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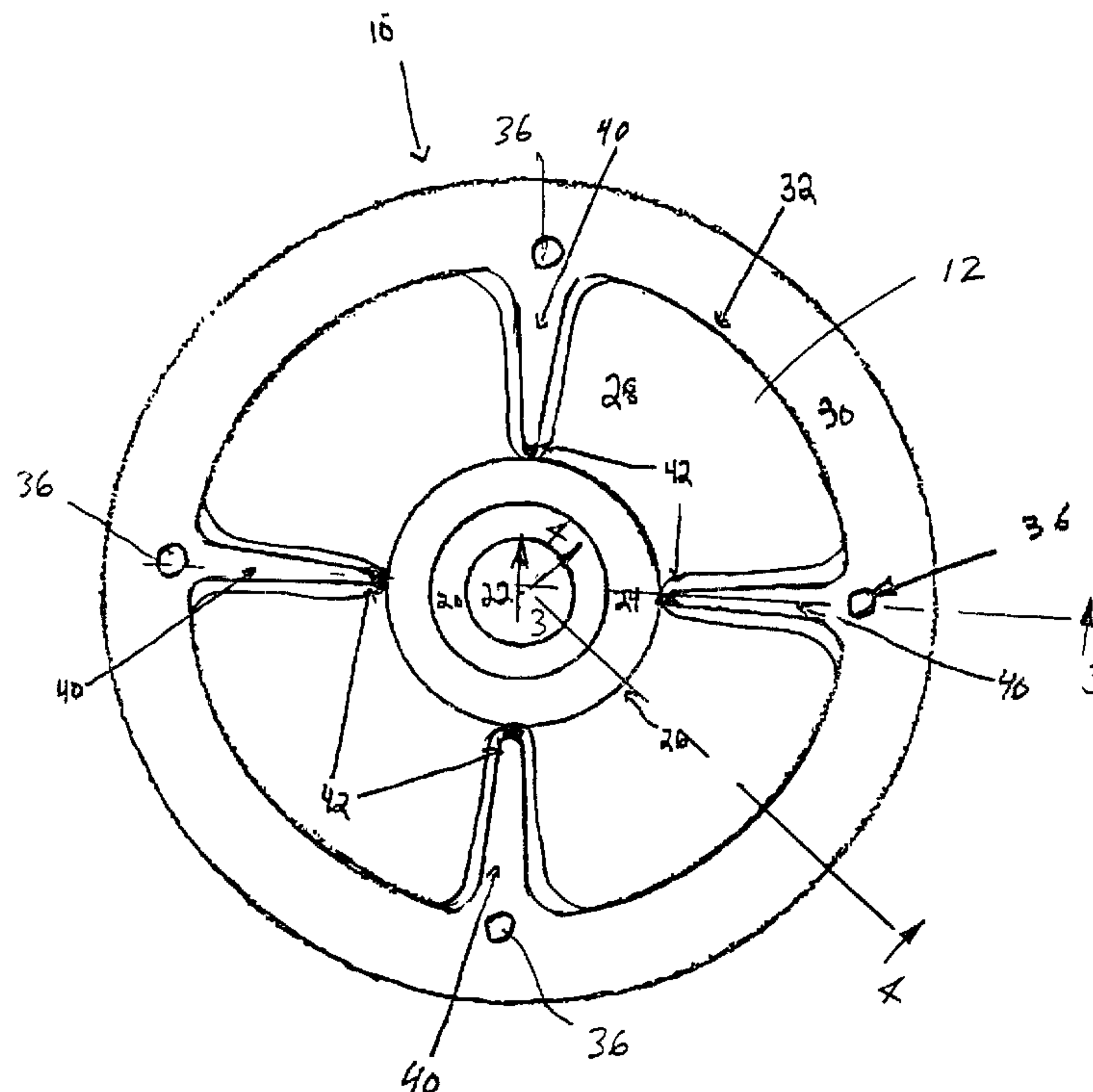
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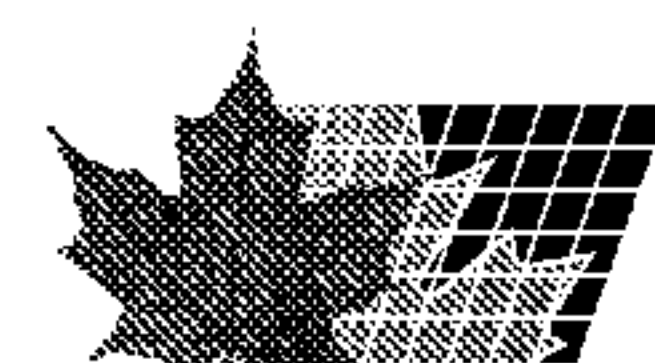
(54) Titre : PLAQUE D'ANCRAGE DE COUVERTURE VENTILEE

(54) Title: VENTED ROOFING ANCHOR PLATE



(57) Abrégé/Abstract:

A roofing anchor plate secures a waterproof membrane to a surface of a roof structure. The roofing anchor plate includes a circumferential channel and radial channels. Air trapped between the anchor plate and a sealing tape is directed along the channels to vent holes positioned at inner ends of the radial channels. The trapped air passes through the vent holes into a cavity formed under the anchor plate between the plate and the waterproof membrane. The elimination of trapped air improves the strength and effectiveness of the seal.



ABSTRACT

A roofing anchor plate secures a waterproof membrane to a surface of a roof structure. The roofing anchor plate includes a circumferential channel and radial channels. Air trapped between the anchor plate and a
5 sealing tape is directed along the channels to vent holes positioned at inner ends of the radial channels. The trapped air passes through the vent holes into a cavity formed under the anchor plate between the plate and the waterproof membrane. The elimination of trapped air improves the strength and effectiveness of the seal.

VENTED ROOFING ANCHOR PLATE

BACKGROUND OF THE INVENTION

The present invention pertains to a holddown device, and more particularly, an apparatus for securing a sealing material to a support structure, particularly a flexible membrane to a roof. The invention relates to
5 a roofing anchor plate or v-plate and method of sealing the same that allows trapped air to escape from over or around the plate when a seal is applied over the plate.

Roofing surfaces can be covered with flexible waterproof membranes to protect against water penetration into a roof structure. These membranes
10 are usually made from a synthetic, flexible material and are often supplied in sheet form in large rolls.

Such membranes must be securely anchored to the roof to prevent displacement of the membrane by uplift forces caused by wind. During wind gusts, for example, the wind pulls the membrane away from the roof. This
15 uplift force can be quite substantial depending on wind velocity. To counter this effect and to prevent the membrane from being pulled off the roof, various types of fastening arrangements have been developed.

A common manner and method used to counter the effect of wind and immobilize the membrane is to secure the membrane with anchor plates.
20 The plates are fastened to the roof via fasteners, e.g. screws or nails, that pass through the plates and an enlarged head portion of the fastener secures the plate to the roof structure. Anchor plates are generally manufactured from stamped metal or molded plastic and are usually circular or disc shaped, but can also be oblong.

25 Once a membrane is spread across a roof structure, anchor plates are placed on top of the membrane and secured to the roof with fasteners that pass through center openings in the plates and through the membrane. In this manner, the membrane is less likely to be displaced by uplift forces.

However, the nails or screws passing through the membrane create potential avenues for water to penetrate the roof structure.

When using anchor plates, therefore, an impermeable sealing tape or adhesive is often applied to cover an upper surface or top of the plate and the immediately surrounding membrane to prevent water from entering the roof structure through the pierced membrane.

When tape or a liquid adhesive is placed over the anchor plate, many presently available plate designs can result in air being trapped around the perimeter of the plate, over the top of the plate, or in both areas. This air entrapment is especially problematic when tape products are used. Since plates have a shape necessary for strength and because they generally protrude above the membrane surface, the tape comes in contact with the top surface of the plate before the membrane in that immediate area. The tape products used for sealing, however, have a release backing that is much stiffer than the tape itself to assist in handling and to keep the tape from sticking to itself when in a roll form. This backing material renders the tape less flexible and can cause the tape to bridge across the plate and engage the membrane surface at a location spaced beyond the plate periphery during application. This condition causes air to be trapped between the tape and the plate/membrane in the vicinity of the bridge. When the release backing is pulled from the tape, the tape tends to lift up where it is not in contact due to the air trapped between the tape and plate/membrane surfaces. When the tape seam is subsequently rolled to create intimate contact with the membrane and plate, the air is trapped. This trapped air represents an unsealed area that contributes to a weaker seam and one with the potential for leaking over time.

Another problem with many presently available anchor plates is the inclusion of a protrusion on an underside of the plate. The protrusion contacts the membrane during installation and causes the membrane to wrinkle around the plate and the edge of the seam. The protrusion also prevents the anchoring plate from being installed on hard surfaces. The protrusion contacts the hard surface and prevents a stable, planar interface

therewith. The protrusion requires a second plate that matingly receives the protrusion on one surface and is substantially planar on an opposite surface to lay flat on the hard surface.

Thus, a need exists for an anchor plate that has a low profile, and
5 reduces the potential for lower seam strength and leaking caused by trapped air. Such an anchor plate preferably would minimize the bridging effect and provide an avenue for trapped air to escape when sealing tape is applied over the plate. Moreover, any improved in-seam anchor plate preferably will not wrinkle the membrane and can be used on a wide variety of surfaces.

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SUMMARY OF THE INVENTION

A new and improved in-seam anchor plate is provided that minimizes the amount of air trapped when a sealing tape is applied over the plate and surrounding membrane.

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In an exemplary embodiment of the invention, an in-seam anchor plate is equipped with plural radial channels and associated vent holes or openings to help trapped air escape from over or around the plate. The plate has an opening in the center that receives a fastener to secure the plate to an underlying roof. When placed on a roof surface, a top surface of
20 the plate tapers from an elevated central region to a reduced height along an outer circumference of the plate. At the end of the taper, a planar edge of the plate extends outwardly. A small radius is formed at the end of the taper to define a circumferential channel around the periphery of the plate.

The anchor plate provides a cavity between a lower surface of the
25 plate and the membrane. The plural radial channels are circumferentially spaced about the anchor plate and extend from the planar edge of the plate to the elevated central region. The plural vent holes are situated at an inner end of the channels. At a wide end of the radial channel there is a round, raised protrusion that prohibits the tape from falling into the channel and
30 thereby sealing it off, thus preventing air removal.

The plate has a low profile with a planar bottom surface and a gradual taper to reduce bridging and provide a large surface area to which the tape can adhere.

When a sealing tape is placed over the anchor plate and subsequently rolled, the circumferential channel, the raised protrusions, the radial channels, and holes at the inner ends of the channels guide any trapped air to the cavity under the plate, thereby allowing the tape to completely contact the mating membrane surface and the plate. The radial channels are preferably four in number, spaced about 90° apart on the plate. The raised protrusion coupled with the minimal channel width prevents a sealing tape from filling the channel and thereby preventing the trapped air from being directed to the vent hole. The vent hole located at the end of each radial channel is preferably angled and elongated to prevent a primer used to mate the tape to the anchor plate from clogging the vent holes.

An advantage of the present invention is the provision of raised protrusions, radial channels, and vent holes to minimize the bridging effect and adverse effect of trapped air when a sealing tape is placed over the anchor plate.

Another advantage of the present invention is the provision of a circumferential channel to guide trapped air into the radial channels and through the vent holes into the cavity defined under the plate.

Still another advantage of the present invention is the provision of a low profile with a gradual taper to help reduce bridging and provide for a large surface area for the tape to contact as the sealing tape is installed.

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BRIEF DESCRIPTION OF THE DRAWINGS

The following is a brief description of the drawings which are presented for the purposes of illustrating the invention and not for purposes of limiting the same.

Fig. 1 is a plan view of a roof anchor plate in accordance with a preferred embodiment of the present invention.

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Fig. 2 is an elevational view of a roof anchor plate in accordance with a preferred embodiment of the present invention.

Fig. 3 is a cross-sectional view taken generally along the lines 3-3 of FIG. 1.

5 Fig. 4 is a cross-sectional view taken generally along the lines 4-4 of FIG. 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to Figures 1-4, a roofing anchor plate **10** has a first or
 10 top surface **12** and a second or bottom surface **14** for securing a waterproof membrane **16** to a roof **18**. The anchor plate of the present invention is generally circular in shape but may be rectangular, oblong or other suitable conformation and is typically manufactured of metal, such as stamped steel, or high quality plastic. A circular center region **20** of the plate includes an
 15 aperture **22** through which a fastener such as a screw, rivet or nail (not shown) secures the plate **10** to the roof **18**. The size of the fastener is chosen such that an enlarged head of the fastener engages around the aperture **22**, effectively securing the plate to the roof. Radially outward from the center region **20**, the plate slopes upwardly via a wall **24** to a raised,
 20 elevated annular region **26**. The plate then preferably slopes downwardly along a gradual taper **28** to a planar edge **30** extending slightly outward and about a perimeter of the plate. The wall **24** and the taper preferably defining an included angle of less than 180 degrees. As best shown in Figure 4, at the juncture of the taper **28** and planar edge **30**, a small radius **32** forms a
 25 circumferential channel **34** along an inner periphery of the planar edge **30**.

A plurality of radial channels **40** extend from the edge **30** of the plate to the elevated annular region **26** and are preferably spaced evenly about the circumference of the plate. The channels preferably vary in width along their radial extent, having a diverging conformation as the channels extend
 30 radially outward from the elevated annular region **26**. As evident in Figure 3, base portions of the radial channels **40** are disposed in the same plane as the planar edge **30** and the central region **20** so that the bottom surface of

the anchor plate has a substantially planar conformation. A steeply angled wall **44** defines an inner end of the radial channels and interconnects with the wall **24** at the raised region **26**. A vent hole **42** is positioned at the end of each radial channel **40** in the angled wall **44**. The vent hole allows each

5 channel to communicate with a cavity **50** formed in an undersurface of the anchor plate, details of which are described below. The upper surface of the remainder of the anchor plate exhibits a low profile as a result of the gradual taper at regions circumferentially disposed between the radial channels.

When placed on a roof **18** over a membrane **16**, the cavity **50**

10 between the bottom surface **14** of the plate and the top of the membrane **16** serves as a reservoir where trapped air can be directed. As is known in the art, since the fastener pierces the membrane **16**, a primer is applied to the top surface of the fastener, the anchor plate **12** and the membrane **16** surrounding the anchor plate **10** to adhere a sealing tape which is applied

15 over these surfaces to prevent water ingress into the roof assembly. The orientation and shape of the vent holes in the angled wall prevents the liquid primer from inadvertently obstructing the vent holes when a sealing tape is applied. A roller is subsequently used to intimately bond the sealing tape to the surfaces that the tape contacts. As noted above, in prior arrangements

20 this resulted in air trapped beneath the tape and prevented a strong bond from forming between the tape and the contact surface (membrane or anchor plate). The gradual slope of the taper **28** minimizes the amount of bridging that the sealing tape experiences between the membrane **16** and the anchor plate **10**. Accordingly, the amount of air trapped under the

25 sealing tape is significantly reduced. When the sealing tape is rolled to enhance the adherence between the sealing tape and the contact surfaces, the remaining trapped air is directed either into the radial channels **40**, or along the circumferential channel **34** and then into one of the radial channels **40**. Once in a radial channel **40**, the trapped air passes through the associated vent hole **42** and into the cavity **50** under the plate. The plate is manu-

30 factured such that the cavity **50** is large enough to accommodate all the trapped air. The air is then held in the cavity between the plate and the

membrane and has little or no adverse effect on the sealing properties of the anchor plate. The elimination of the trapped air from around the top of the plate and along its perimeter improves the adhesion and the leak protection provided by the sealing tape positioned over the plate and the seam. The
5 raised protrusions **36** are positioned to keep the tape from entering the channel opening.

The radial channels **40** in the plate are designed such that their width is minimized to prevent the tape from entering them and sealing channels **40** which could prevent the channels **40** from funneling trapped air to the vent
10 holes **42**. Similarly, the vent holes **42** are positioned at an angle at a point where the radial channels **40** slope up toward the annular high point **26** to diminish the chance that they will be clogged by any applied primer.

The radial channels **40** in the plate also impart a greater stiffness to the plate than that of previous plates without channels. This stiffness allows
15 the plate to better resist the effects of wind uplift. In addition, greater holding pressure is applied on the membrane by this plate due to the force that the planar bottom surface of the channels applies to the membrane. Previous plates without channels only contacted the membrane along an outer edge. The channels of the present invention provide a greater surface area
20 engaging the membrane, resulting in a more secure attachment. In the preferred embodiment, the plate has a diameter of about 5.72 cm and a maximum height of about 0.30 to 0.38 cm, although other dimensions and configurations may used.

The invention has been described with reference to an illustrative
25 embodiment. Modifications and alterations will occur to others upon reading the preceding detailed description. It is intended that the invention be construed as including all such alterations and modifications insofar as they come within the scope of the appended claims or the equivalents thereof.

WHAT IS CLAIMED IS:

1. A roofing anchor plate for securing a membrane to a roof structure, the anchor plate comprising:
 - a central area;
 - 5 a taper extending from the central area toward a periphery of the anchor plate;
 - a substantially planar edge;
 - a radial channel extending from the central area to the planar edge; and
 - 10 a vent hole extending through the anchor plate and positioned at an end of the radial channel adjacent the central area for directing trapped air from one surface of the anchor plate to another surface of the anchor plate.
- 15 2. A roofing anchor plate according to claim 1 further comprising additional radial channels and additional vent holes wherein the number of vent holes is equal to the number of radial channels such that each radial channel has one vent hole positioned at an end of the radial channel adjacent the central area.
- 20 3. A roofing anchor plate according to claim 1 wherein the vent holes are positioned at an angle relative to a radial extent of the channel.
4. A roofing anchor plate according to claim 1 wherein a bottom
 - 25 surface of the channel is disposed in a same plane as the planar edge.
5. A roofing anchor plate according to claim 1 wherein the anchor plate has a substantially circular periphery.
- 30 6. A roofing anchor plate according to claim 1 wherein a cavity is formed between the another surface of the plate and a membrane covering a roof when the anchor plate is secured to the roof through the membrane.

7. A roofing anchor plate according to claim 1 wherein the taper terminates in a radius defining a circumferential channel with the planar edge.

8. A roofing anchor plate according to claim 1 wherein the anchor plate is made of at least one of metal and plastic.

9. A roofing anchor plate according to claim 1 wherein the plate has a diameter of about 5.72 cm and a maximum height of about 0.30 to 0.38 cm.

10. A roofing anchor plate according to claim 9 wherein the planar edge is disposed outwardly of and surrounds the circumferential channel.

11. A roofing anchor plate according to claim 10 wherein the planar edge is circumferentially continuous.

12. A roofing anchor plate according to claim 1 wherein the central area has an aperture extending therethrough for receiving an associated fastener to secure the anchor plate to a roof.

13. A roofing anchor plate according to claim 1 wherein the central area is surrounded by a sloping surface that merges into the taper, the sloping surface and taper defining an included angle of less than 180°.

14. A roofing anchor plate according to claim 1 further comprising a raised protrusion at an opening of the channel at the planar edge.

15. A roofing anchor plate for securing a membrane to a roof surface, the anchor plate comprising:

a central area;

a taper extending from the central area toward a periphery of the anchor plate;

a substantially planar edge;

plural radial channels extending from the central area to the

planar edge;

plural raised protrusions at openings of the channels adjacent the planar edge; and

5 plural vent holes extending through the anchor plate and positioned at an end of the radial channels adjacent the central area for directing trapped air from one surface of the anchor plate to another surface of the anchor plate.

10 16. A roofing anchor plate according to claim 15 wherein the vent holes are positioned at an angle at the end of the radial channels.

17. A roofing anchor plate according to claim 15 wherein bottom surfaces of the channels are disposed in a same plane as the planar edge.

15 18. A roofing anchor plate according to claim 15 wherein a cavity is formed between the another surface of the plate and a membrane covering a roof when the anchor plate is secured to the roof over the membrane.

19. A roofing anchor plate according to claim 15 wherein the planar edge is circumferentially continuous.

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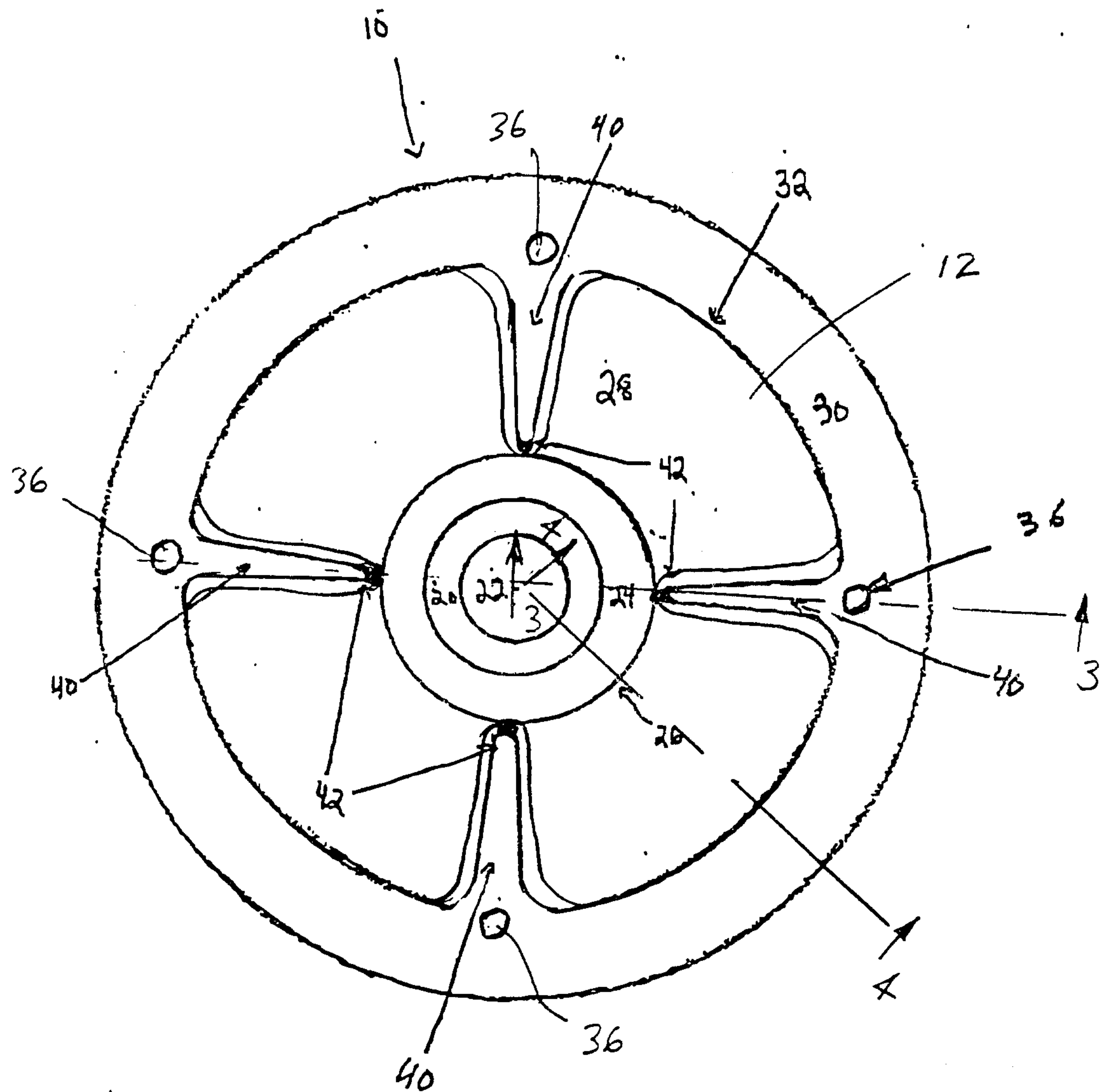


Fig 1

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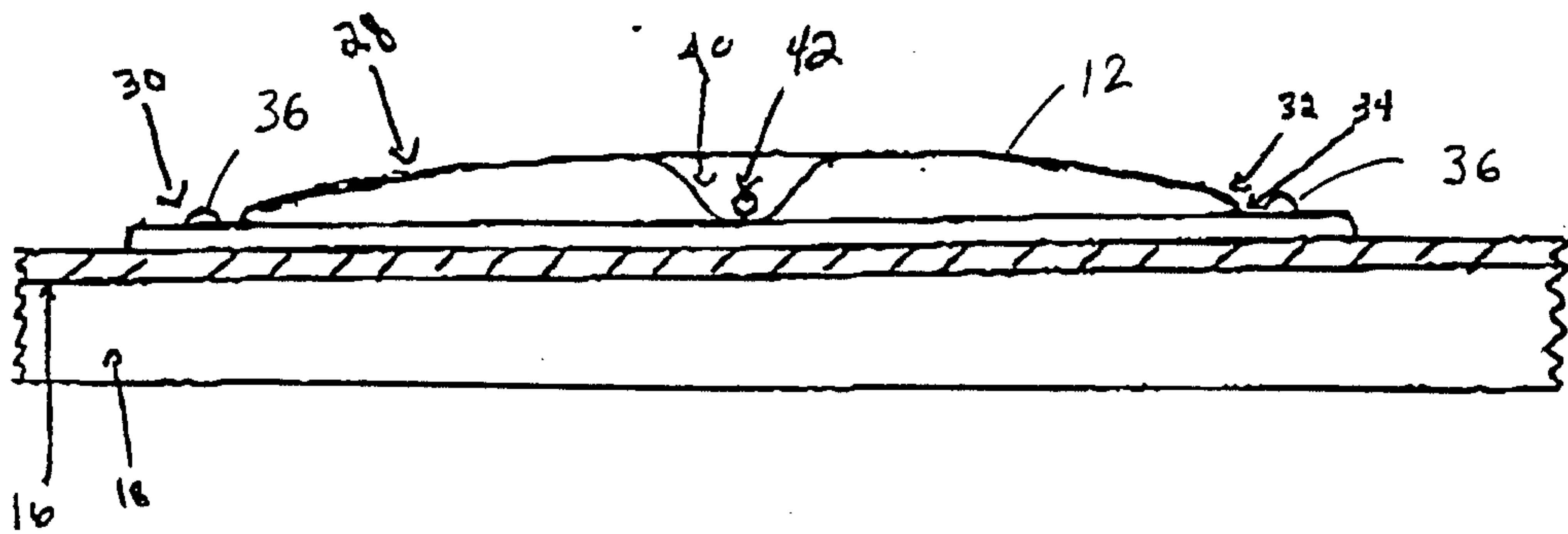


Fig. 2

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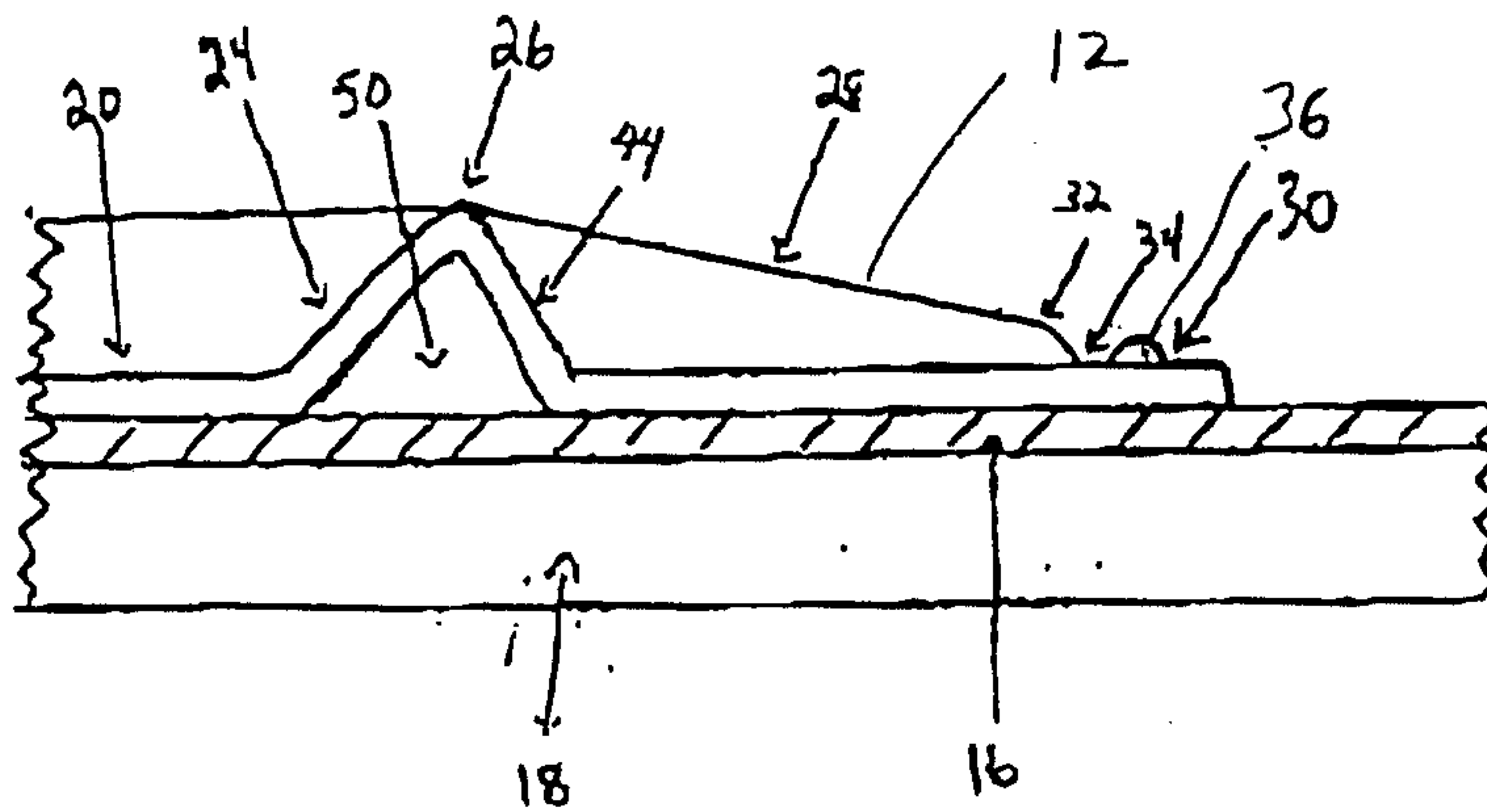


Fig. 3

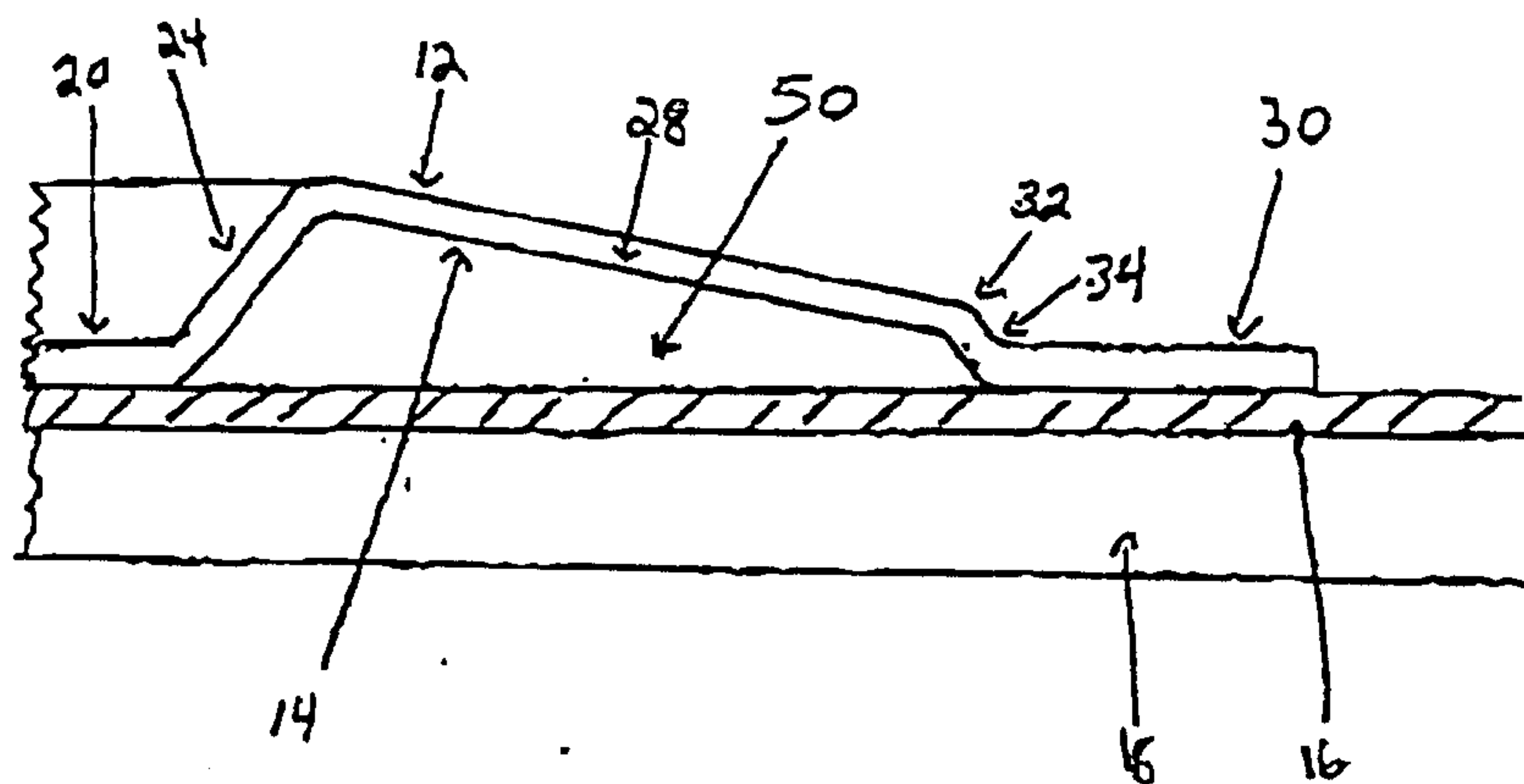


Fig. 4

