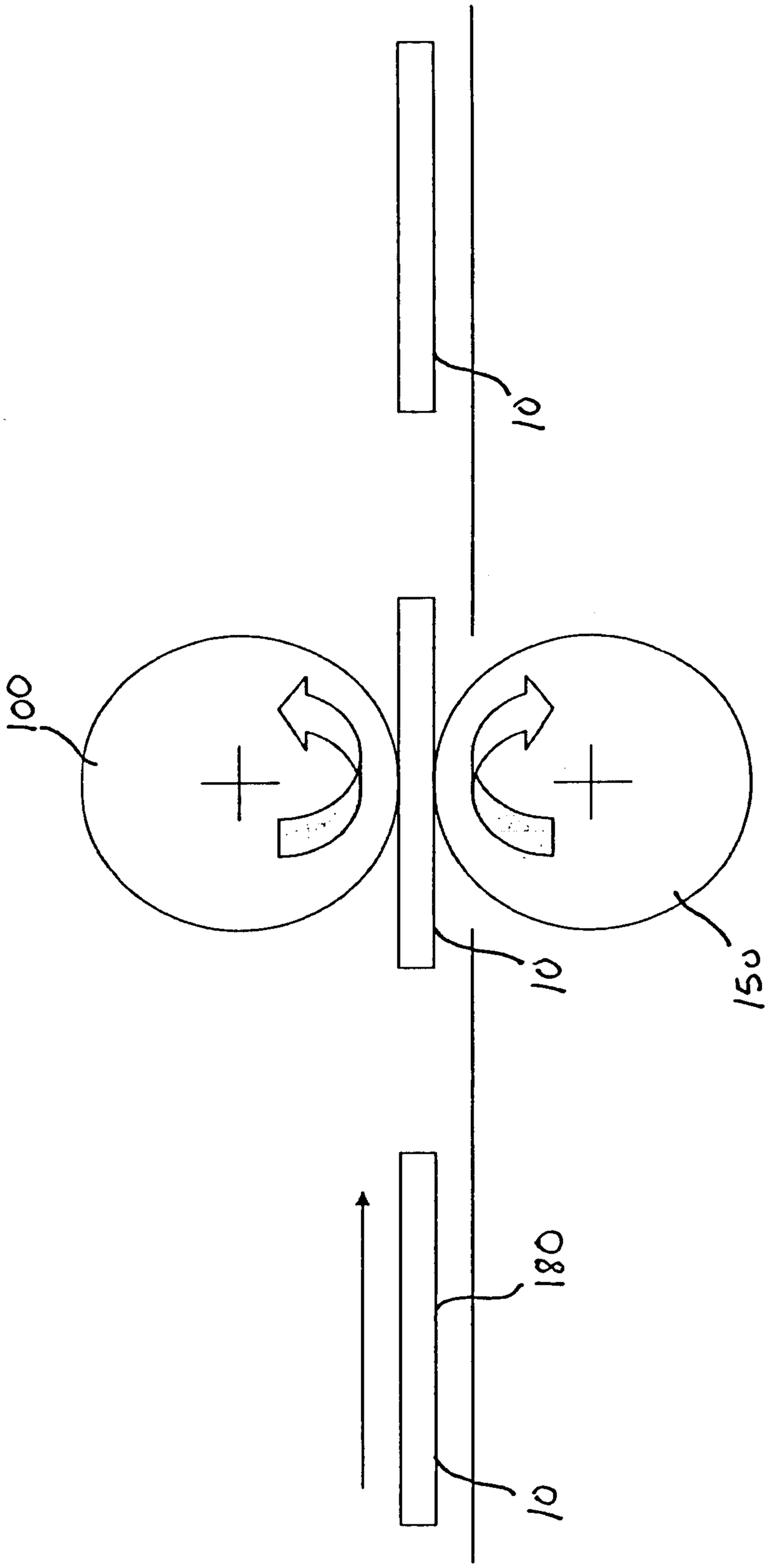


FIG. 6

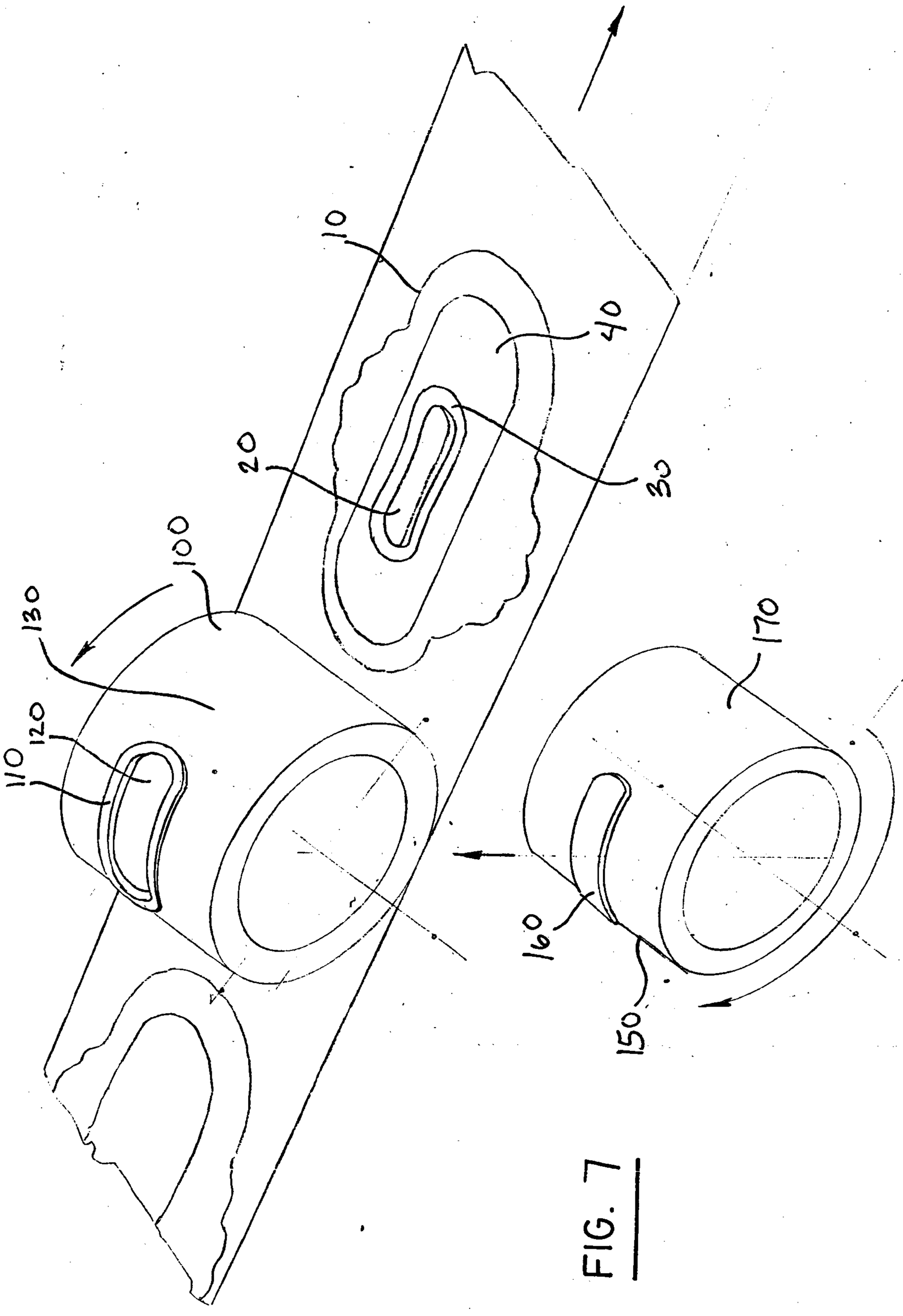


FIG. 7

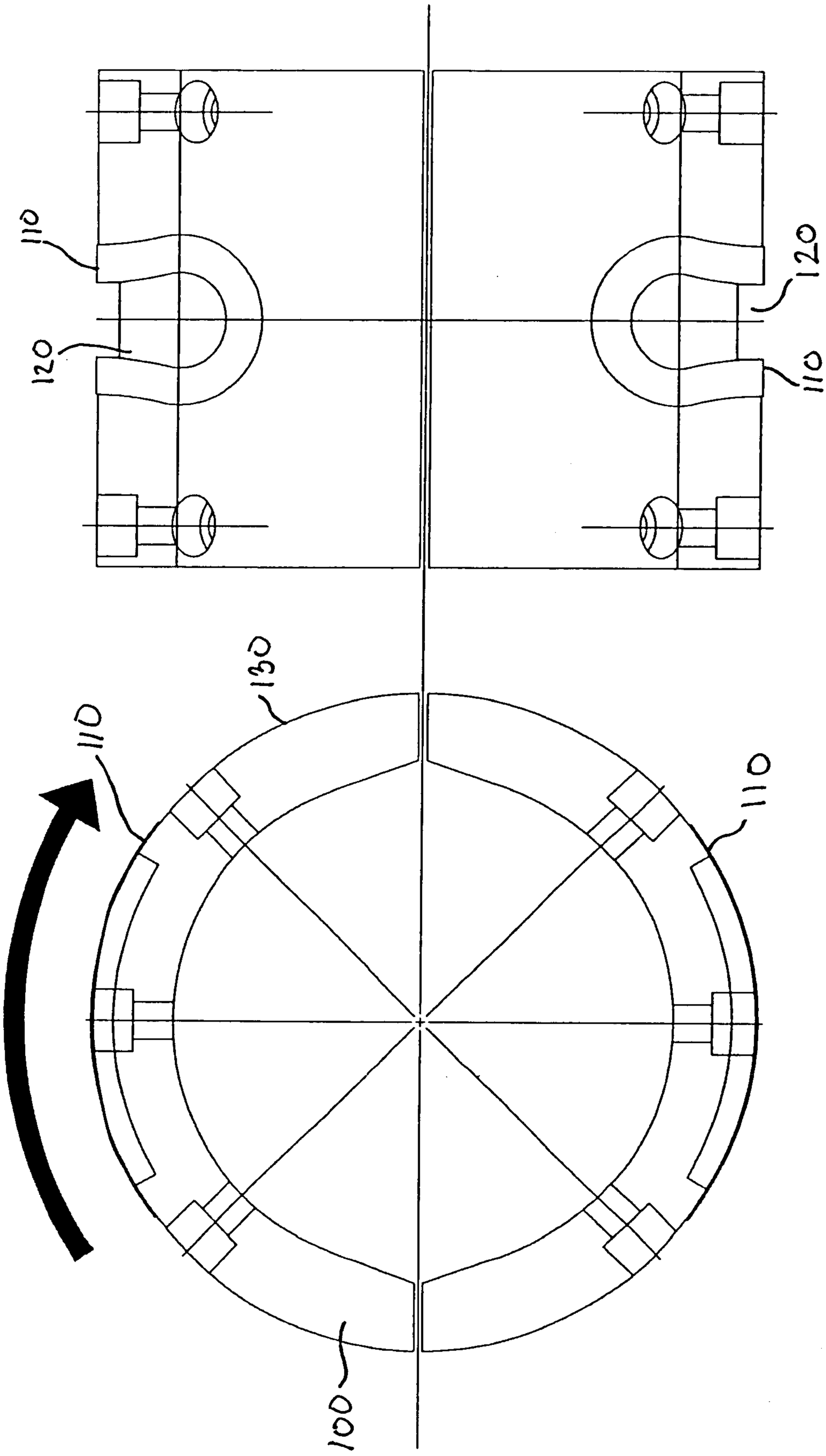


FIG. 8

FIG. 9

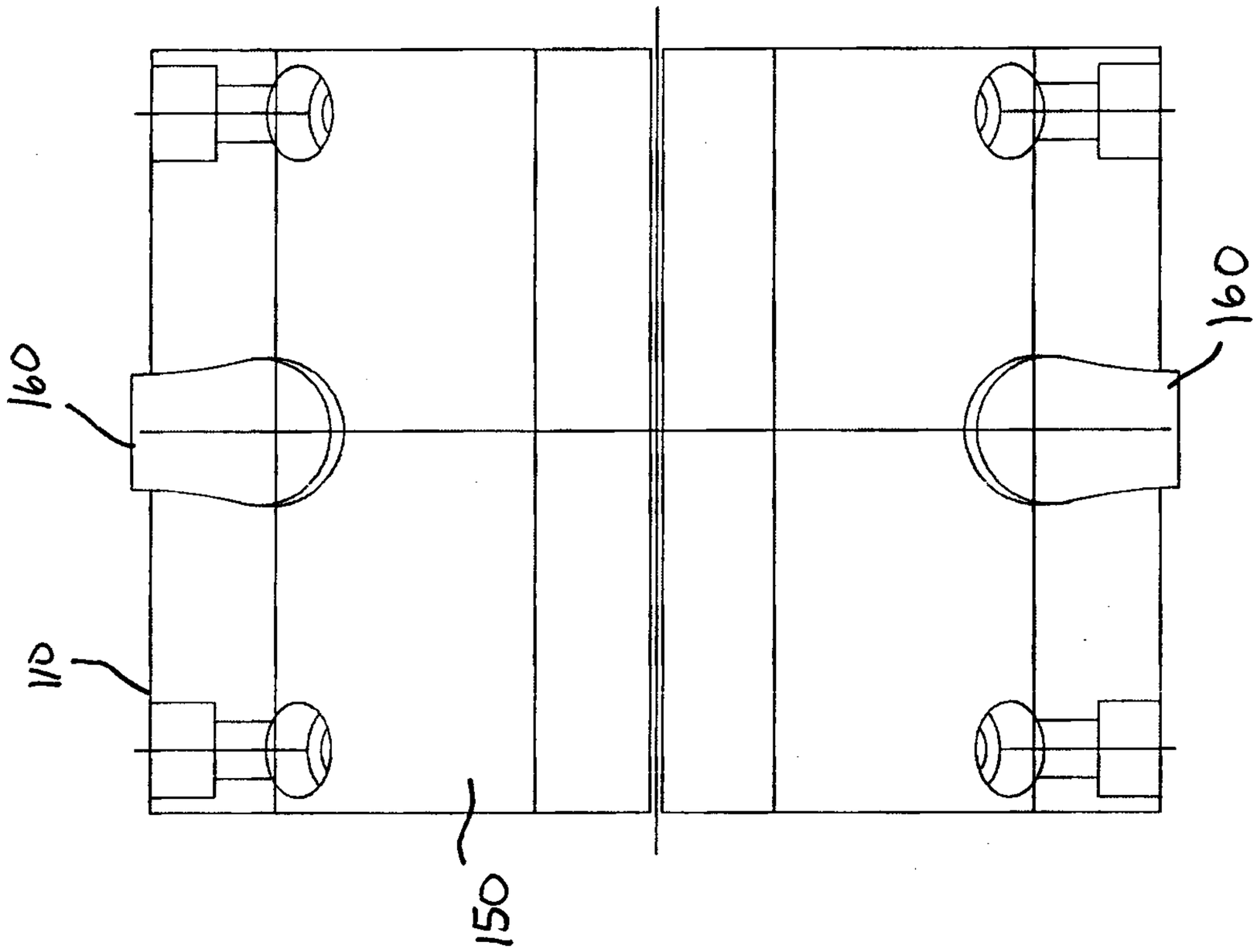


FIG. 11

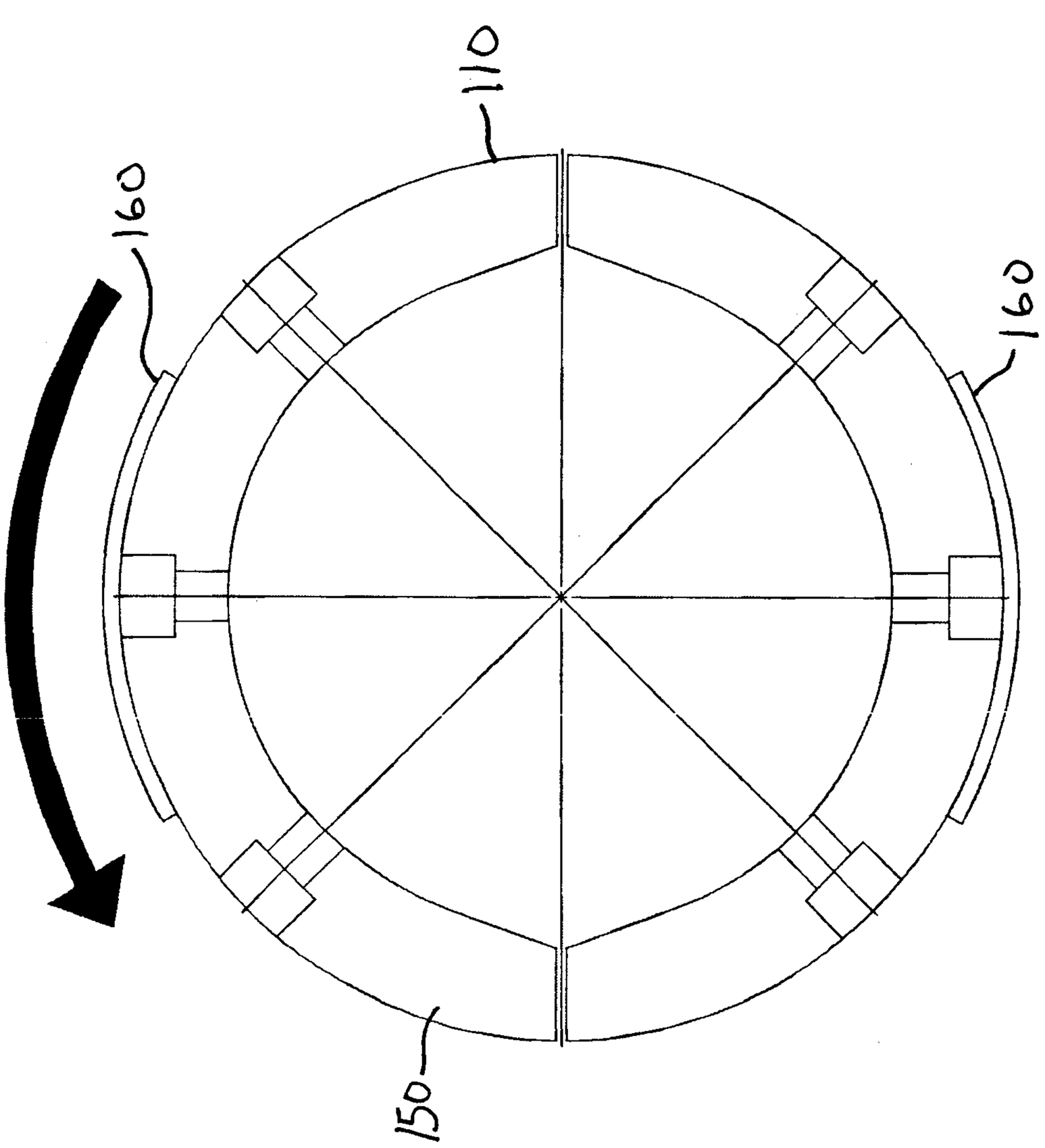


FIG. 10

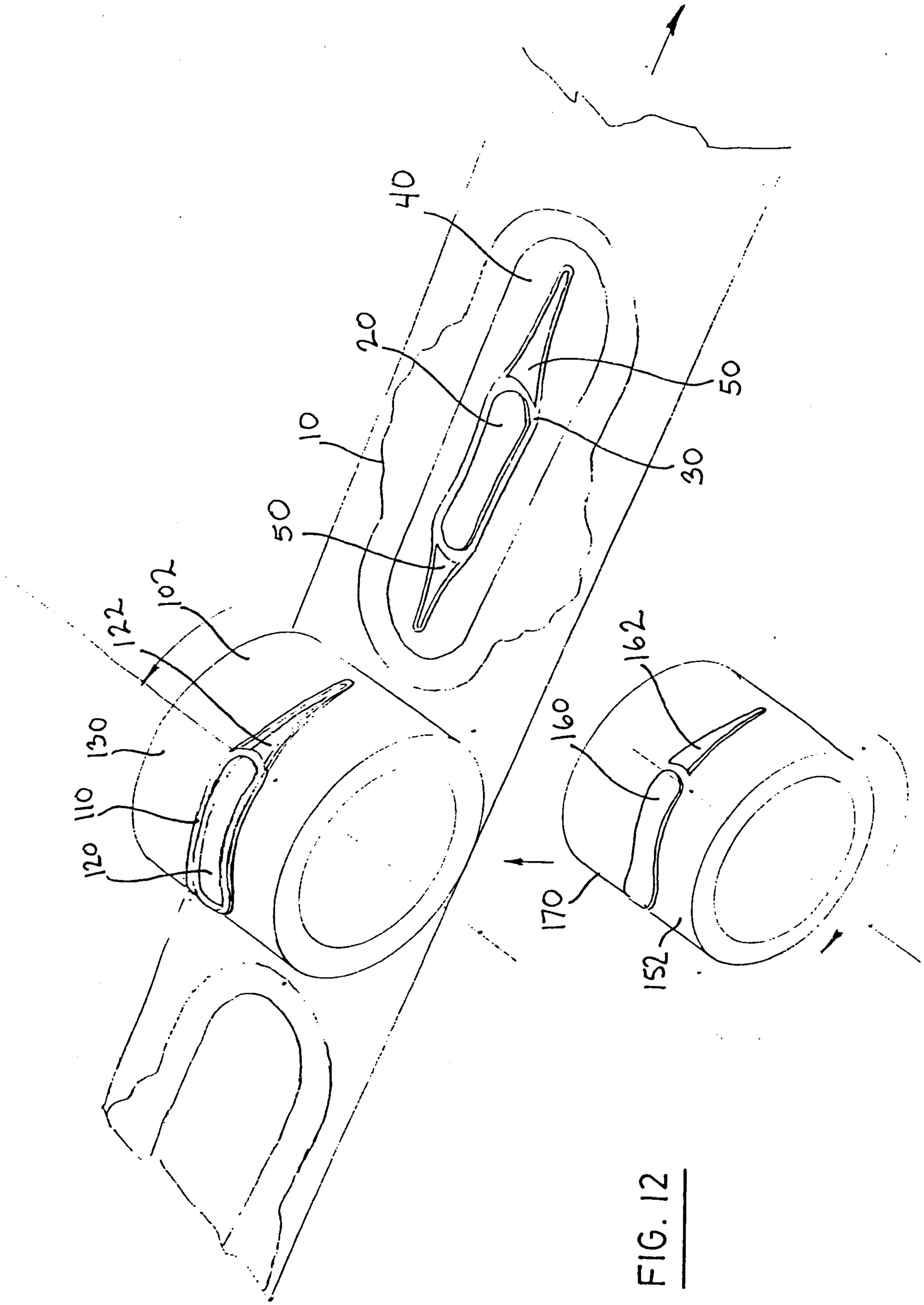


FIG. 12

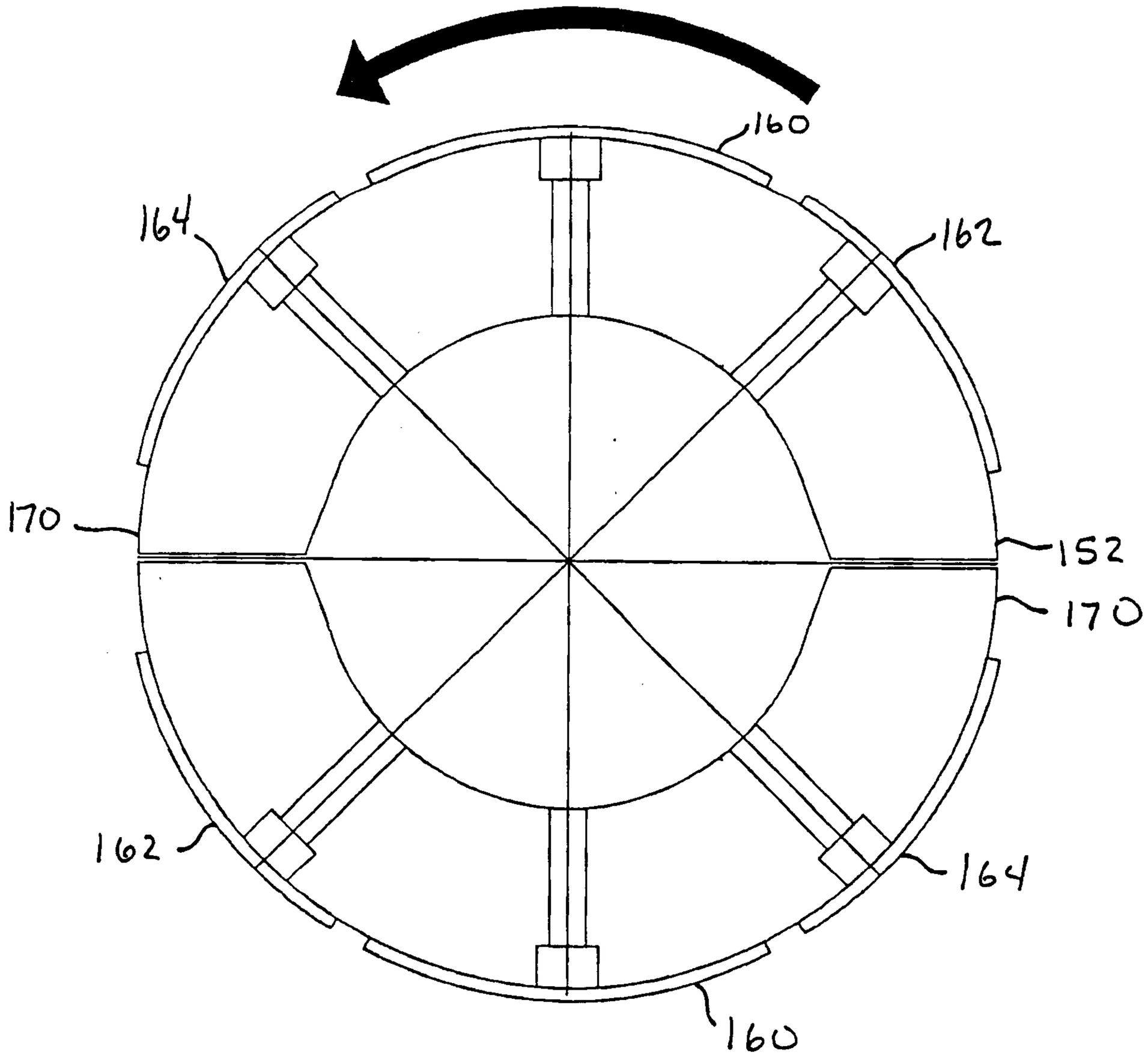


FIG. 13

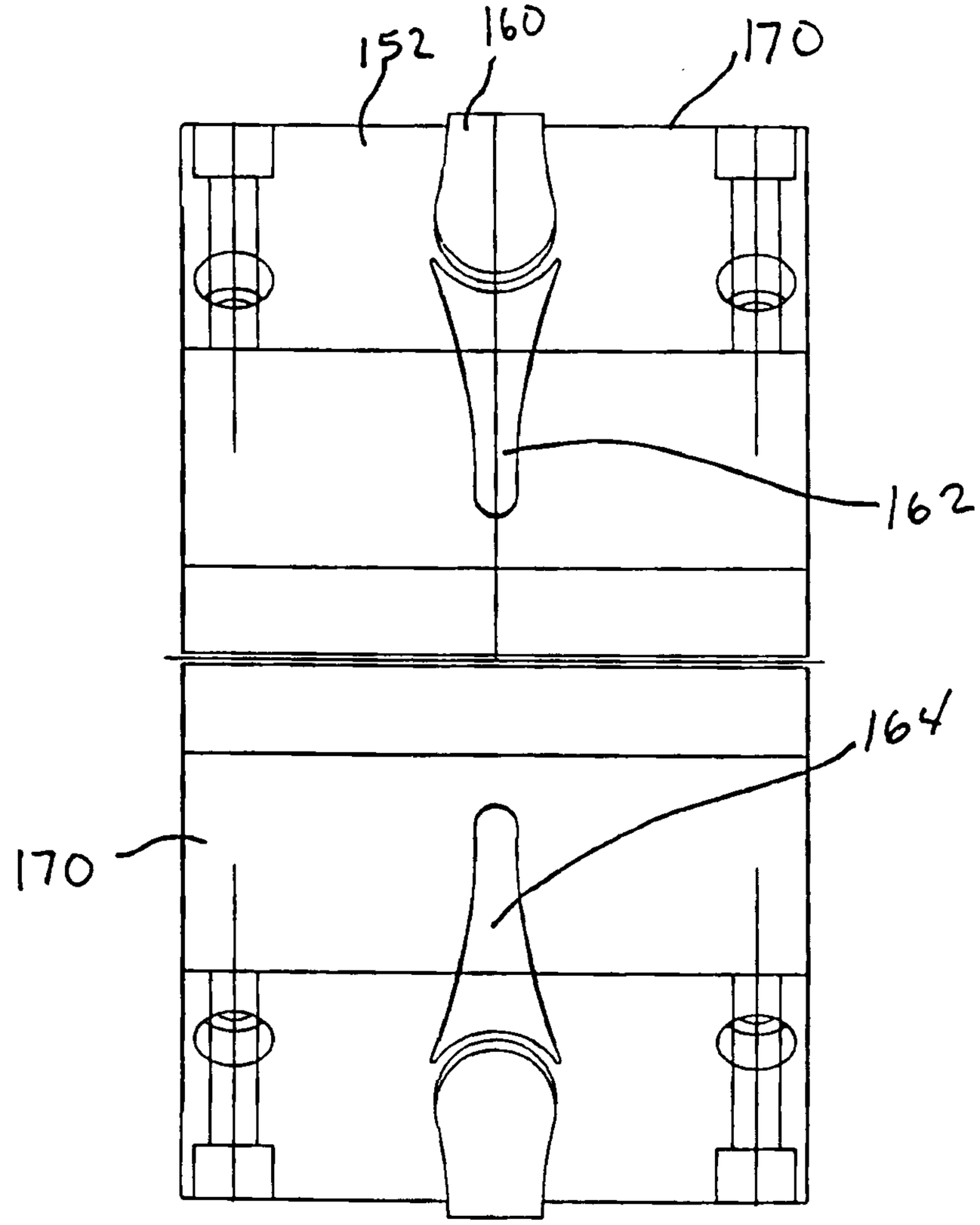
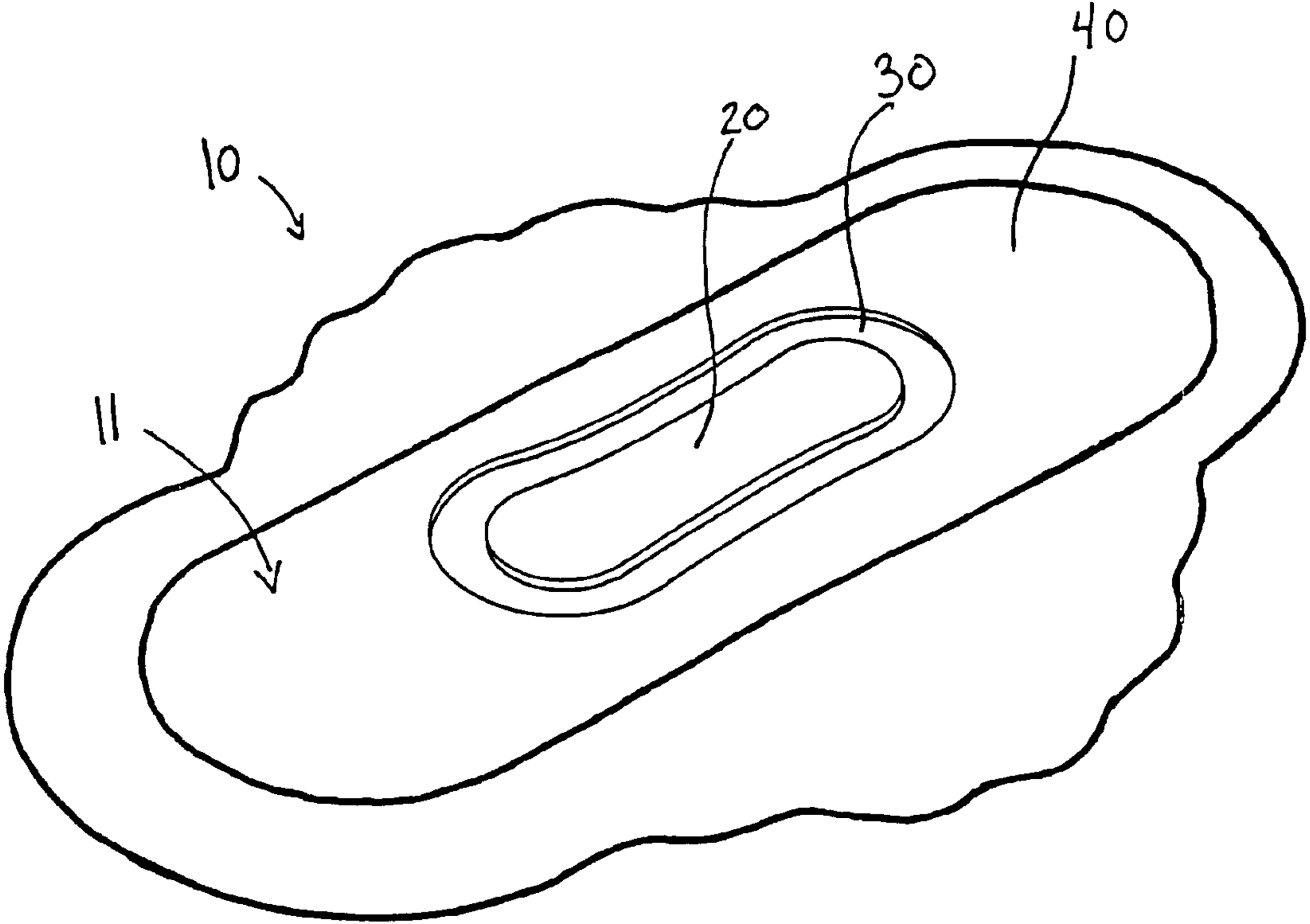


FIG. 14


10
11
20
30
40