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 (72) Inventeur/Inventor:  
 SYLER, RODNEY R., US  
 (73) Propriétaire/Owner:  
 A.O. SMITH CORPORATION, US  
 (74) Agent: SMART & BIGGAR

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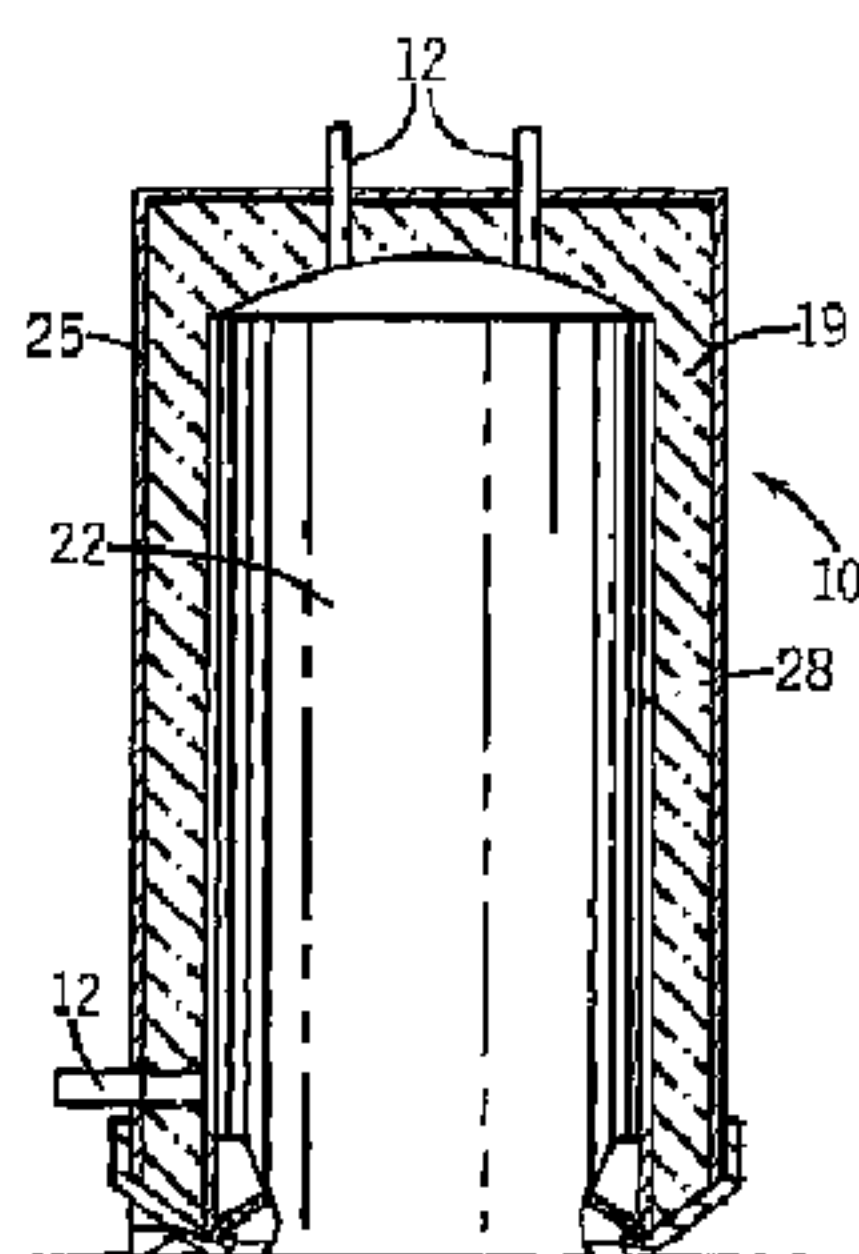


FIG. 2

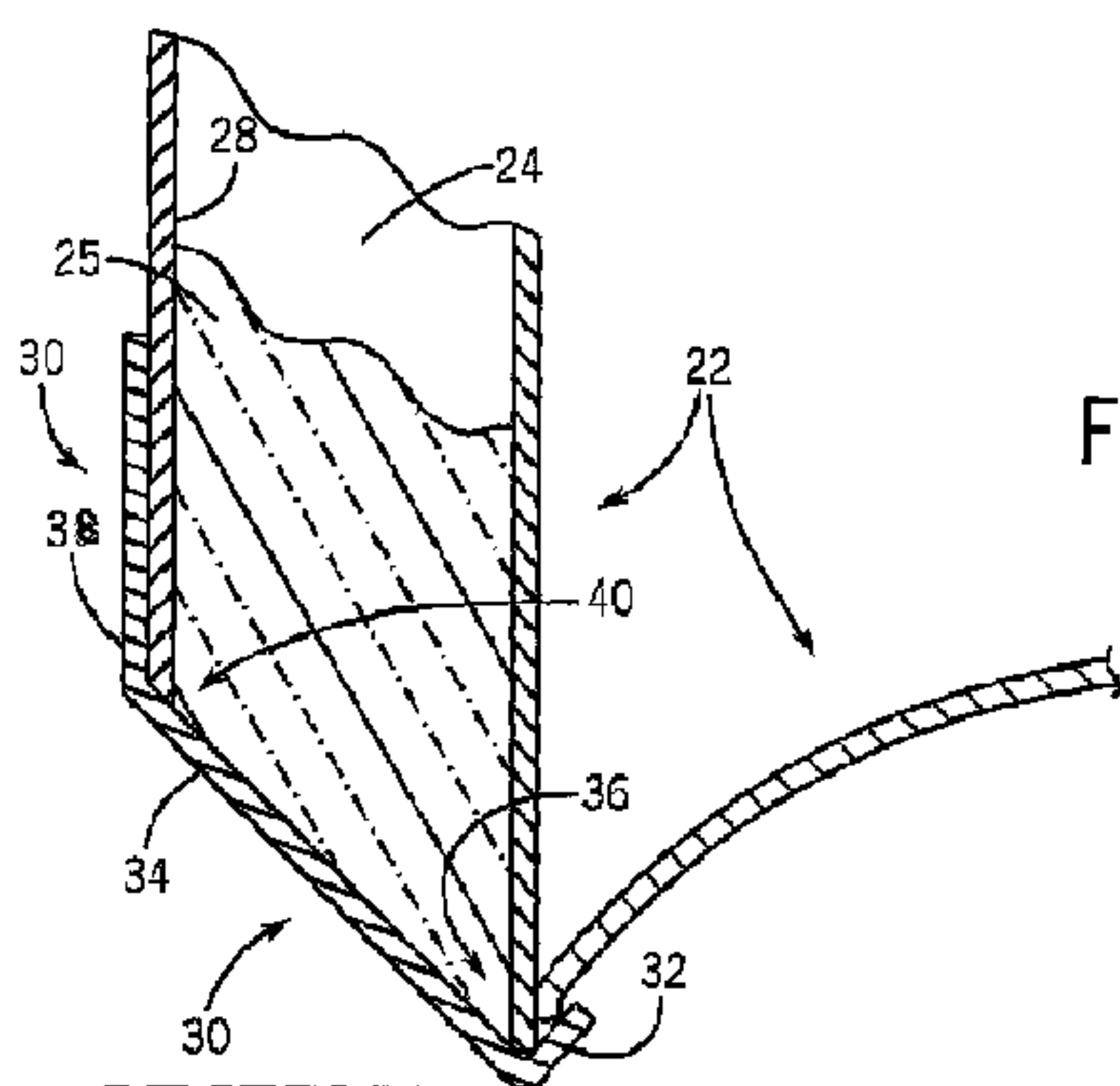


FIG. 4

(57) Abrégé/Abstract:

A support base is provided for a water heater, the support base having a structure for supporting components of the water heater in their proper position in a manner that elevates an outer jacket of the heater and provides space for insulation between the outer jacket and an inner water tank. The support base comprises a lip at one end of the support base, an angled middle portion projecting upwardly from the lip such that the lip and the angled middle portion intersect to form a trough for positioning and supporting the water tank. The support base also has a top portion extending in a generally vertical direction from an upper end of the angled middle portion such that the top portion provides support for the outer jacket.

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(71) Applicant (for all designated States except US): **A.O. SMITH CORPORATION** [US/US]; 11270 West Park Place, Milwaukee, WI 53224 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **SYLER, Rodney, R.** [US/US]; 735 Sneed Road W., Franklin, TN 37069 (US).

(74) Agent: **JONES, Daniel, S.**; Michael Best & Friedrich, LLP, 100 East Wisconsin Avenue, Suite 3300, Milwaukee, WI 53202 (US).

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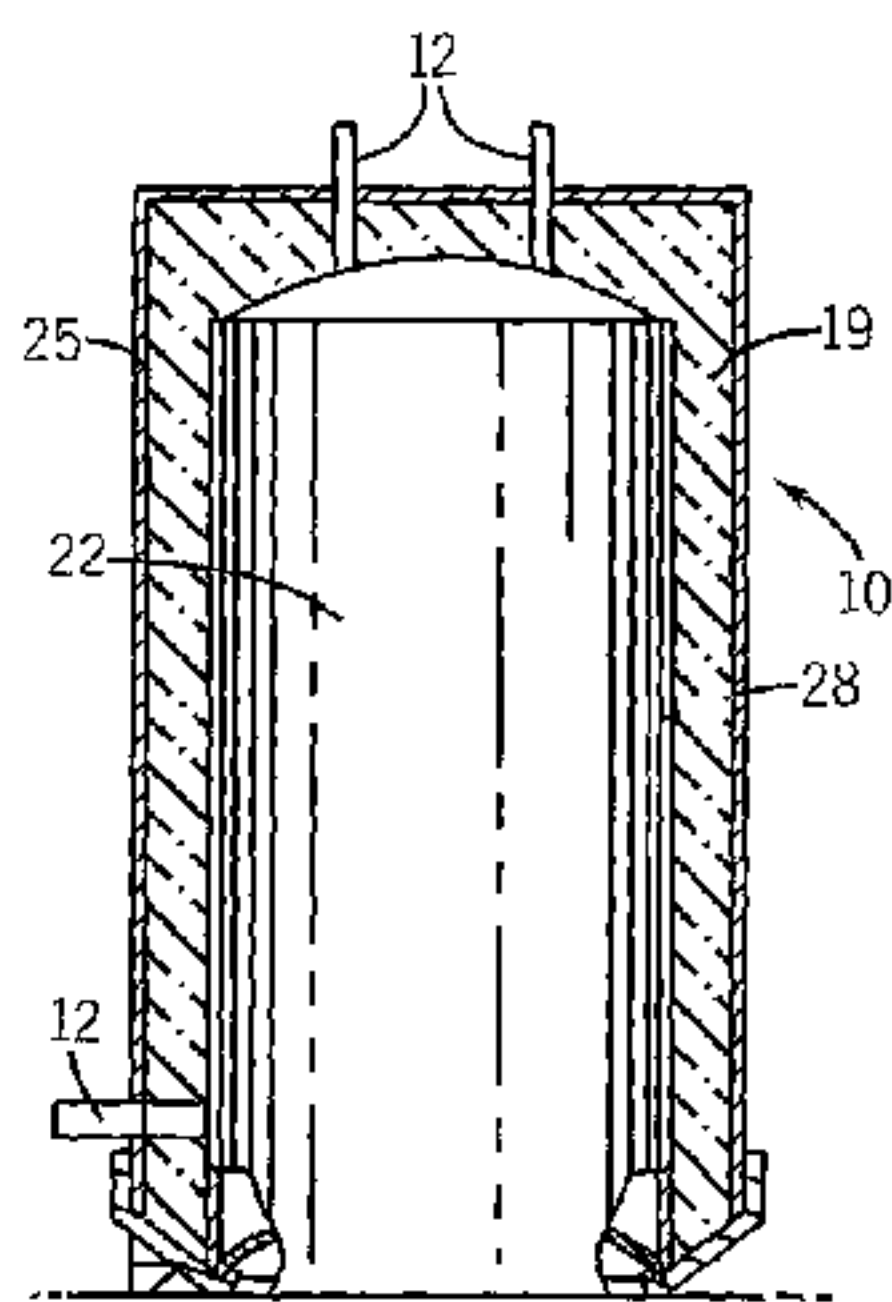


FIG. 2

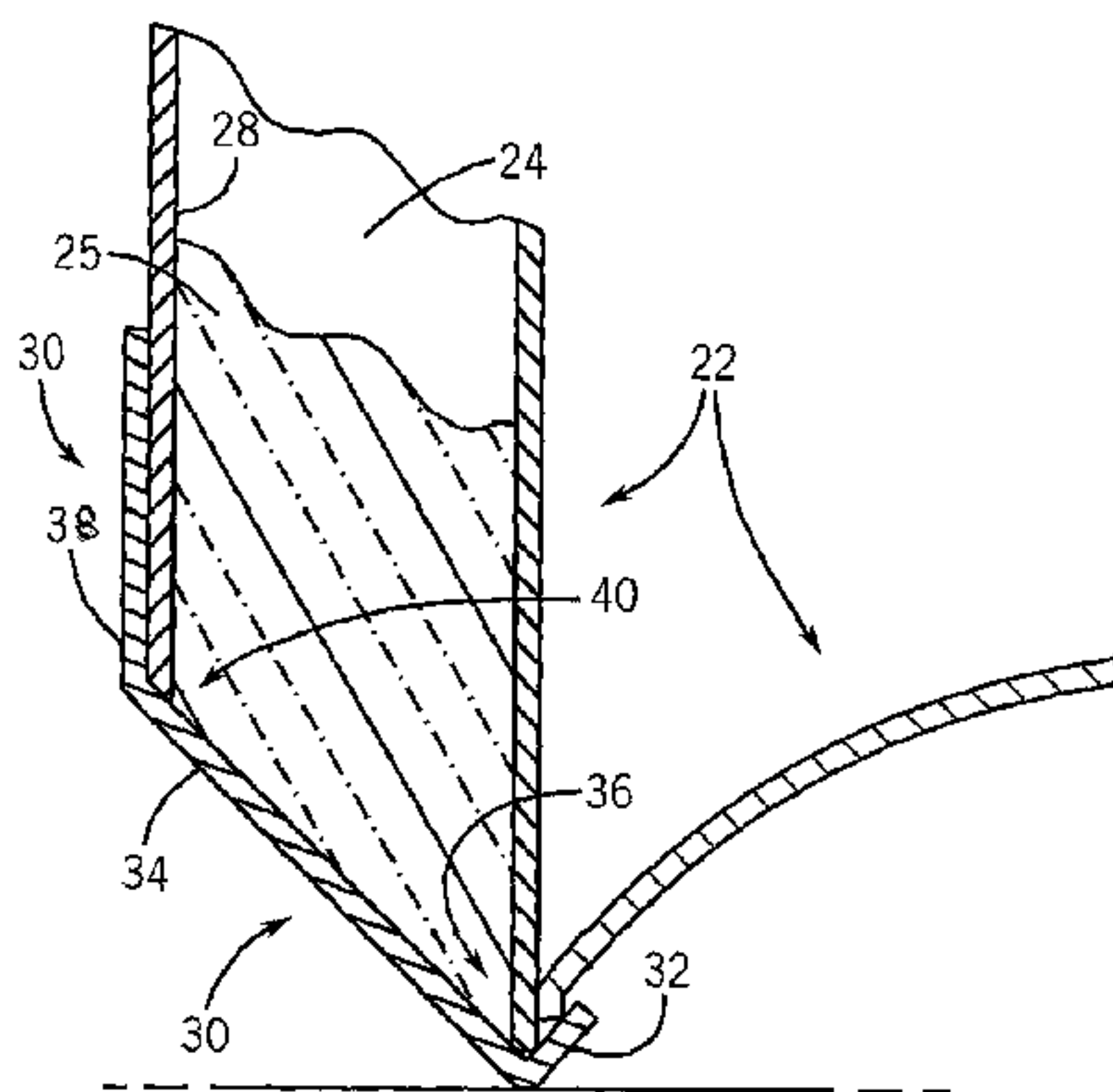


FIG. 4

(57) Abstract: A support base is provided for a water heater, the support base having a structure for supporting components of the water heater in their proper position in a manner that elevates an outer jacket of the heater and provides space for insulation between the outer jacket and an inner water tank. The support base comprises a lip at one end of the support base, an angled middle portion projecting upwardly from the lip such that the lip and the angled middle portion intersect to form a trough for positioning and supporting the water tank. The support base also has a top portion extending in a generally vertical direction from an upper end of the angled middle portion such that the top portion provides support for the outer jacket.

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## WATER HEATER BASE

### BACKGROUND

[0001] The present invention relates to a water heater support base for supporting components of a water heater in their proper position and in a manner that elevates an outer jacket of the water heater and still provides sufficient space for insulation between a water tank and the outer jacket.

[0002] As conventionally constructed, a water heater typically has a water tank adapted to hold a quantity of water to be heated, an outer jacket outwardly circumscribing the vertical water tank sidewall portion and forming an annular insulation space between the jacket and the water tank. A quantity of insulation is typically disposed in this annular space. A bottom end of the water tank and jacket is typically placed into a bottom pan structure and suitably secured to the pan. The bottom pan must be both durable and structurally sound to support and properly position the water heater components.

[0003] A common method of placing insulation in the annular space surrounding the water tank, after a bottom portion of the water tank and outer jacket structure are secured within the bottom pan, is to simply inject liquid foam insulation into the annular space and let the injected foam cure after injection. One of the functions of the bottom pan is to hold the base of the water tank and outer jacket in position during the foam injection and curing process, to prevent the water tank from wandering around within the outer jacket as the foam expands.

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## SUMMARY

**[0004]** In one aspect of the invention, there is provided a water heater having: a water tank; a support base for supporting the water tank and an outer jacket, the support base comprising: a lip forming an inside portion of the support base; an angled middle portion  
5 projecting upwardly from the lip in a non-vertical and non-horizontal direction such that the lip and the angled middle portion intersect to form a trough for positioning and supporting the water tank; and a top portion extending in a generally vertical direction from an upper end of the angled middle portion such that the top portion provides support for the outer jacket; wherein the angled middle portion and the top portion intersect to form a support surface for  
10 the outer jacket such that a lower edge of the outer jacket is elevated above the intersection of the lip and the angled middle portion.

**[0004a]** In another aspect of the present invention, there is provided a water heater having: a water tank for storing water; a device for heating water in the water tank, the tank defining a circular bottom edge; an outer jacket surrounding the water tank; an annular  
15 insulation space between the outer jacket and the water tank; insulation placed in the insulation space; a support base for supporting the water tank and the outer jacket, the support base comprising: a lip forming an inside portion of the support base; an angled middle portion projecting upwardly from the lip in a non-vertical direction such that the lip and the angled middle portion intersect to form a trough for positioning and supporting the bottom edge of  
20 the water tank; a top portion extending in a generally vertical direction from an upper end of the angled middle portion such that the top portion provides support for the outer jacket; and wherein an intersection of the angled middle portion and the top portion so as to form a support surface for the outer jacket such that a lower edge of the outer jacket is elevated above the intersection of the lip and the angled middle portion; an intersection of the lip and the  
25 angled middle portion to form an interior angle of less than ninety degrees; and an intersection of the angled middle portion and the top portion to form an interior angle of more than ninety degrees.

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## BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Fig. 1 is a simplified fragmented section view showing a prior art construction of a water heater utilizing a typical prior art support base;

[0006] Fig. 2 is a section view showing a water heater utilizing a support base of the present invention and illustrating insulation in relation to an inner water tank and a surrounding outer jacket for the water heater.

[0007] Fig. 3 is a section view showing the construction of a preferred embodiment of a support base for supporting a water heater in accordance with the present invention.

[0008] Fig. 4 is a section view of the support base of Fig. 3 with certain other water heater components also shown in section view.

[0009] Fig. 5 is a partial elevation view of a portion of a support base formed with a corrugation construction.

## DETAILED DESCRIPTION

[0010] Before any embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having" and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. Unless specified or limited otherwise, the terms "mounted," "connected," "supported," and "coupled" and variations thereof are used broadly and encompass both direct and indirect mountings,

connections, supports, and couplings. Further, “connected” and “coupled” are not restricted to physical or mechanical connections or couplings.

**[0011]** Referring now to the drawings and, more particularly, to Fig. 1, there is shown generally at 10 a basic prior art construction of a water heater. The water heater 10 comprises a water tank 22 in which water is heated by a heating device, shown in dashed outline at 13, such as electric resistive elements in the a lower portion of the interior of the water tank 22, as is well known in the art. The water tank 22 is provided with pipe fittings 12 or other fittings such as 12', which lead to the internal resistive elements 13. The water tank 22 is typically provided with a dome shape bottom wall 14 and the water tank sits on an insulating support base 15, which has formed in it a circular trough in which the bottom edge of the water tank 22 sits. The insulating support base 15 is positioned as a flat layer in a pan 16 about which is secured an outer jacket 28. A top cover 18 is secured over a top end of the outer jacket 28. The outer jacket 28 is provided with a side wall that is spaced apart from an outer wall of the water tank 22 to provide an insulating space 19. As foam insulation expands within the insulating space 19, the tank 22 is prevented from wandering within the jacket 28 by the insulating base 15. A similar construction is illustrated in U.S. Patent No. 5,154,140.

**[0012]** In Fig. 2, a water heater 10 is shown in a structure that incorporates the present invention. A ring-shaped support base 30 supports the water tank 22 and centers it in the jacket 28 the foam insulation injection and curing process.

**[0013]** Referring now to Figs. 3 and 4 there is shown a cross-section of the one construction of the support base 30. It should be understood that a range of dimensions and angles can be utilized in the practice of the invention. The specific selection of surface size, angles and dimensions is a matter of choice for those skilled in the art. In the embodiment shown, the support base 30 is formed in three separate sections, as viewed in a cross-section. These three sections comprise a lip 32, an angled middle portion 34 and a top portion 38. To form these three sections, a single piece of metal material can be transformed into the three sections using various metal shaping techniques. It is also possible to form the support base 30 by coupling three separate structures. Alternatively, non-metallic materials can be utilized such as plastic. Various other non-metallic materials and means of construction may also be utilized.

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[0014] Referring again to Figs. 3 and 4, in the embodiment shown the angled middle portion 34 constitutes the largest cross-section and greatest surface area of the three sections. The angle 31 of this middle portion 34 in comparison to a surface or floor on which it will stand may be, for example, 45 degrees or another angle suitable for a particular construction. The angled middle portion 34 can be either straight or curved when viewed in cross-section.

[0015] The angled middle portion 34 is coupled to or formed to be integral with the lip 32 at its lower end and the top portion or vertical portion 38 at its upper end. The lip 32 is typically coupled to the angled middle portion 34 at something less than a 90 degree angle (for example, 85 degrees) between the two parts as shown at 33 in Fig 3. At this junction or intersection between the lip 32 and the angled middle portion 34, there is formed a trough 36 that extends around the circumference of the support base 30 to define a trough circle. The diameter of the trough circle is the same as the diameter of the bottom edge of the water tank 22 so that the bottom edge of the water tank 22 fits snugly within the trough 36. It can be readily appreciated that this trough 36 provides a suitable platform and positioning device for the water tank 22.

[0016] At its other end, the angled middle portion 34 is coupled to or integral with the top portion 38. In the embodiment shown, the top portion 38 is generally angled in a vertical or nearly vertical direction. Consequently, the angle between the top portion 38 and the angled middle portion 34 will generally be more than 90 degrees, and typically about 135 degrees. Again, this angle can be varied over a range.

[0017] At an intersection or junction between the top portion 38 and the angled middle portion 34, there is provided a support surface 40 that supports a lower end or lower edge of the outer jacket 28. It can be readily appreciated that this support surface 40 is elevated a distance off the floor equal to the rise 100 of the triangle. Compared to prior art water heater constructions in which the jacket extends all the way to the floor, the present invention enables use of a shorter length outer jacket and consequently saves an amount of jacket material equal to the rise 100 multiplied by the circumference of the jacket 28.

[0018] It can also be appreciated that elevation of the outer jacket 28 means that space 24 is reduced by a volume about equal to the triangle extending all the way around the base 30. The reduction in space 24 gives rise to a savings in insulation material 25 required to fill the space 24. Another cost savings provided by the support base 30 of the present invention compared to prior art flat pans is that the base pan 30 does not extend across the entire bottom of the water tank 22, but instead is ring-shaped with a hole in the middle under the tank 22. The material savings in this regard are roughly equal to the surface area under the water tank 22.

[0019] Another advantage of the present invention is apparent from Figs. 3 and 4. It is desirable to position the water tank 22 centrally within outer jacket 28 so that the water tank is supported to remain centered within the outer jacket 28 during the process of filling space 24 with foam. This is desirable because adequate and uniform insulation space is provided around an outer surface of water tank 22 without any inadequate or thin insulation spaces. This also means that the weight of the water tank 22 and the weight of the water tank 22 when filled with water, remains centered within outer jacket 28 and centered on the support base 30.

[0020] Referring now to Fig. 5, an embodiment of the invention is shown that uses a specific construction method to form the support base 30. The support base in Fig. 5 is made with corrugations that provide structural rigidity. Additionally, the corrugated structure is relatively easy to manufacture. Corrugations ease the process of manufacturing because an initially flat strip of metal can be bent, shaped and formed with appropriate bends and angles to transform a flat strip of metal into a support base 30 with a lip 32, an angled middle portion 34 and a top portion 38. The corrugations take up the material along the inner radius (i.e., at the lip 32) of the base support 30, which is smaller than the outer radius (i.e., at the top portion 38). By properly spacing and sizing the corrugations, the radius of a strip of material can be adjusted such that when the two ends are joined together to form a circular band, the trough 36 circle has a diameter equal to the bottom edge of the water tank 22 it is intended to support.

[0021] Additional forms of construction may also be utilized to form the support base 30. For example, crimps may be utilized to transform a flat strip of metal into a curved, circular band that can be shaped into the proper construction to form the support base 30. Various other forms of manufacturing, forming and shaping will be apparent to those skilled in the art.



**[0022]** An alternate embodiment of the invention comprises a water heater support base being formed as an integral extension of the outer jacket. In this embodiment, the base is formed from the same material as the outer jacket and can be formed from the same sheet stock. In a profile view, the support base, the lip and the outer jacket will appear as a single part. The lip is formed as an extension of the outer jacket material. In this alternate embodiment, the outer jacket length is increased over the length shown in previous embodiments. However, since the support base is integral with the outer jacket, the result can be a net material savings. Additionally, manufacturing steps may be simplified.

**[0023]** Thus the invention provides, among other things, a water heater support base that positions and supports a water tank and an outer jacket to provide adequate and uniform insulation space around the water tank and such that the lower end of outer jacket is elevated vertically.

**[0024]** Various features and advantages of the invention are set forth in the following claims.

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CLAIMS:

1. A water heater having:
  - a water tank;
  - a support base for supporting the water tank and an outer jacket, the support
- 5 base comprising:
  - a lip forming an inside portion of the support base;
  - an angled middle portion projecting upwardly from the lip in a non-vertical and non-horizontal direction such that the lip and the angled middle portion intersect to form a trough for positioning and supporting the water tank; and
- 10 a top portion extending in a generally vertical direction from an upper end of the angled middle portion such that the top portion provides support for the outer jacket;
  - wherein the angled middle portion and the top portion intersect to form a support surface for the outer jacket such that a lower edge of the outer jacket is elevated above the intersection of the lip and the angled middle portion.
- 15 2. The water heater of claim 1 wherein at least a portion of the support base is formed with a corrugated shape.
3. The water heater of claim 1 wherein at least a portion of the support base is formed with crimps.
4. The water heater of claim 1 wherein the lip is formed with a corrugated shape.
- 20 5. The water heater of claim 1 wherein the lip is formed with crimps.
6. The water heater of claim 1 wherein the water tank and the outer jacket are spaced apart to form an insulation space.

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7. The water heater of claim 6 wherein the insulation space is filled with insulating foam.

8. The water heater of claim 1 wherein the support base, the lip, the angled middle portion and the top portion are circular.

5 9. A water heater having:

a water tank for storing water;

a device for heating water in the water tank, the tank defining a circular bottom edge;

an outer jacket surrounding the water tank;

10 an annular insulation space between the outer jacket and the water tank;

insulation placed in the insulation space;

a support base for supporting the water tank and the outer jacket, the support base comprising:

a lip forming an inside portion of the support base;

15 an angled middle portion projecting upwardly from the lip in a non-vertical direction such that the lip and the angled middle portion intersect to form a trough for positioning and supporting the bottom edge of the water tank;

a top portion extending in a generally vertical direction from an upper end of the angled middle portion such that the top portion provides support for the outer jacket; and

20 wherein an intersection of the angled middle portion and the top portion so as to form a support surface for the outer jacket such that a lower edge of the outer jacket is elevated above the intersection of the lip and the angled middle portion;

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an intersection of the lip and the angled middle portion to form an interior angle of less than ninety degrees; and

an intersection of the angled middle portion and the top portion to form an interior angle of more than ninety degrees.

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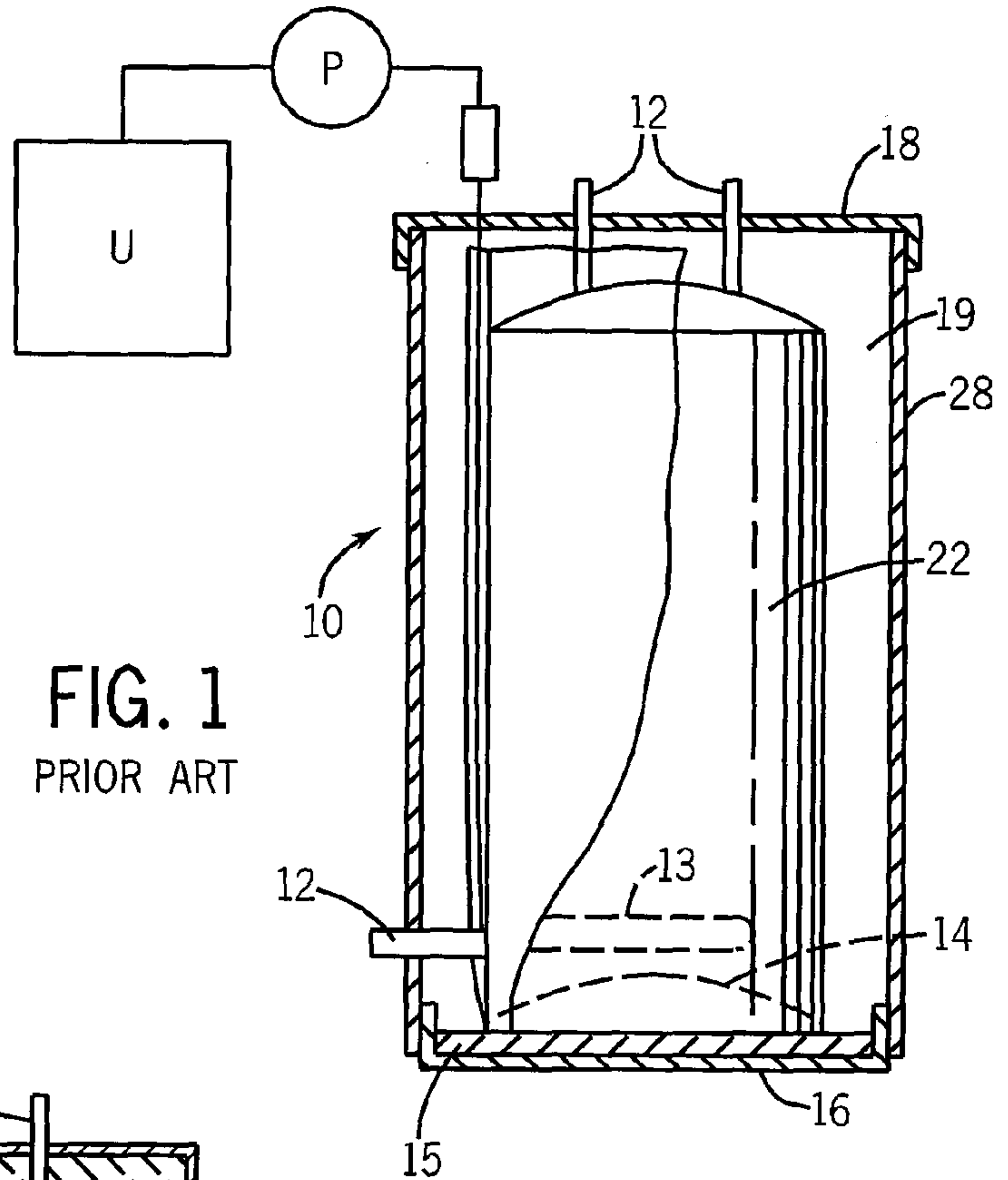


FIG. 1  
PRIOR ART

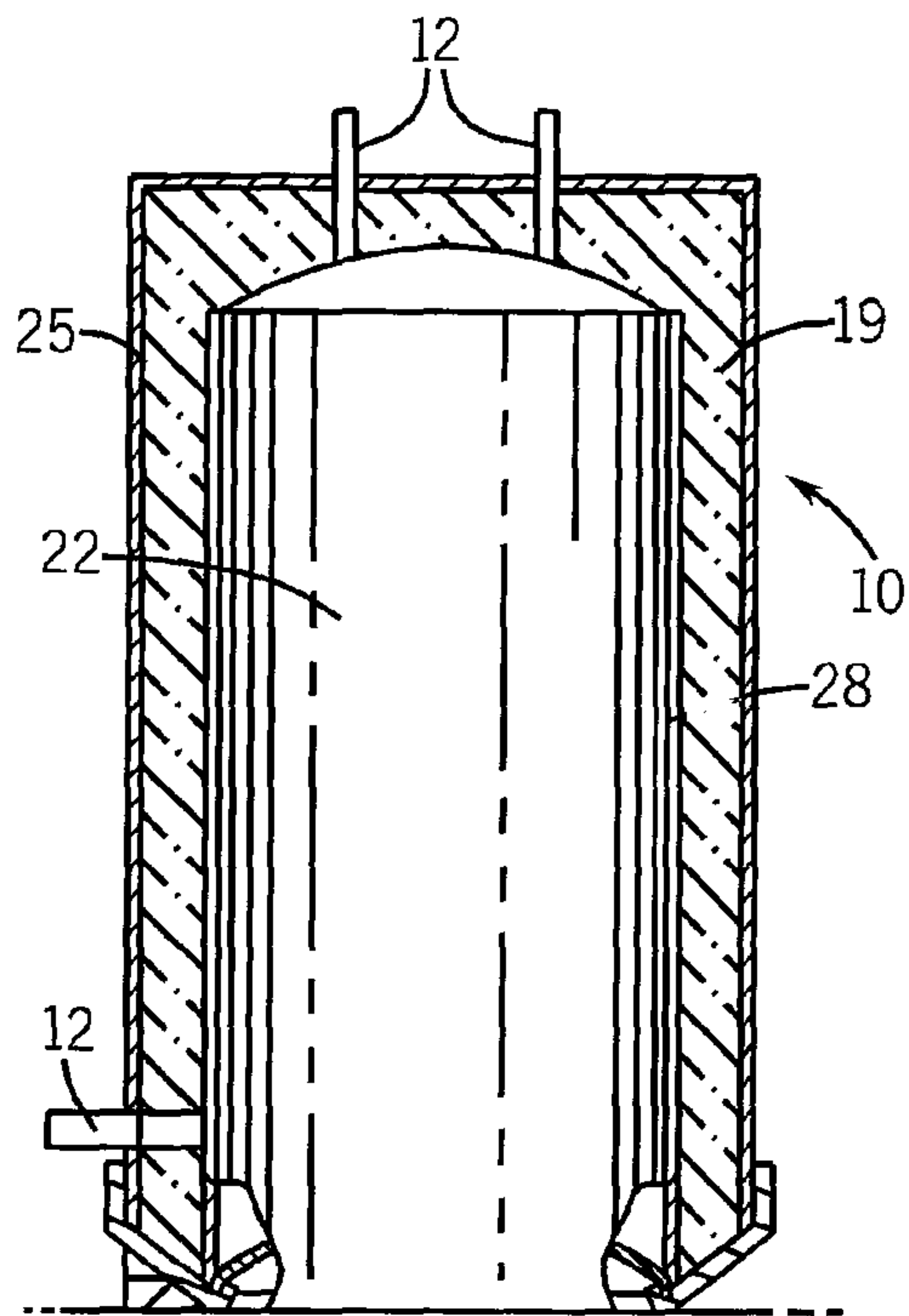
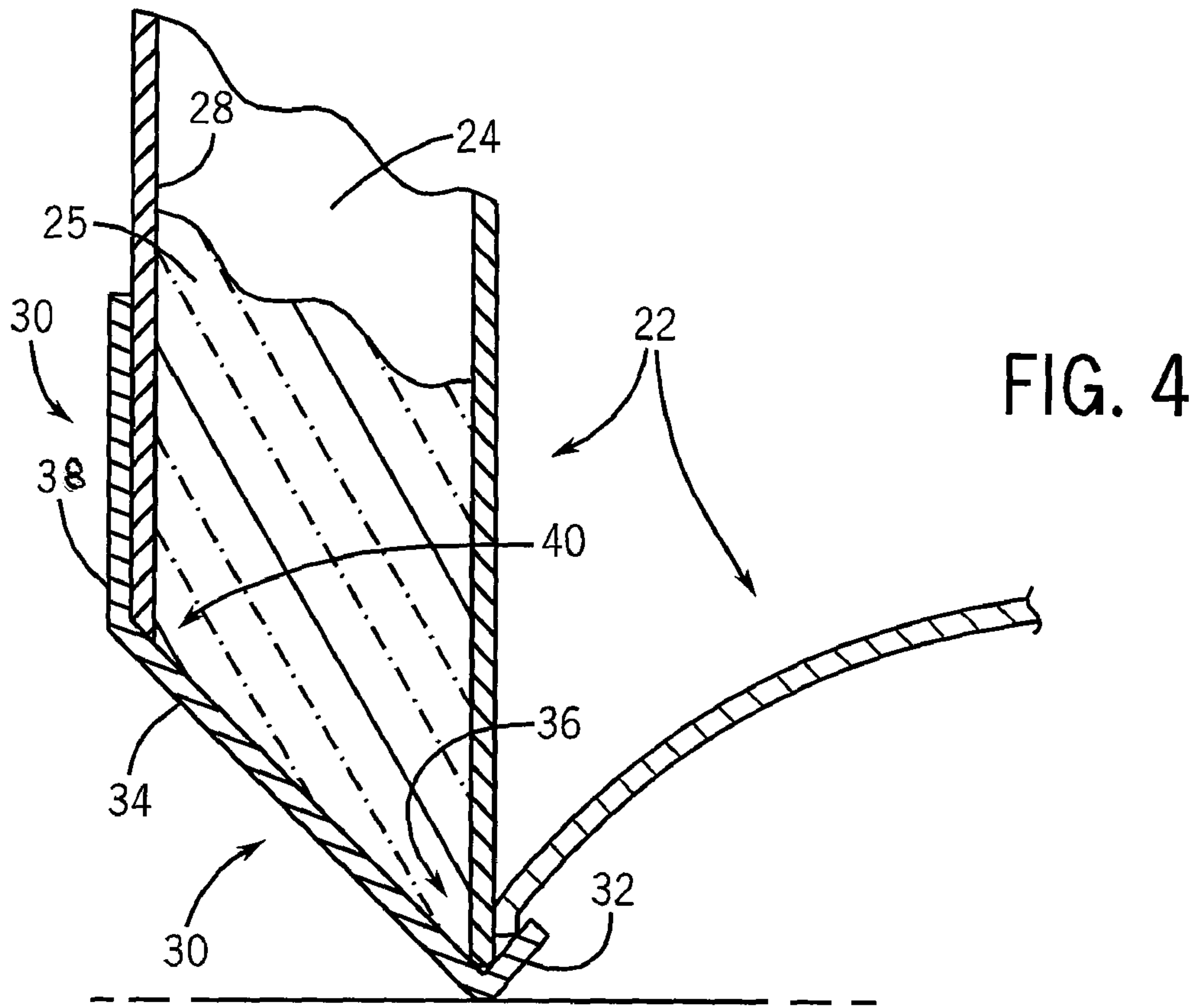
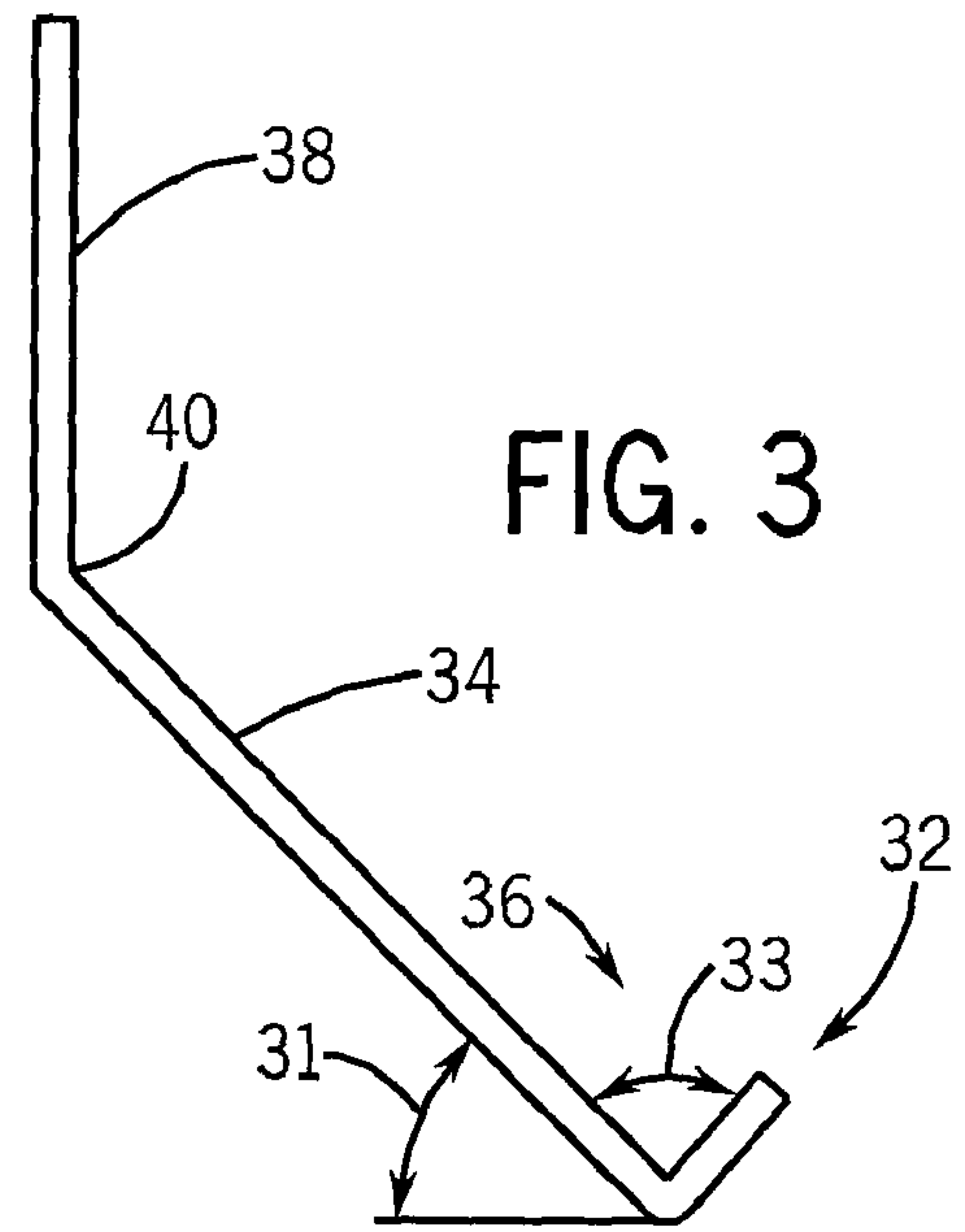


FIG. 2

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3/3

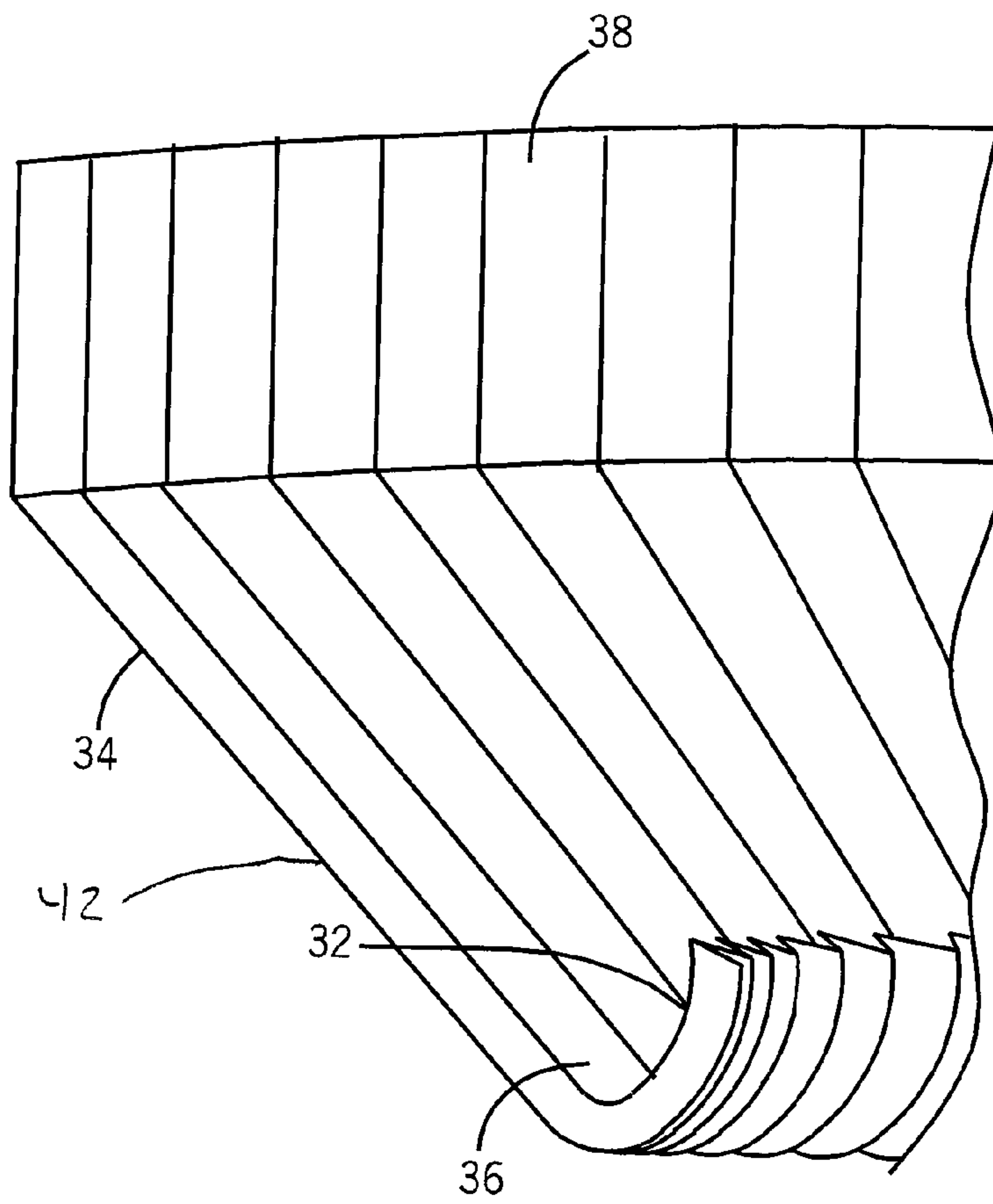


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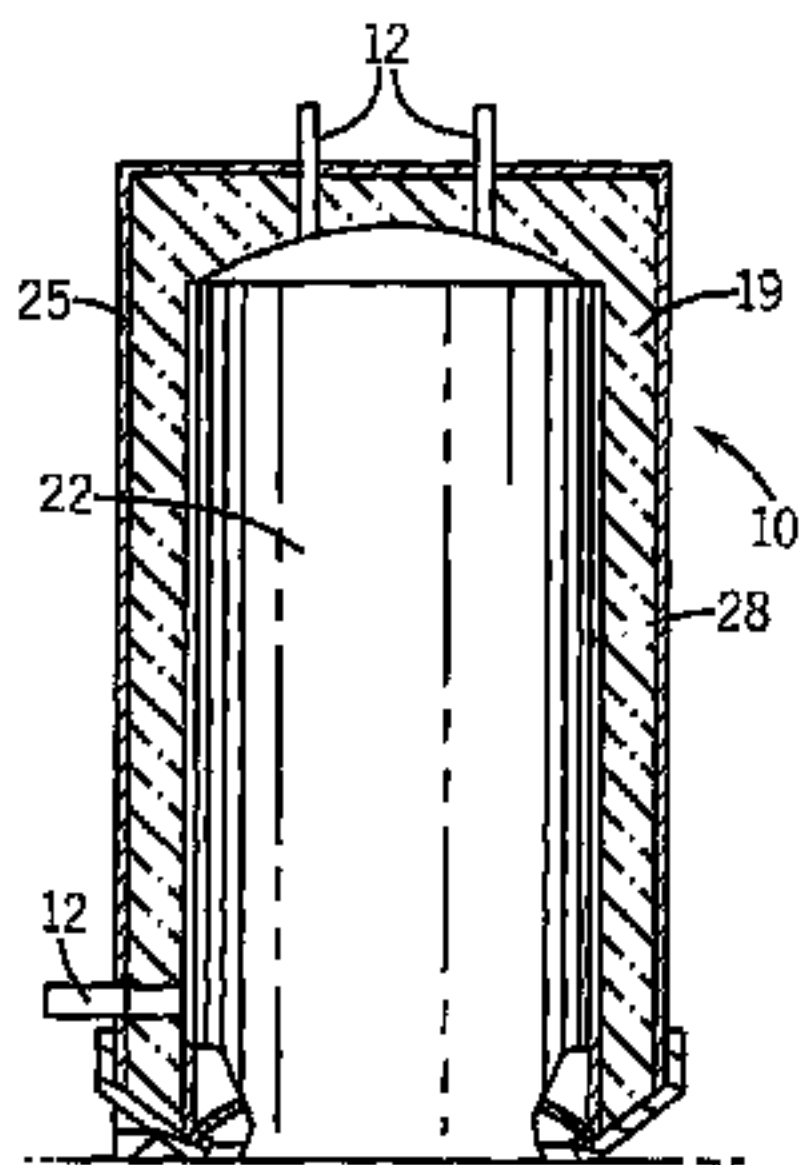


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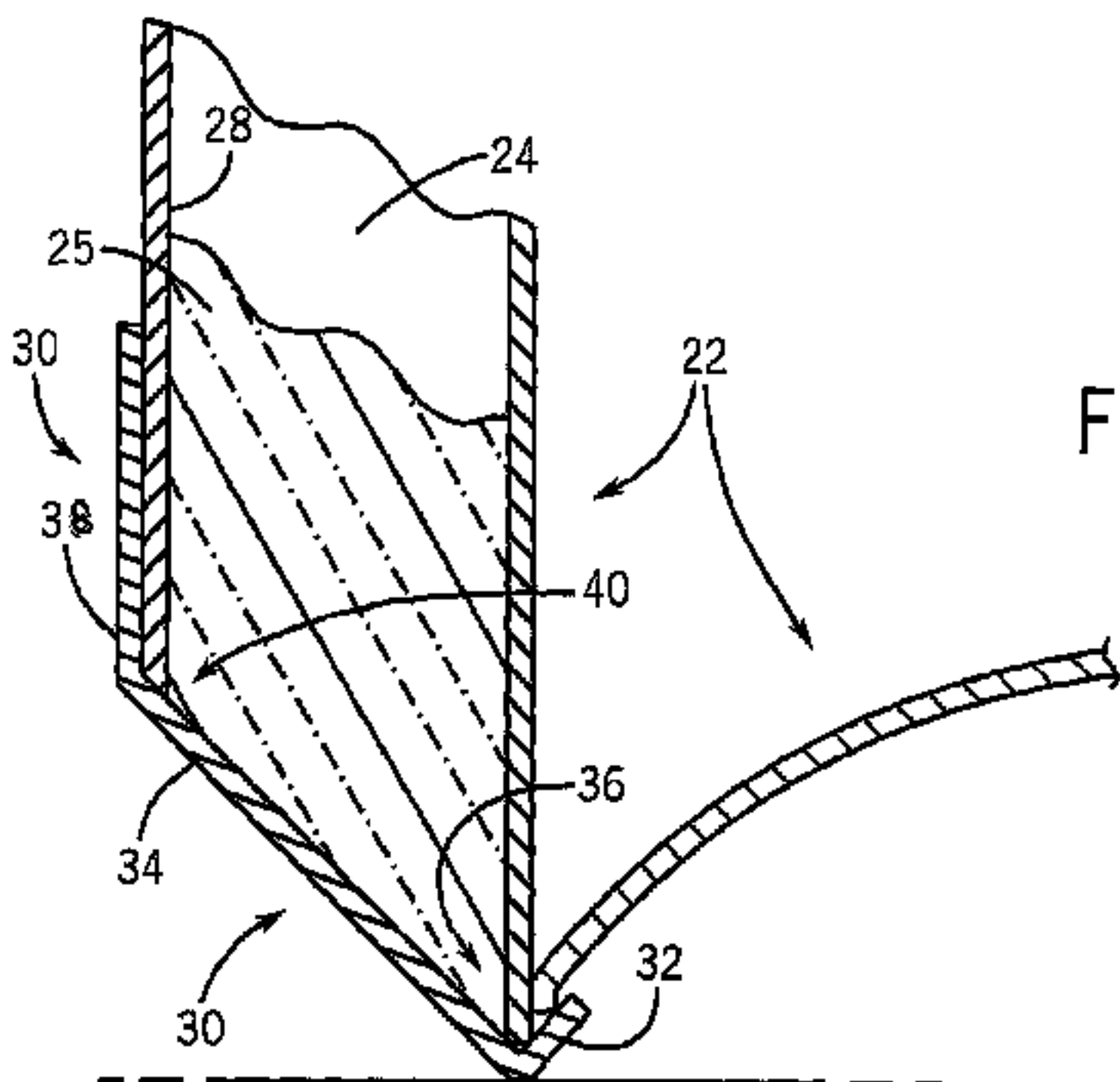


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