



(86) Date de dépôt PCT/PCT Filing Date: 2006/10/24

(87) Date publication PCT/PCT Publication Date: 2007/05/10

(45) Date de délivrance/Issue Date: 2014/05/27

(85) Entrée phase nationale/National Entry: 2008/04/23

(86) N° demande PCT/PCT Application No.: US 2006/060182

(87) N° publication PCT/PCT Publication No.: 2007/053805

(30) Priorité/Priority: 2005/11/01 (US11/265,438)

(51) Cl.Int./Int.Cl. *A47J 31/44* (2006.01)

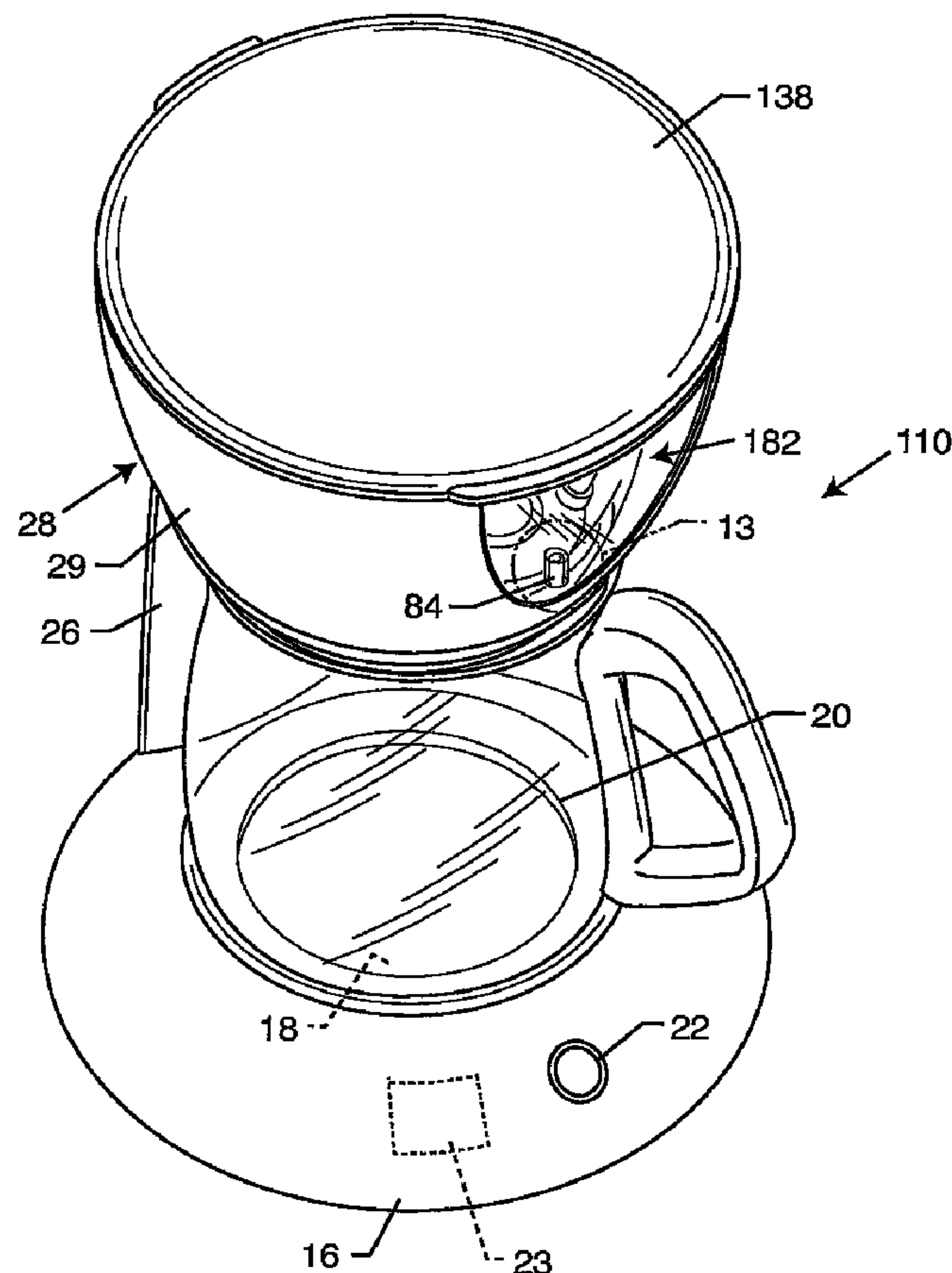
(72) Inventeur/Inventor:
BURROWS, BRUCE D., US

(73) Propriétaire/Owner:
AROMA FRESH, LLC, US

(74) Agent: GOWLING LAFLEUR HENDERSON LLP

(54) Titre : CAFETIERE

(54) Title: COFFEE BREWER



(57) Abrégé/Abstract:

An improved coffee brewer and brewing method are provided for producing brewed coffee with improved flavor. The coffee brewer includes a brew basket having jet ports connected to a source of heated water and positioned to deliver hot water streams into the

(57) **Abrégé(suite)/Abstract(continued):**

brew basket at a location beneath the level of coffee grounds contained therein. These hot water streams turbulently agitate and stir the coffee grounds to produce a substantially fluidized bed of water-borne coffee grounds for improved flavor extraction and enhanced aroma. This fluidized bed is directed against one or more mesh filter elements forming a wall portion of the brew basket for outward passage of the thus-brewed coffee which is then directed into an underlying carafe or the like. In one preferred form, a portion of the brew basket incorporates an illuminated window to permit visual observation of the fluidized bed therein.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
10 May 2007 (10.05.2007)

PCT

(10) International Publication Number
WO 2007/053805 A2

(51) International Patent Classification:

A47J 31/44 (2006.01)

(21) International Application Number:

PCT/US2006/060182

(22) International Filing Date: 24 October 2006 (24.10.2006)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

11/265,438 1 November 2005 (01.11.2005) US

(71) Applicant and

(72) Inventor: **BURROWS, Bruce, D.** [US/US]; 24844 Anza Drive, Valencia, CA 91355 (US).(74) Agents: **LOWRY, Stuart, O.** et al.; Kelly Lowry & Kelley, LLP, Suite 1650, 6320 Canoga Avenue, Woodland Hills, CA 91367 (US).(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,

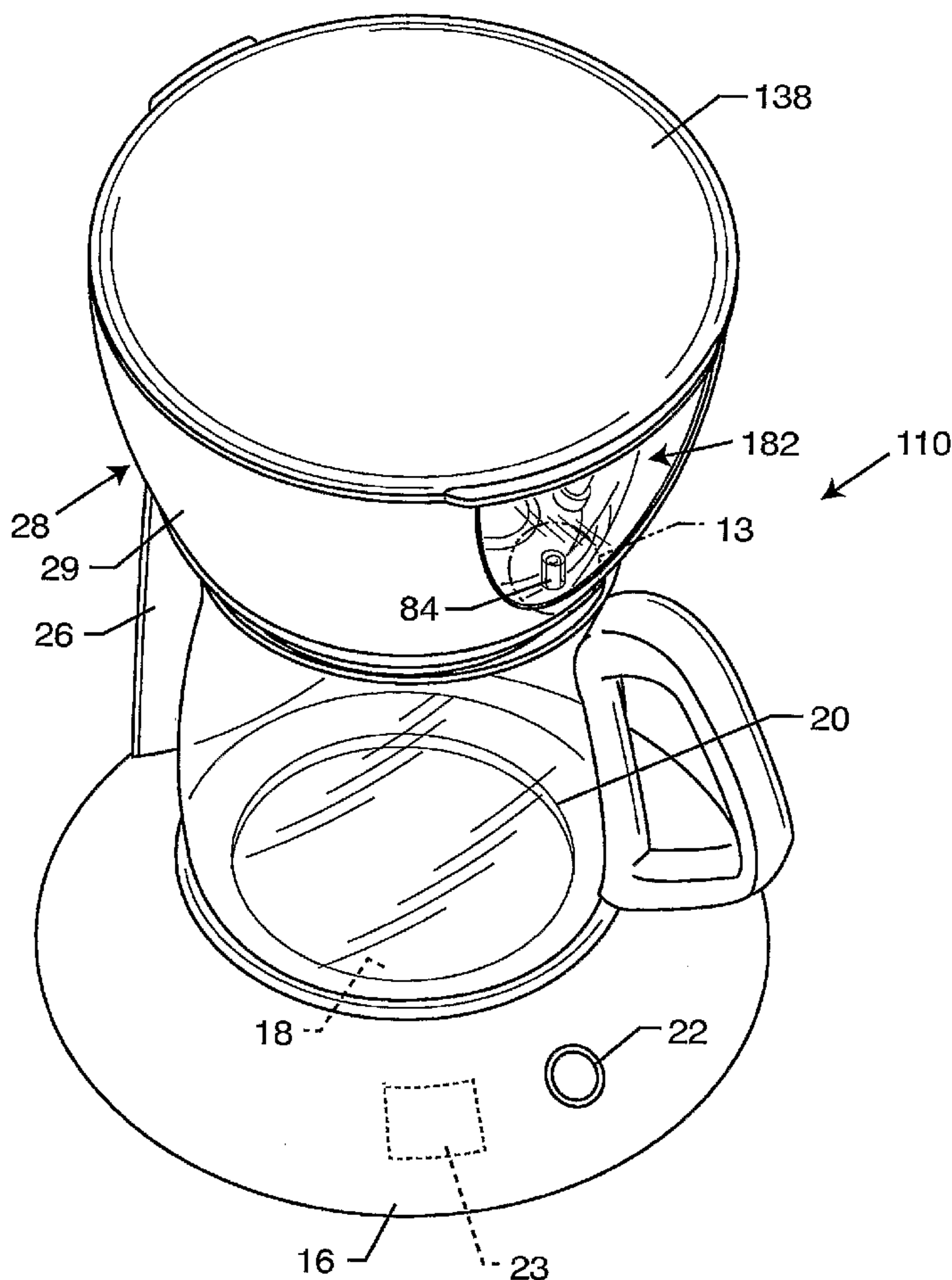
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report**For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: COFFEE BREWER



(57) **Abstract:** An improved coffee brewer and brewing method are provided for producing brewed coffee with improved flavor. The coffee brewer includes a brew basket having jet ports connected to a source of heated water and positioned to deliver hot water streams into the brew basket at a location beneath the level of coffee grounds contained therein. These hot water streams turbulently agitate and stir the coffee grounds to produce a substantially fluidized bed of water-borne coffee grounds for improved flavor extraction and enhanced aroma. This fluidized bed is directed against one or more mesh filter elements forming a wall portion of the brew basket for outward passage of the thus-brewed coffee which is then directed into an underlying carafe or the like. In one preferred form, a portion of the brew basket incorporates an illuminated window to permit visual observation of the fluidized bed therein.

WO 2007/053805 A2

COFFEE BREWER

DESCRIPTION

BACKGROUND OF THE INVENTION

[Para 1] This invention relates generally to improvements in devices and systems for brewing coffee or the like. More particularly, this invention relates to an improved coffee brewer utilizing streams of heated water for turbulently agitating and stirring coffee grounds to produce a substantially fluidized bed of water-borne coffee grounds, to yield brewed coffee having improved flavor and enhanced aroma and other characteristics.

[Para 2] Drip-style coffee brewers are available in a wide range of different configurations and sizes for use in residential or commercial environments to produce brewed coffee. Such coffee brewers commonly include a water reservoir from which a controlled volume of water is heated and then dispensed downwardly by dripping or spraying onto coffee grounds contained within an underlying, upwardly open brew basket. The hot water intermixes with the coffee grounds to produce the desired brewed coffee beverage which is drained from the brew basket through a filter element into an underlying coffee pot such as a carafe or decanter. In one common form, the brewer includes a refillable water reservoir from which the water is delivered through a heating element for

drip-flow dispensing into the brew basket. Alternately, the brewer may be coupled directly to a tap water supply or the like.

[Para 3] While drip-style coffee brewers of the above described type have been used extensively for many years, the flavor and other characteristics of the brewed coffee is inconsistent and, in many cases, can be of marginal or unacceptable quality. Such problems are believed to stem from inadequate and/or inconsistent intermixing of the hot water with the coffee grounds contained in the brew basket, resulting in brewed coffee exhibiting inconsistent flavor and body traits, often including unacceptable bitter taste attributes. In this regard, the downward dispensing of hot water onto the initially dry coffee grounds in the underlying brew basket can produce erosion-type channels through the coffee grounds, wherein such channels can permit a significant portion of the water volume to pass through the coffee grounds and drip from the brew basket without significantly wetting or otherwise adequately intermixing therewith. While this channeling problem can sometimes be mitigated by carefully pre-distributing the coffee grounds substantially uniformly within the brew basket, significant attention to this aspect of the coffee brewing process is seldom given.

[Para 4] A variety of modified coffee brewers and related brewing processes have been provided in an attempt to overcome these problems and disadvantages by providing improved intermixing between the heated water and the coffee grounds within a filtered brew basket. In general, such concepts utilize mechanical stirring devices for improving thorough contact between the

heated water and the coffee grounds. While such concepts may provide brewed coffee with enhanced and/or more consistent flavor characteristics, they inherently incorporate moving parts that increase the overall complexity and cost of the coffee brewer, and are susceptible to occasional break-down to require periodic repair or replacement.

[Para 5] There exists, therefore, a continuing need for further improvements in and to coffee brewers and related coffee brewing processes for achieving significantly improved intermixing between heated water and coffee grounds, for providing brewed coffee of consistent high quality and improved flavor and other desirable attributes, without requiring mechanical stirring devices and their attendant disadvantages. The present invention fulfills these needs and provides further related advantages.

SUMMARY OF THE INVENTION

[Para 6] In accordance with the invention, an improved coffee brewer and brewing method are provided for producing brewed coffee with improved flavor. The coffee brewer includes a removably mounted brew basket having jet ports connected to a source of heated water and positioned to deliver hot water streams into the brew basket at a location for turbulently agitating and stirring coffee grounds contained therein to produce a substantially fluidized bed of water-borne coffee grounds for improved flavor extraction. This fluidized bed is directed against one or more mesh filter elements forming a wall portion of the

brew basket for outward passage of the thus-produced coffee which is then directed into an underlying carafe or the like.

[Para 7] In one preferred form, the coffee brewer includes a water reservoir coupled via a first check valve for flow in heat transfer relation with a heating unit. The heating unit elevates the temperature of the water substantially to the boiling point, whereupon the heated water flows through a second check valve to the brew basket. The heated water flows to and through the jet ports into the interior of the brew basket, with at least some of the jet ports being disposed at a position beneath the level of coffee grounds contained therein. As a result, the heated water is jetted or sprayed into and thoroughly wets the coffee grounds with an agitating and stirring action that is effective to lift, suspend, and turbulently stir the grounds in a manner to produce a substantially fluidized bed of water-borne grounds. In the preferred form, the jet ports are oriented for rotationally stirring the coffee grounds with a substantial spinning or orbital path of motion.

[Para 8] The fluidized bed of water-borne coffee grounds provides improved and consistent intermixing of the heated water with the coffee grounds for enhanced flavor extraction with minimal bitter and/or other undesirable attributes. This spinning fluidized bed is directed by centrifugal action in a generally radially outward direction against an inboard side wall of the brew basket, a portion of which is defined by the mesh filter element or elements which permit outward flow-through passage of the brewed liquid coffee while substantially preventing outward passage of the coffee grounds. The brewed

coffee passed through the filter element or elements is directed further as by gravity flow into an underlying coffee pot such as a carafe or decanter.

[Para 9] In accordance with a further preferred aspect of the invention, a frontal portion of the brew basket side wall comprises a substantially transparent window visible from the exterior of the coffee brewer, when the brew basket mounted is thereon. During a brewing cycle, the spinning fluidized bed of water-borne coffee grounds within the brew basket is thus externally observable.

[Para 10] A light may be provided generally at or inclose proximity to the transparent window, for illuminating the visible brewing process. In a preferred form, the light such as an LED or the like is mounted onto the brewer for slide-fit reception into a pocket or recess formed in the brew basket generally at a lower margin of the basket window, when the brew basket is mounted onto the brewer. The region of the light pocket or recess, or the light itself, may be frosted for improved light dispersal and distribution across the window area. In the preferred form, the light is positioned in an at least slightly spaced relation from an inboard side of the basket window, thereby defining a chamber between the light and window through which a portion of the water-borne coffee grounds may circulate during a brew cycle, with such portion being back-illuminated by the light. The light is turned on at the initiation of the brew process, and may be adapted to turn off at the conclusion of the brew process thereby providing a visual indication that the brew process has been completed.

[Para 11] Other features and advantages of the invention will become more apparent from the following detailed description, taken in conjunction with the

accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[Para 12] The accompanying drawings illustrate the invention. In such drawings:

[Para 13] FIGURE 1 is a side perspective view illustrating a coffee brewer in accordance with the present invention, with a carafe positioned beneath an overlying head of the coffee brewer for drip-flow reception of brewed coffee;

[Para 14] FIGURE 2 is a front perspective view of the coffee brewer of FIG. 1, with the carafe removed;

[Para 15] FIGURE 3 is a top perspective view of the coffee brewer, with a hinged lid on the brewer head disposed in an open position to expose an underlying reservoir for pour-in reception of a volume of water for use in brewing coffee;

[Para 16] FIGURE 4 is another top perspective view similar to FIG. 3, but depicting additional removal of a brew basket and cap therefore, to expose an upwardly open cavity on the brewer head for removably supporting the brew basket;

[Para 17] FIGURE 5 is another top perspective view similar to FIG. 4, but showing further removal of an upper housing member of the brewer head, to exposed underlying water flow conduits;

[Para 18] FIGURE 6 is an exploded perspective view of the coffee brewer;

- [Para 19] FIGURE 7 is a top perspective view of the brew basket;
- [Para 20] FIGURE 8 is a bottom perspective view of the brew basket;
- [Para 21] FIGURE 9 is a top plan view of the brew basket;
- [Para 22] FIGURE 10 is a vertical sectional view taken generally on the line 10-10 of FIG. 9;
- [Para 23] FIGURE 11 is an enlarged fragmented sectional view showing a jet port in accordance with one preferred form of the invention, wherein heated water is jetted through the jet port into the brew basket;
- [Para 24] FIGURE 12 is perspective view showing the top and front sides of a coffee brewer constructed in accordance with one alternative preferred form of the invention;
- [Para 25] FIGURE 13 is an enlarged fragmented perspective view corresponding with the encircled region 13 of FIG. 12;
- [Para 26] FIGURE 14 is a top and front perspective view similar to FIG. 12, but showing a hinged upper lid on the brewer in an open position for pour-in reception of a volume of water for use in brewing coffee, and also showing a hinged brew basket cap in an open position;
- [Para 27] FIGURE 15 is a top and front perspective view similar to FIG. 14, but illustrating the brew basket in exploded relation with the brewer;
- [Para 28] FIGURE 16 is an enlarged top perspective view of the brew basket shown in FIGS. 14-15;
- [Para 29] FIGURE 17 is a top plan view of the brew basket of FIG. 16;

[Para 30] FIGURE 18 is a front elevation view of the brew basket of FIGS. 16–17;

[Para 31] FIGURE 19 is a right side elevation view of the brew basket of FIGS. 16–18;

[Para 32] FIGURE 20 is an enlarged fragmented vertical sectional view taken generally on the line 20–20 of FIG. 17;

[Para 33] FIGURE 21 is a top and front perspective view similar to FIG. 14, but illustrating a further alternative preferred form of the invention;

[Para 34] FIGURE 22 is a schematic diagram depicting one preferred form including a light circuit and sensor for controlling illumination of a light associated with the brew basket; and

[Para 35] FIGURE 23 is an enlarged fragmented and somewhat schematic sectional view depicting an alternative form of the sensor.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[Para 36] As shown in the exemplary drawings, an improved coffee brewer referred to generally in FIGURES 1–6 by the reference numeral 10 is provided for rapid and consistent high quality brewing of coffee. The coffee brewer 10 includes a brew basket 12 (FIGS. 4–10) for receiving a selected quantity of ground coffee (not shown). In accordance with a primary aspect of the invention, the brew basket 12 is adapted for connection to a source of heated water, and includes at least one and preferably a plurality of jet ports 14 (FIGS. 7 and 9–11) positioned for agitating and turbulently stirring the coffee grounds to produce a

substantially fluidized bed of suspended and water-borne coffee grounds within the brew basket 12. This fluidized bed results in substantially improved and intimately thorough wetting contact and intermixing between the hot water and the coffee grounds, for achieving enhanced flavor extraction to consistently produce a high quality, fuller-bodied and more robust coffee beverage.

[Para 37] The improved coffee brewer 10 of the present invention is shown generally in one preferred form in FIGS. 1-6. As depicted, the coffee brewer 10 comprises a relatively compact base 16 having a platen 18 formed or carried thereon with a size and shape suitable for secure rested support of a coffee pot 20 such as a carafe or decanter or the like. An on-off button 22 is exposed at a front side of the base 16 and may be depressed manually when brewing of a pot of coffee is desired, as will be described in more detail. A power cord 24 (FIG. 1) protrudes rearwardly from the base 16 for connecting the brewer 10 to a suitable electrical power source.

[Para 38] A support post 26 extends upwardly from a rear side of the base 16 to support an upper brewer head 28 in a position generally cantilevered over the upwardly open coffee pot 20 supported on the base platen 18. In general terms, the brewer head 28 comprises a relatively compact housing structure defining a water reservoir 30 (FIGS. 3-4) for receiving a selected volume of water for use in brewing a pot of coffee, in combination with an upwardly open cavity 32 (FIGS. 4-6) for removably supporting the brew basket 12. Upon depression of the on-off button 22, water within the reservoir 30 is delivered in heat exchange relation with a heating unit 34 shown mounted within the base 16 as viewed in

FIG. 6, and further to the brewer basket jet ports 14 for delivery into the interior of the brew basket 12 in the form of a plurality of pressurized or jetted hot water streams. These hot water jets turbulently stir and intermix with coffee grounds contained within the brew basket 12 to produce the fluidized bed or suspension of coffee grounds within a spinning and swirling body of water within the brew basket, to produce the improved, high quality, and consistent coffee beverage in accordance with the invention. It is believed that the circulating particulate grounds produce an increased proportion of relatively microscopic fines due to abrading action during circulation. This coffee beverage is filtered and delivered from the brew basket to the underlying coffee pot or carafe 20, ready for immediate use and enjoyment. In the filtered state, a substantial proportion of the small fines remain in the coffee beverage wherein such fines contribute to the rich coffee flavor.

[Para 39] More particularly, as shown in more detail in FIGS. 3-6, the illustrative brewer head 28 includes an upper housing bowl 29 with an internal, generally vertically oriented divider wall 36 subdividing the brewer head 28 into the upwardly open water reservoir 30 occupying a rearward region of the head 28, and the brewer basket cavity 32 at a forward region of the head 28. A rear hinged lid 38 is provided on the brewer head 28 for normally closing the water reservoir 30, but this lid 38 is adapted for quick and easy pivoting movement to an open position (as viewed in FIGS. 3-4) to permit a selected volume of water to be poured into the reservoir 30. In a typical residential coffee maker, the reservoir 30 may be sized for receiving a standardized volume of water, such as a

water volume sufficient to brew a standardized volume of coffee, such as 8, 10 or 12 cups. Alternately, the brewer head 28 may include volumetric gradation marks (not shown) indicating the volume of water contained therein, to facilitate brewing of different selected volumes of coffee. As a further alternative, persons skilled in the art will recognize and appreciate that the coffee brewer 10 may be connected directly to a tap water source or the like, in lieu of the reservoir 30 for pour-in reception of a selected water volume.

[Para 40] The upper housing bowl 29 defining the water reservoir 30 is mounted on a lower housing shell 39 (shown best in FIGS. 5-6) which is supported at an upper end of the support post 26 in cantilevered relation spaced above the base 16. Water within the reservoir 30 is coupled through a port 40 formed in a bottom wall of the upper bowl 29 (FIG. 6) to an underlying receiver 44 which is mounted on the lower shell 39 within a compartment 46 defined cooperatively between the upper bowl 29 and lower shell 39. This receiver 44 may include a spring-loaded valve positioned for engagement by the upper bowl 29 for movement to an open position permitting downward water flow from the reservoir 30, when the upper bowl 29 is mounted on the lower shell 39. Such downward water flow proceeds through the receiver 44 and further through a short supply conduit 48 (FIGS. 5-6) which couples the water downflow to a passage 50 formed in the support post 26 and further to the heating unit 34. A first check valve 45 (FIG. 6) is mounted along this passage 50 within the support post 26 to permit water downflow, but to prevent upward backflow from the heating unit 34 toward the reservoir 30.

[Para 41] The heating unit 34, although depicted generally in FIG. 6 by dotted lines, comprises a standard dual pathway device of the type known in the art for use in coffee brewers. In particular, the heating unit 34 incorporates an electrical resistance heating element mounted within one annular pathway and disposed in heat transfer relation with water flow through an adjacent annular pathway. One exemplary dual pathway heating unit of this general type is shown and described in U.S. Patent 4,070,956. With this construction, the water downflow through the post passage 50 is circulated through the water pathway of the heating unit 34 which heats the water substantially to boiling. A downstream end of the water pathway through the heating unit 34 is coupled to a second flow passage 52 (FIG. 6) for upward or return flow to the brewer head 28.

[Para 42] The upward return flow passage 52 through the support post 26 delivers the heated water through a short transition conduit 54 to an inverted, generally U-shaped turn 56 positioned within the water reservoir 30 and disposed at least slightly above a maximum fill level of the reservoir. This inverted and elevated conduit turn 56 prevents water within the reservoir 30 from draining past the turn 56 when the reservoir is filled with water. A downstream end of the inverted conduit turn 56 is coupled by an additional supply conduit 58 to a second check valve 60 mounted at the underside of the upper bowl 29 to permit one-way flow-through passage of water from the supply conduit 58 to brew basket 12, but prevents backflow of water to the conduit 58.

[Para 43] More particularly, the second check valve 60 is positioned in aligned relation with an inflow port 62 (FIGS. 3 and 6) formed in the bottom wall of the upper housing bowl 29, at a location generally centered within the brew basket cavity 32. In this regard, as shown best in FIGS. 8 and 10, the brew basket 12 includes a downwardly open feed port 64 having a size and shape for seated reception on the underlying inflow port 62, when the brew basket 12 is positioned within the brew cavity 32. This feed port 64 communicates water inflow from the second check valve 60 to the jet ports 14 of the brew basket 12.

[Para 44] The brew basket 12 may comprise a generally bowl-shaped component constructed primarily from lightweight molded plastic or the like, to provide a generally upwardly open geometry defined by a bottom wall 66 joined to an upstanding side wall 68 of generally cylindrical configuration. The bottom wall 68 is formed to include the downwardly open feed port 64 for communicating hot water inflow upwardly into a false bottom or plenum chamber 70 (FIG. 10) which distributes the hot water flow to at least one and preferably a plurality of hollow ribs 72 formed in the side wall 68. In the preferred configuration as shown, three of said hollow ribs 72 are formed in the side wall 68 at approximate 120° intervals, and each of these ribs 72 includes a closed upper end and has at least one and preferably multiple jet ports 14 formed along the height thereof for jetting hot water streams into the interior of the brew basket 12. FIGS. 6-7 and 9-10 illustrate each hollow rib 72 with a pair of vertically spaced jet ports 14 positioned and aimed for jetting water streams

generally tangentially in a common swirling direction (clockwise, as viewed in FIG. 9) into the brew basket interior.

[Para 45] At least the lower jet ports 14 on the hollow ribs 72 are positioned at a level below a normal level or upper surface of a bed of dry coffee grounds placed into the brew basket 12 for brewing coffee, as indicated approximately by the dotted line 74 in FIG. 10. Thus, when the hot water is jetted through the jet ports 14, at least a portion of the hot water stirs and agitates the body of coffee grounds to initiate a swirling or spinning action to create the fluidized bed of water-borne coffee grounds. That is, upon initial supply of hot water into the brew basket 12, water passing through the lower jets 14 stirs and agitates the initially dry coffee grounds, whereas the upper jets may be disposed above the upper surface of the coffee grounds and thereby initially spray onto and wet that upper surface. As hot water flow continues, the brew basket 12 gradually fills substantially with water, while the agitating and stirring action of the lower jets continues. As the brew basket fills with water, the water level eventually increases to a point higher than the upper jets 14, as indicated approximately by the dotted line 76 in FIG. 10, whereby the upper and lower jets 14 cooperatively stir and agitate the combined body of coffee grounds and water to suspend and swirl the coffee grounds in the form of a water-borne fluidized dispersion. Such action exposes the entire volume of the coffee grounds to the heated water thoroughly and substantially uniformly, and for substantially for the entire period of the brew cycle, to result in a significantly improved and consistently high quality brewed coffee beverage. A removable cap 77 is normally provided to

close the top of the brew basket 12 and thereby prevent undesired spilling of water or coffee grounds therefrom during the brewing procedure.

[Para 46] In one preferred form as illustrated in FIG. 11, the jets ports 14 formed along the hollow ribs 72 of the brew basket 12 may be designed for minimizing or eliminating undesirable inflow or ingestion of particle-laden coffee when the supply of hot water to the jet ports 14 terminates. As shown in FIG. 11, each jet port 14 can be shaped to define a tapered profile with a cross sectional size that reduces toward a downstream or discharge end thereof, in combination with a filter screen 15 which can be formed as by in-place plastic molding generally at an upstream or inlet end of the jet port 14. Upon supply of hot water to the jet port, the water passes freely through the filter screen 15 and then outwardly through the jet port 14 at a substantial velocity for intermixing with the coffee grounds within the brew basket. Upon cessation of the hot water flow, any particulate grounds which may flow or be drawn into the jet port 14 are collected on the downstream side of the filter screen 15, where they cannot clog internal flow passages of the coffee maker apparatus. Instead, such collected grounds are retained on the screen 15 where they are hydraulically delivered back into the brew basket 12 during a subsequent brew cycle. Alternative structures for capturing ingested coffee grounds and/or for preventing backflow of such coffee grounds into and/or through the jet ports 14 will be apparent to persons skilled in the art.

[Para 47] The thus-produced fluidized bed is swirled by centrifugal action against the inboard side of the brew basket side wall 68, a portion of which is

defined by one or more mesh or mesh-like filter elements 78. Such filter elements 78 are supported by the brew basket 12 in slightly spaced relation to the adjacent divider wall 36 to define a flow pathway for brewed coffee to pass therebetween to a drip outlet port 79 (FIG. 6) formed in the upper bowl 29 and an underlying drip outlet port 80 (FIGS. 5-6) formed in the lower shell 39. This latter outlet port 80 is positioned over the upwardly open coffee pot 20, whereby the brewed coffee flows downwardly for collection within the pot 20.

[Para 48] As viewed in FIGS. 1-6, the brew basket cavity 32 formed in the upper housing bowl 29 may intersect and thereby interrupt a forward region of the bowl 29, to form an arcuate recess 83 to expose a frontal portion or segment 82 of the brew basket 12 at a front side of the brewer head 28. In this regard, this exposed frontal segment 82 of the brew basket 12 is desirably formed from a transparent or partially transparent material to permit visual observation of the swirling and spinning fluidized bed during the brewing procedure. A lower margin of the recess 83 in the upper bowl 29 is disposed above the drip outlet port 79. The removable cap 77 may also be formed from a transparent or partially transparent material.

[Para 49] In use, to brew a pot of coffee, a selected volume of water is poured into the water reservoir 30, and the brew basket 12 containing a selected quantity of ground coffee is placed into the associated brew basket cavity 32 in the brewer head 28. A portion of the water within the reservoir 30 will flow downwardly through the first check valve 45 to fill the associated pathway within the heating unit 34. Then, upon depression of the on-off button 22, the heating

unit 34 is energized to raise the temperature of the water therein substantially to boiling, resulting in pressure-forced pumping the hot water upwardly through the inverted and elevated inverted conduit turn 56 and further through the second check valve 60 to the jet ports 14 within the brew basket 12. This upwardly pumped water is replaced by continued water downflow from the reservoir 30, for heating by the heating unit 34, until the reservoir 30 reaches a substantially empty condition. The hot water is jetted into the interior of the brew basket 12 via the jet ports 14, as described, to generate the swirling turbulent fluidized bed of water-borne coffee grounds. The thus-brewed coffee is filtered through the mesh filter elements 78 for delivery into the underlying pot 20, wherein the brewed coffee may be retained in a heated state by suitably controlling the heating unit 34 for heating the platen 18. Alternately, the heating unit 34 may be designed to de-activate and the brewed coffee may be retained within an insulated decanter. Following this brew cycle, the brew basket 12 may be removed from the brewer head 28 for appropriate cleaning and discarding of the spent coffee grounds retained on the filter elements. Thereafter, the brew basket 12 may be refilled with coffee grounds for a subsequent brew cycle.

[Para 50] The improved coffee brewer 10 of the present invention thus produces brewed coffee by means of intimately thorough and consistent intermixing between the hot water and coffee grounds, to produce a coffee beverage of repeatable high quality taste and other characteristics. In addition, because the heated water passes directly into the coffee grounds, the resultant steam rising from the fluidized bed is believed to carry enhanced or intensified

coffee aroma, thereby producing an enhanced of more enjoyable coffee brewing experience.

[Para 51] FIGS. 12-20 depict a modified coffee brewer 110 constructed in accordance with one alternative preferred form of the invention. For sake of clarity and ease of description, components common to those shown and described in FIGS. 1-11 are identified by common reference numerals, whereas modified components which correspond generally in terms of function with those shown and described in FIGS. 1-11 are identified by common reference numerals increased by 100. In general terms, the modified coffee brewer 110 of FIGS. 12-19 includes an externally visible light 84 positioned generally within a transparent frontal segment 182 or front window for illuminating the visible brewing process.

[Para 52] More particularly, the modified coffee brewer 110 generally comprises a lower support base 16 defining a platen 18 for removably supporting a coffee pot 20. The pot 20 is positioned beneath an upper brewer head 28 mounted on an upstanding support post 26. An on-off button or switch 22 is provided on the front of the support base 16 for initiating a brew cycle.

[Para 53] The upper brewer head 28 comprises an upwardly open housing bowl 29 carrying a hinged lid 138 for normally closing and covering the otherwise open top of the bowl 29, as viewed in FIG. 12. The hinged lid 138 can be pivoted upwardly to an open position, as viewed in FIGS. 14-15, to expose the bowl interior which includes a central divider wall 36 separating the bowl interior into a rearwardly disposed water reservoir 30 and a forwardly disposed brew

basket cavity 32. A hinged cap 177 is shown for normally closing and covering the brew basket cavity 32. A modified brew basket 112 is removably seated within this cavity 32, for supporting a selected quantity of ground coffee in the course of a coffee brewing cycle. Importantly, in this modified embodiment, water from the reservoir 30 is coupled through an appropriate heating element for delivery via an inflow port 62 (FIG. 15) to the brew basket 112, in the same manner as shown and described previously herein with respect to FIGS. 1-11.

[Para 54] As shown in FIGS. 12-15, the light 84 is positioned generally at the front of the brew basket cavity 32, generally centered at a lower margin of the front-open arcuate recess 83. The light 84 comprises a relatively small light element preferably such as an LED upstanding a short distance at this lower margin of the recess 83. In one preferred form, the light 84 incorporates a translucent bulb body such as a frosted bulb for providing broad and relatively uniform dispersal of generated light energy, substantially without providing a sharp point of light. Alternately, persons skilled in the art will appreciate that a non-frosted bulb may also be used. Persons skilled in the art will also recognize that a variety of different light sources may be used, including but not limited to incandescent bulbs and the like.

[Para 55] The brew basket 112 (FIGS. 15-19) is generally constructed as previously shown and described to include an underside feed port (not shown) for registry with the inflow port 62 when the brew basket 112 is seated within the cavity 32 for a brew cycle. Hot water from the inflow port 62 thus enters a false bottom or plenum chamber (also not shown) of the brew basket 112, for

flow further to and upwardly through a plurality of upstanding hollow ribs 72 each having at least one and preferably multiple jet ports 14 formed therein. As previously described, these jet ports 14 deliver the hot water in jetted streams into the brew basket interior for turbulently agitating and stirring the coffee grounds during a brew cycle. At least one and preferably a plurality of these jet ports 14 are disposed below the surface level of the coffee grounds contained within the brew basket, as previously shown and described.

[Para 56] The frontal segment 182 of the brew basket 112 comprises a forwardly protruding structure having a size and shape for substantially seated reception within the arcuate recess 83. Accordingly, this frontal segment 182 defines a generally U-shaped shoulder 88 which protrudes forwardly from the otherwise generally truncated conical profile of the brew basket 112. A forward margin of this shoulder 88 is joined to a substantially transparent front window 89 of the frontal segment 182, whereas a rearward margin of the shoulder 88 is joined to the rearwardly-disposed truncated conical portion of the brew basket which includes mesh-type filter elements or segments 78 through which brewed coffee may flow outwardly and drain downwardly into the underlying coffee pot 20 as previously shown and described in FIGS. 1-11.

[Para 57] The U-shaped shoulder 88 of the forwardly protruding frontal segment 182 defines a relatively small, downwardly open pocket 90. This pocket 90 is positioned, and has a size and shape, for sliding reception of the upstanding light 84, when the brew basket 112 is mounted within the brew cavity 32. As viewed in FIG. 20 in accordance with a preferred construction, this pocket

90 is spaced rearwardly at least a short distance from an inboard side of the transparent window 89, thereby defining a chamber 91 therebetween, so that a portion of the water-borne coffee grounds may flow or circulate through this chamber 91, *i.e.*, between the window 89 and the light-containing pocket 90. In this position, when energized, the light 84 illuminates or back-lights the transparent window 89 thereby also illuminating and back-lighting the portion of the water-borne coffee grounds circulating between the light and the window to render the brewing process externally visible. When a non-frosted light 84 is used, the region of the basket defining the pocket 90 is preferably frosted for improved and relatively even light distribution.

[Para 58] As previously noted, this brew process includes multiple water jets oriented for turbulently stirring the coffee grounds during the brew cycle, for purposes of achieving improved extraction of coffee flavor. When the brew cycle is initiated as by depression of the on-off button 22, a control circuit 23 (FIG. 12) energizes the light 84. Upon completion of the brew cycle, as indicated by a cessation of jetted water inflow to the brew basket 112, the control circuit 23 may be adapted to turn the light 84 off thereby indicating brew cycle completion.

[Para 59] FIGURE 21 shows a further alternative preferred form of the invention, wherein components identical to those shown and described in FIGS. 12-20 are referred by common reference numerals, and further wherein modified but otherwise functionally similar components are referred to by reference numerals increased by 100. As shown, a light 84 is carried on the lower end of a post 92 depending from a modified hinged cap 277 for closing the brew basket

cavity 32 during a brew cycle. The light 84 in FIG. 21 is suitable coupled to the control circuit 23 for on-off regulation in the same manner as previously shown and described with respect to FIGS. 12-20. In particular, during a brew cycle, the light 84 in FIG. 21 is spaced rearwardly from an inboard side of the transparent front window 89 on the brew basket 112, thereby permitting at least some of the water-borne coffee grounds to circulate between the light 84 and the window 89 during brewing. Such circulating grounds are thus back-lighted for easy external viewing. The light 84 may be frosted, or otherwise positioned within a frosted pocket defined at a distal end of the post 92.

[Para 60] FIGURE 22 is a schematic diagram showing the coffee brewer of FIGS. 12-21 in association with the control circuit 23. As shown, water from the reservoir 30 flows through the pair of check valves 45 and 60 disposed at opposite sides of the heating unit 34 for supply as hot water jets into the interior of the brew basket 110 as previously shown and described. Such water flow is initiated upon depression of a suitable on-off switch or button 22 adapted to couple electrical power to the heating unit 34, and also through a light control circuit 94 to the light 84. Illumination of the light 84 can be responsive to a suitable sensor 96 such as temperature sensor for detecting the presence of hot water flow from the second check valve 60 and through the conduit 58 to the brew basket. Suitable sensor forms may include a thermistor, or a bimetal thermal sensor, or the like. When heater water flow is initiated and detected by the sensor 96, the light 84 is illuminated by the light control circuit 94. When the brew cycle is complete, and hot water flow past the sensor 96 thus stops, the

sensor will detect a reduced temperature and thereupon signal the light control circuit 94 to extinguish the light 84 thus providing a visible indication that the brew process has been finished.

[Para 61] In a further alternative form as viewed in FIG. 23, a modified sensor 196 may be provided in the form of a float element 97 carrying a magnet 98 or the like in close proximity with a magnetic reed switch 296 coupled to the light control circuit 94. In this embodiment, upon initiation of hot water flow to the brew basket 110, the float element 97 is carried upwardly along the flow conduit 58 thereby displacing the magnet 98 relative to the reed switch 296 resulting in switch movement indicative of said hot water flow. The reed switch 296 thus signals the light control circuit 94 which responds by energizing the light 84. Subsequently, when the hot water flow ceases, the float element descends within the conduit for reversing the state of the reed switch 296, which thereupon signals the light control circuit 94 to de-energize the light 84. Suitable stops 101 and 103 may be provided along the conduit for defining end limits of float movement therein.

[Para 62] A variety of further modifications and improvements in and to the coffee brewer of the present invention will be apparent to those persons skilled in the art. Accordingly, no limitation on the invention is intended by way of the foregoing description and accompanying drawings, except as set forth in the appended claims.

We Claim:

1. A coffee brewer, comprising:

a brew basket for receiving a quantity of ground coffee;

at least one water inflow port for introducing at least one hot water stream into said brew basket for contacting the ground coffee to produce brewed coffee; said brew basket further including a substantially transparent window to permit visual observation of the ground coffee contained therein;

a light for illuminating at least a portion of said brew basket for external viewing through said window; and

at least one filter element for passage of the brewed coffee substantially without passage of the ground coffee; said at least one water inflow port being positioned for introducing said at least one hot water stream into the brew basket at a location within the ground coffee contained therein, whereby the at least one hot water stream agitates and stirs the ground coffee, said transparent window and said light accommodating external viewing of the water-agitated ground coffee during a brew cycle; said light being spaced at least a short distance from said window and cooperating therewith to define a chamber therebetween for receiving a portion of the water-agitated coffee grounds during the brew cycle, said light back-illuminating said portion of the water-agitated coffee grounds.

2. The coffee brewer of claim 1 wherein said at least one filter element defines a wall portion of said brew basket.
3. The coffee brewer of claim 1 further including a brewer head defining a brew cavity for removably receiving and supporting said brew basket.
4. The coffee brewer of claim 3 wherein said brew cavity further defines a forwardly open geometry with a generally U—shaped arcuate recess, said light being positioned generally at a lower margin of said arcuate recess.
5. The coffee brewer of claim 4 wherein said brew basket includes a frontal segment including a forwardly protruding shoulder having a size and shape for seated reception generally within said arcuate recess, and a substantially transparent front window, said shoulder further defining a pocket for slide-fit reception of said light, said pocket being spaced at least a short distance from said window and cooperating therewith to define a chamber therebetween, said light back-illuminating said chamber.
6. The coffee brewer of claim 5 wherein said pocket is translucent.
7. The coffee brewer of claim 1 wherein said brew basket is upwardly open, and further including a cap movable between an open position to permit coffee

grounds to be received into and removed from said brew basket, and a closed position during a brew cycle, said cap in said closed position carrying said light in a position spaced from said window and cooperating therewith to define said chamber therebetween.

8. The coffee brewer of claim 1 wherein said light comprises an LED.

9. The coffee brewer of claim 1 wherein said light comprises a translucent bulb body.

10. The coffee brewer of claim 1 wherein said light comprises a frosted bulb.

11. The coffee brewer of claim 1 further including a light control circuit for respectively turning the light on and off upon initiation and completion of the brew cycle.

12. The coffee brewer of claim 11 including a sensor for detecting completion of the brew cycle and for signaling said light control circuit.

13. A coffee brewer, comprising:

a brew basket for receiving a quantity of ground coffee;

a brewer head defining a brew cavity for removably receiving and supporting said brew basket;

at least one water inflow port for introducing at least one hot water stream during a brew cycle into said brew basket at a location within the ground coffee contained therein, whereby the at least one hot water stream agitates and stirs the ground coffee to produce brewed coffee; said brew basket further including a frontal segment having a substantially transparent front window to permit visual observation of the ground coffee contained therein;

a light positioned within said brew basket during the brew cycle and spaced at least a short distance from said window and cooperating therewith to define a chamber therebetween for circulation of at least a portion of the water-agitated ground coffee during the brew cycle, said light back—illuminating said chamber; and

at least one filter element for passage of the brewed coffee substantially without passage of the ground coffee.

14. The coffee brewer of claim 13 further including a light control circuit for respectively turning the light on and off upon initiation and completion of the brew cycle.

15. The coffee brewer of claim 14 including a sensor for detecting completion of a brew cycle and for signaling said light control circuit.

1 / 13

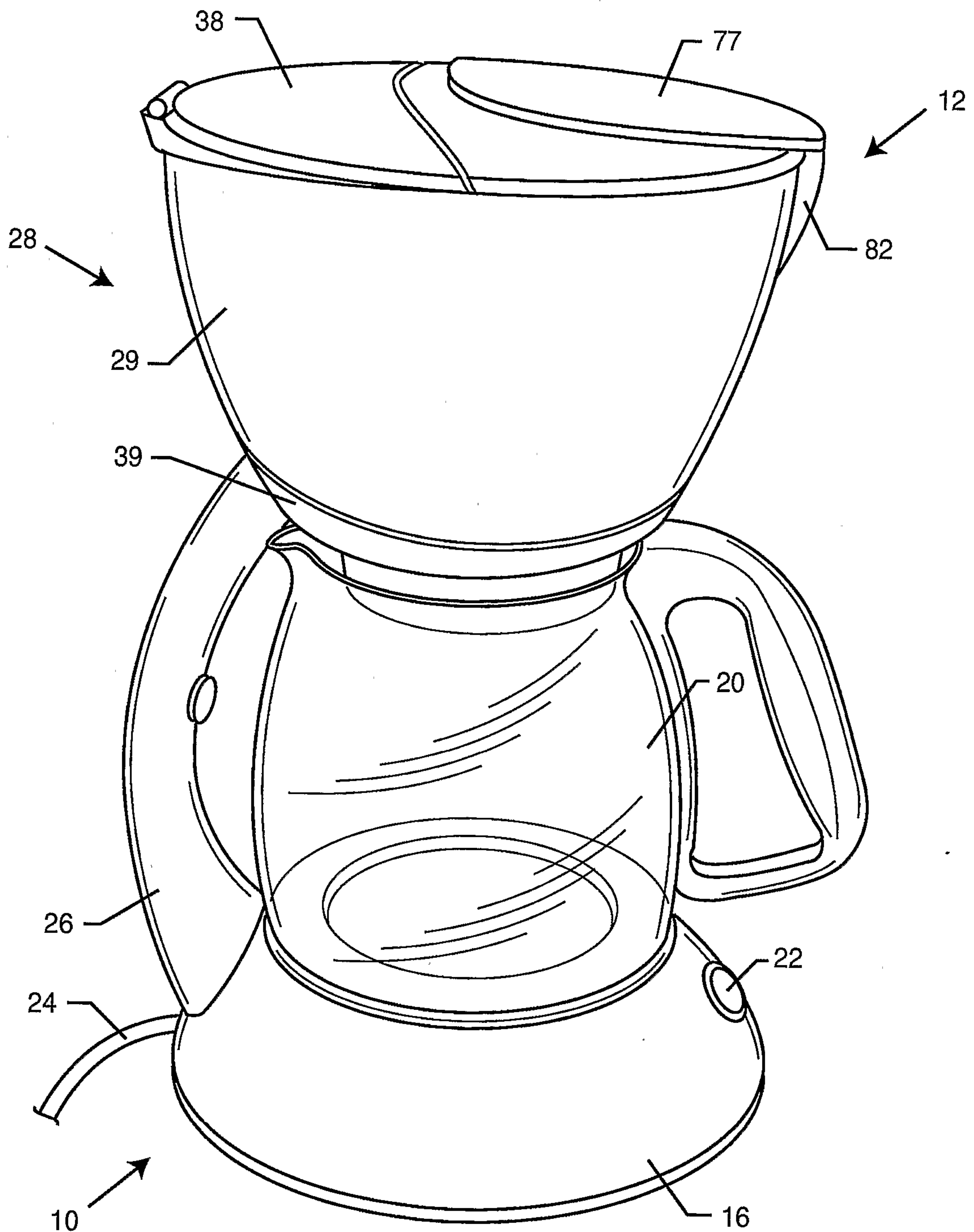


FIG. 1

2 / 13

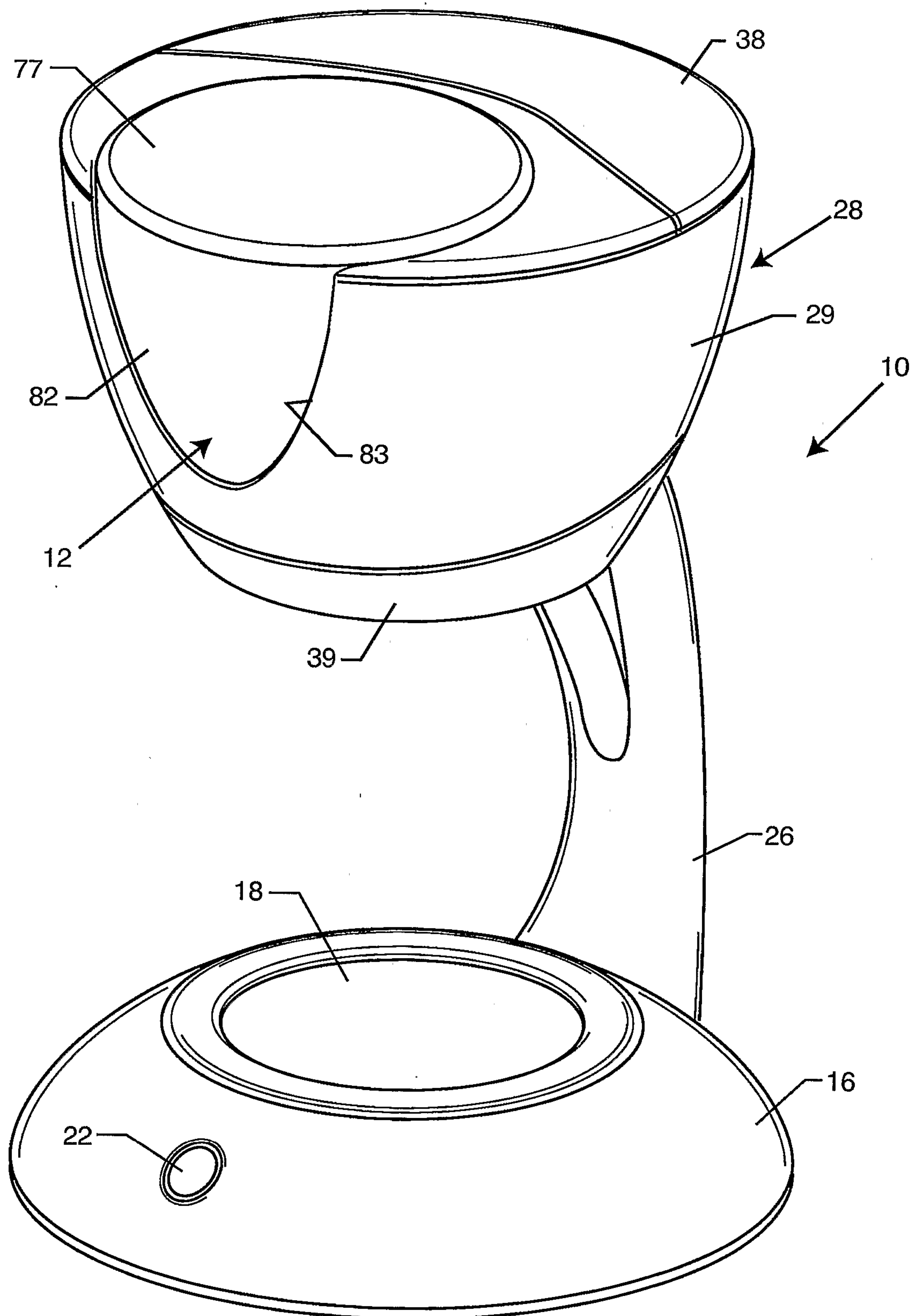


FIG. 2

3 / 13

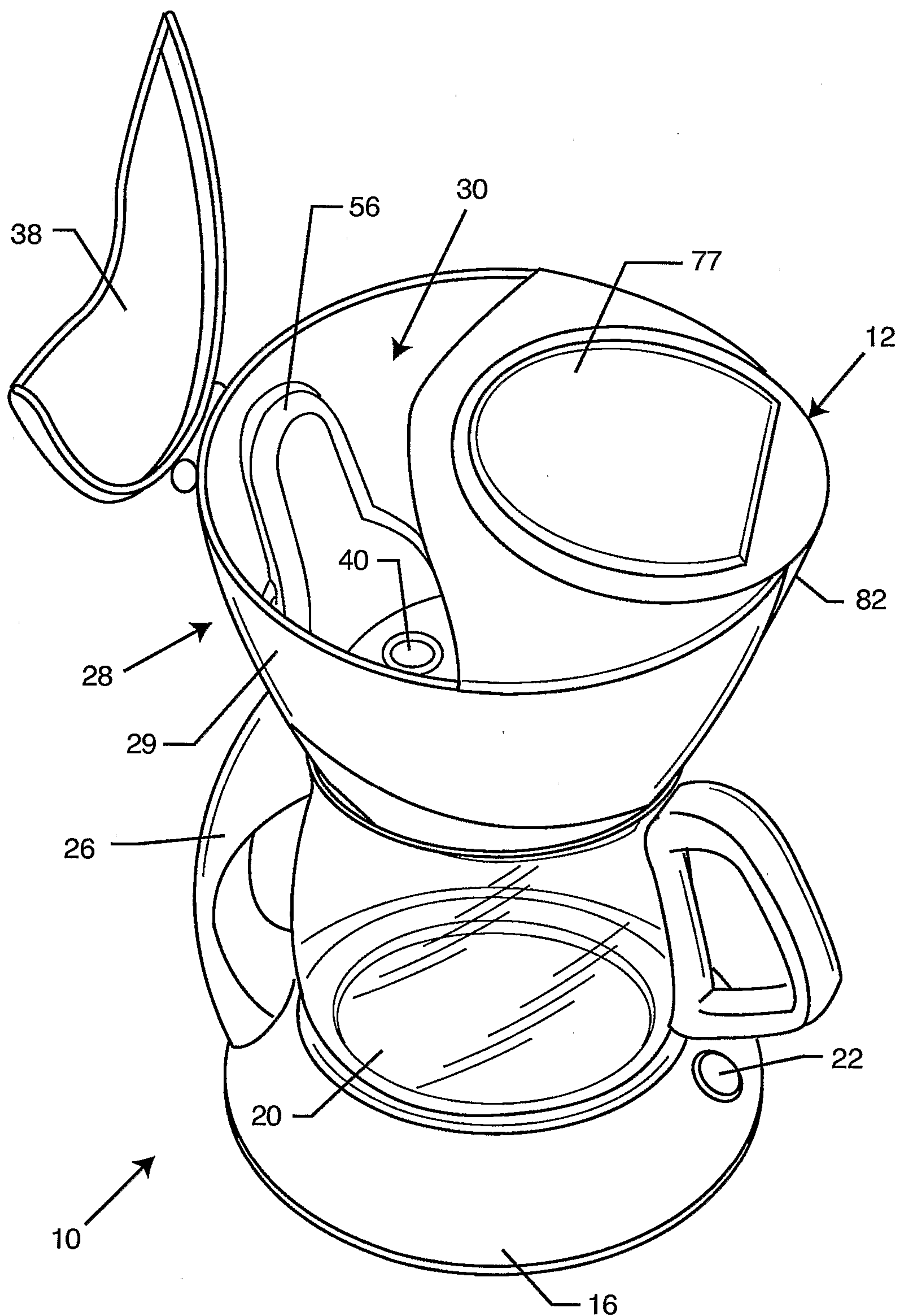
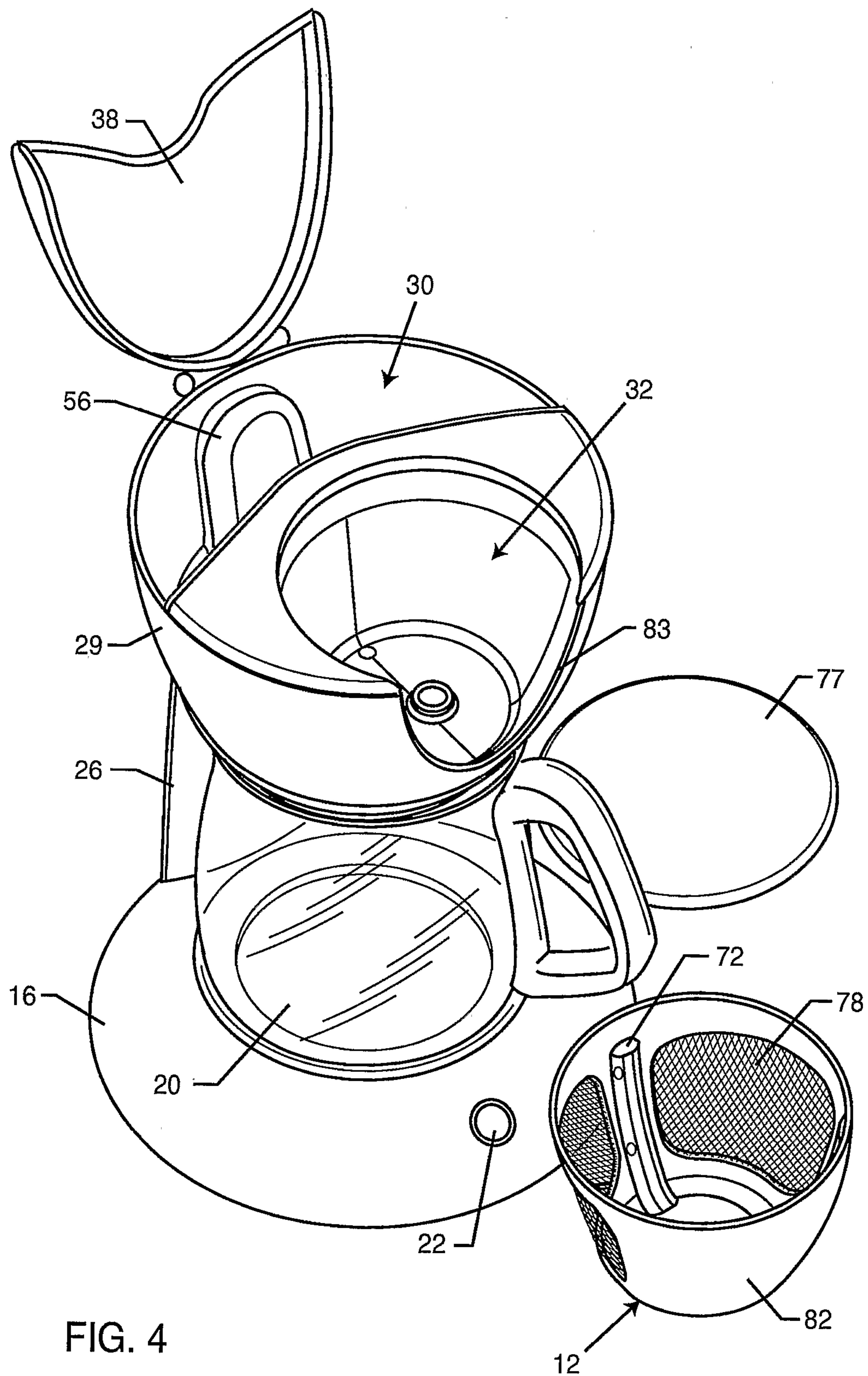


FIG. 3

4 / 13



6 / 13

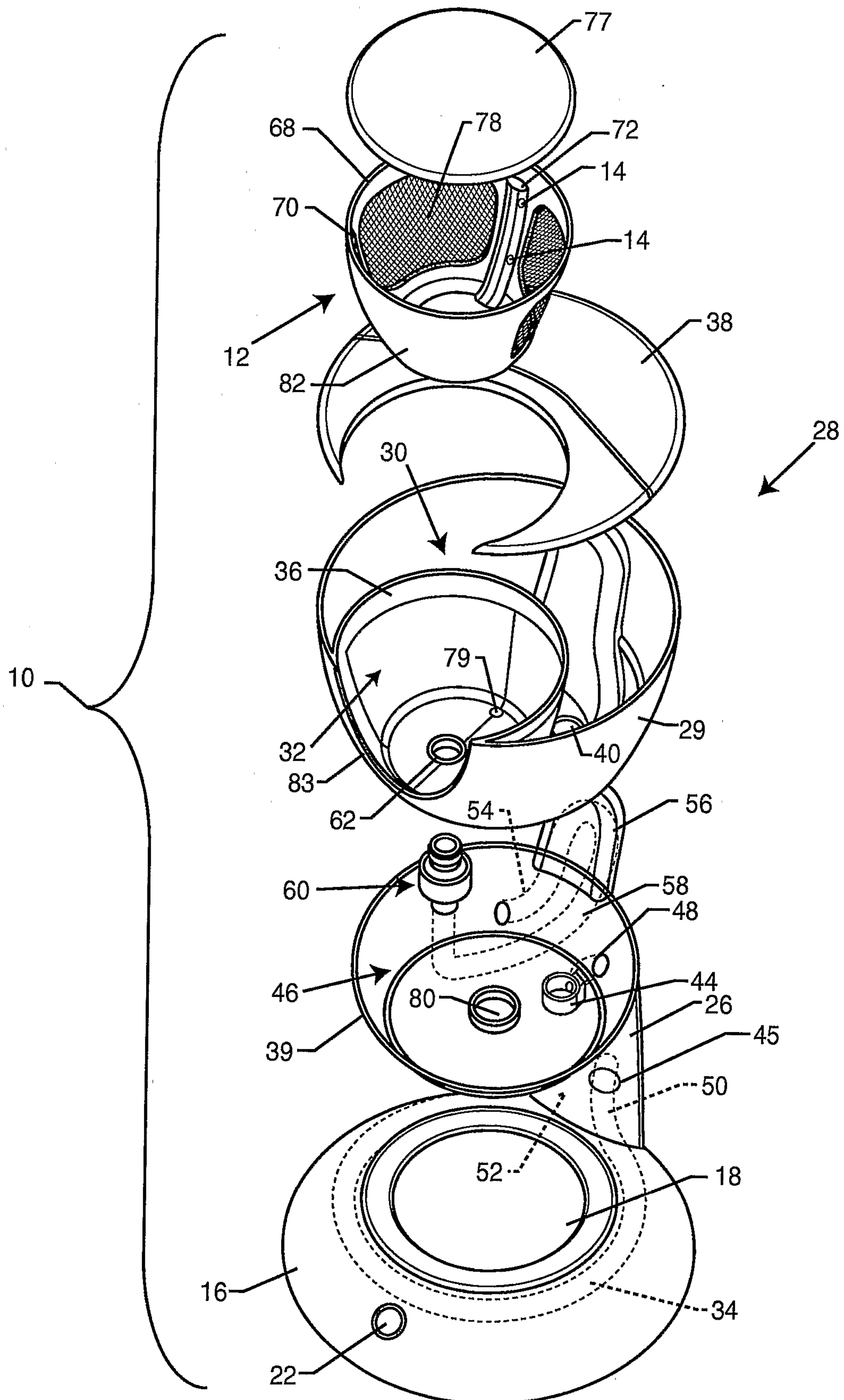


FIG. 6

7 / 13

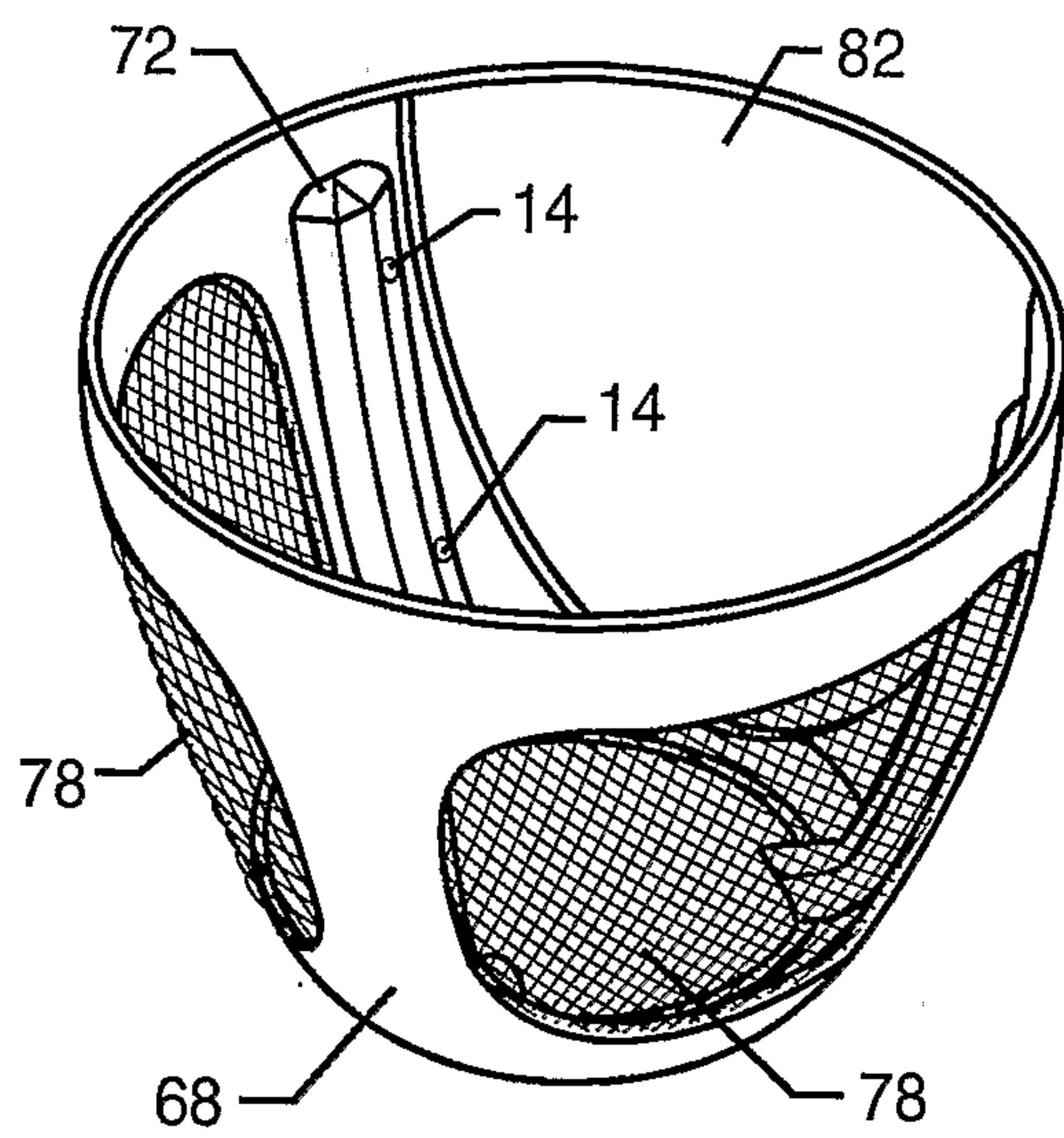


FIG. 7

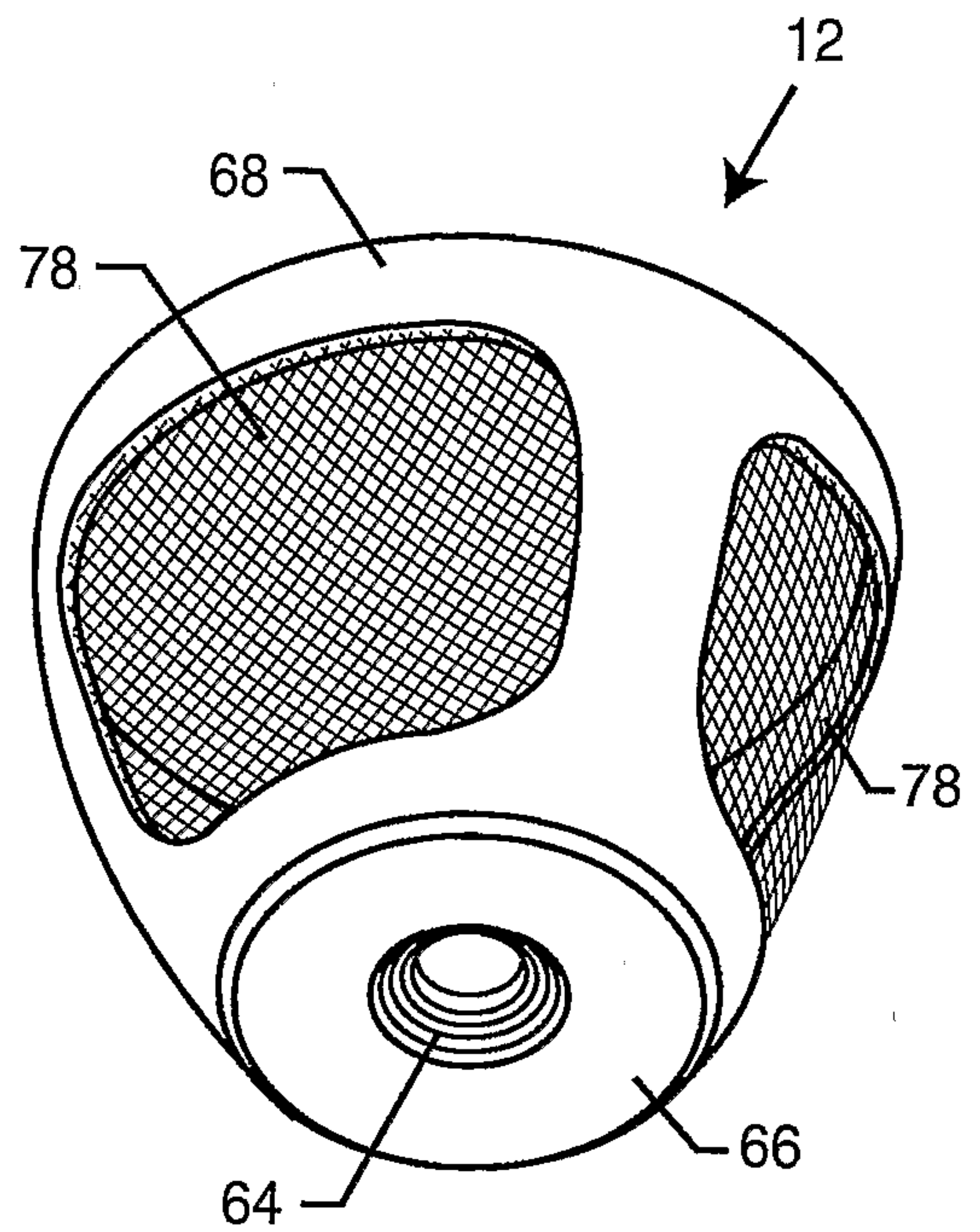


FIG. 8

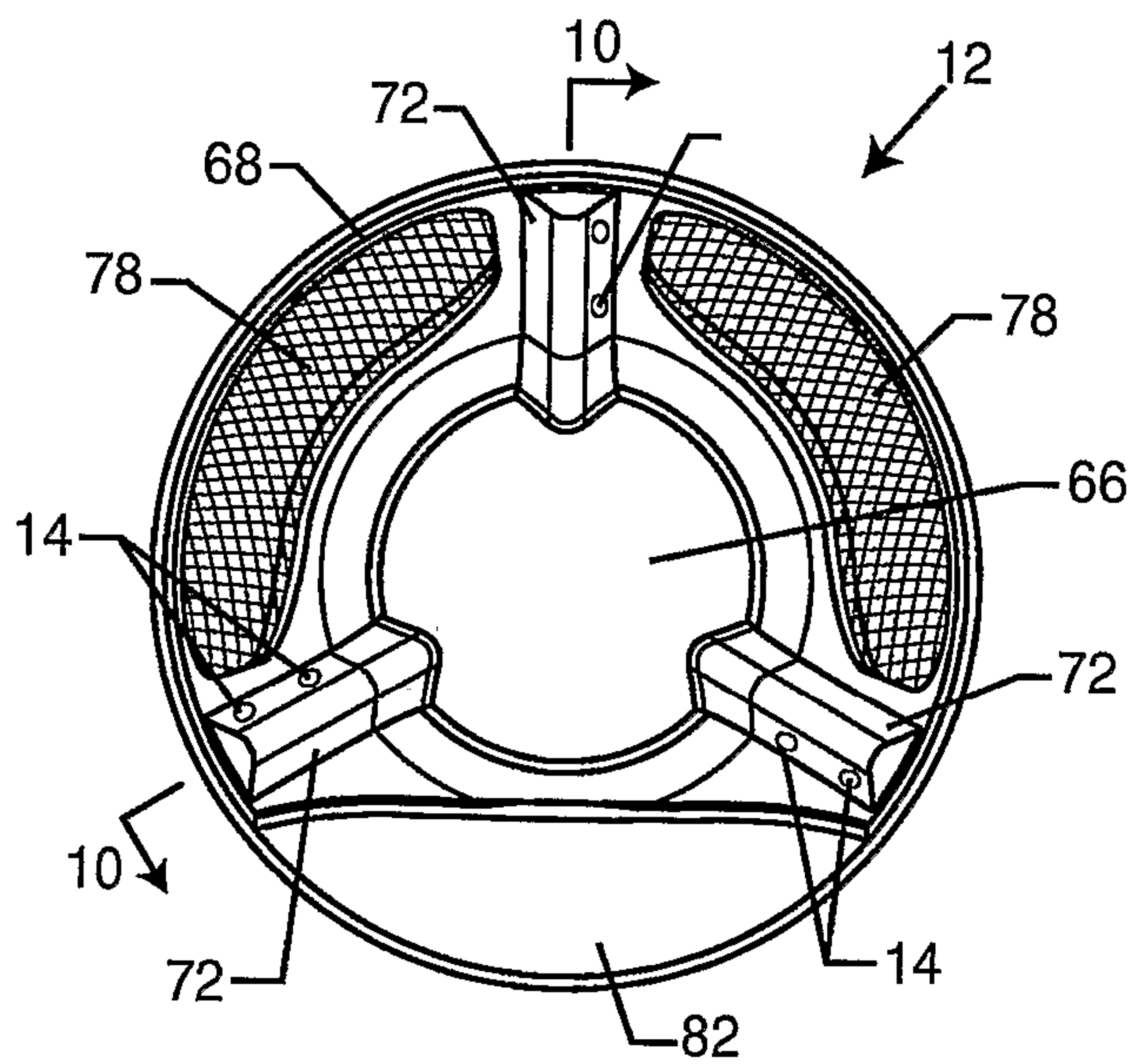


FIG. 9

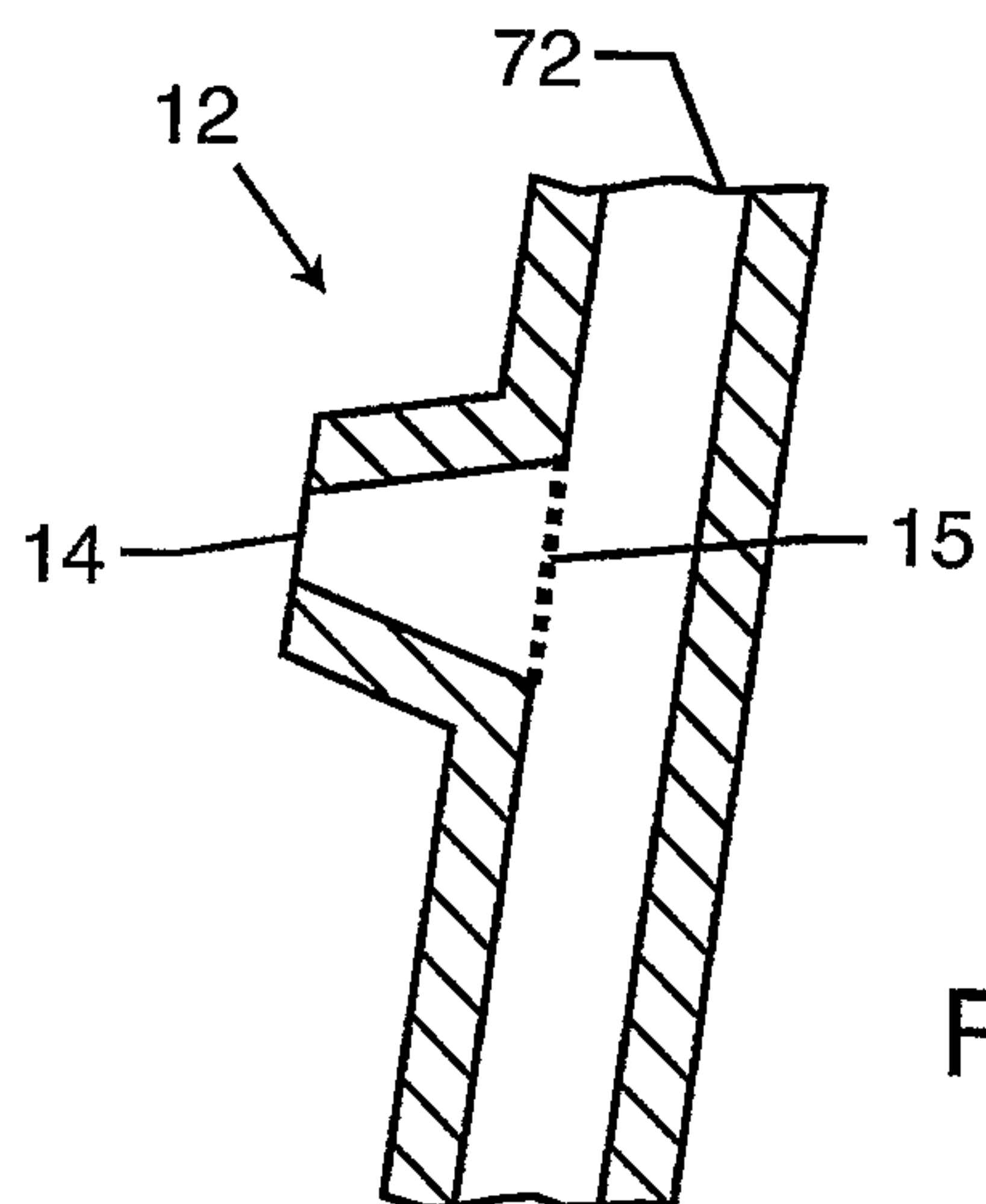


FIG. 11

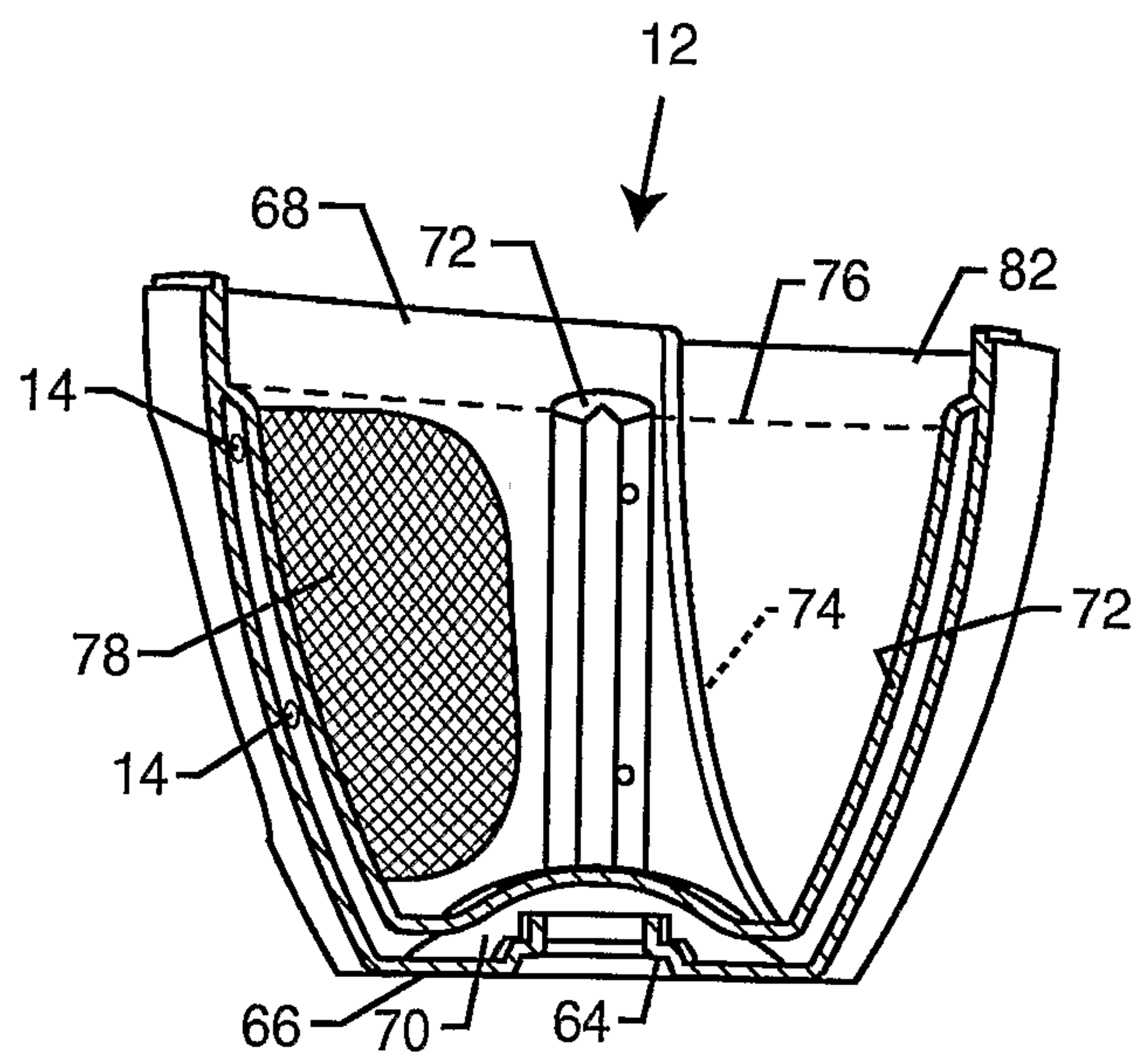


FIG. 10

8 / 13

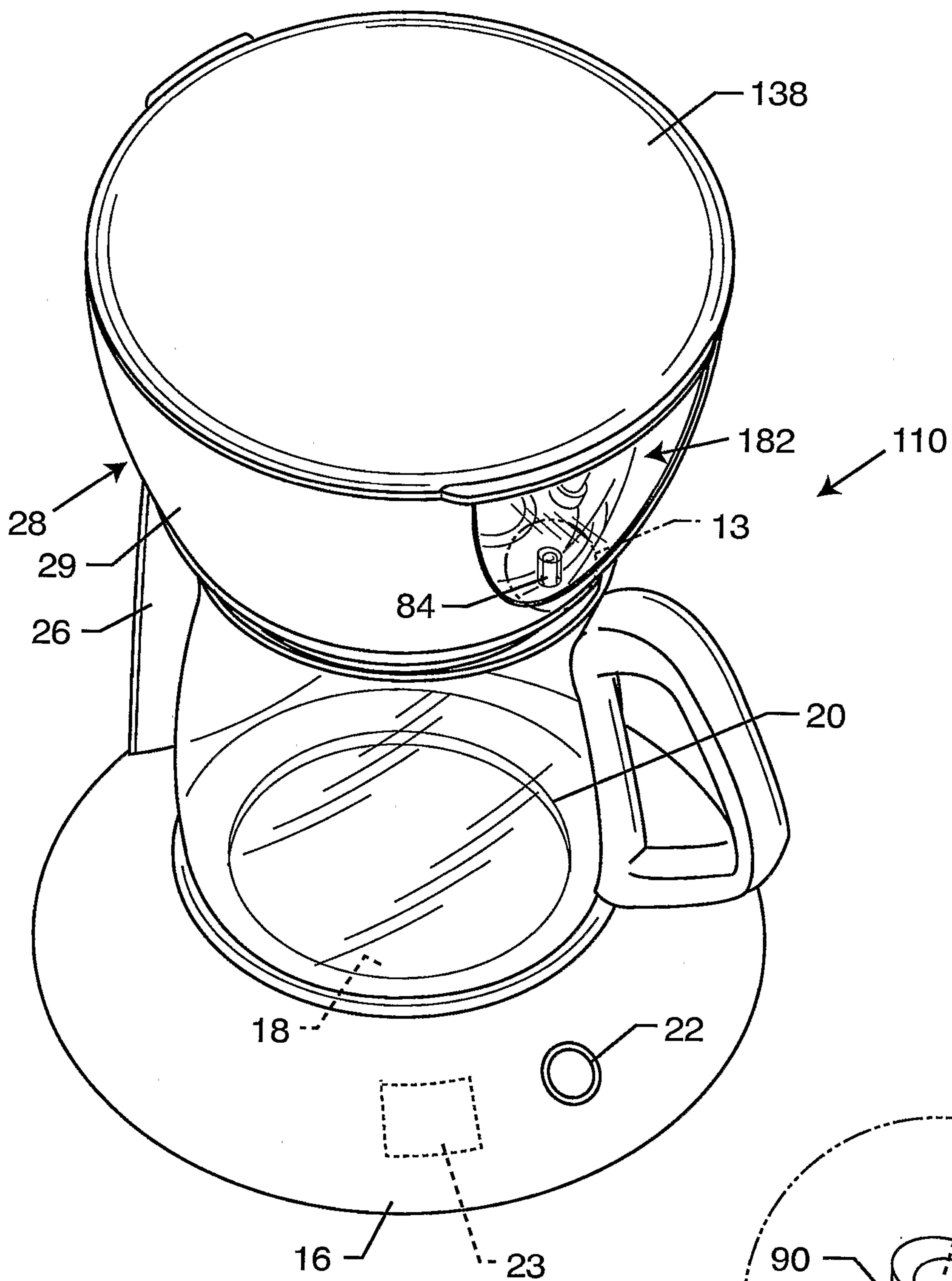
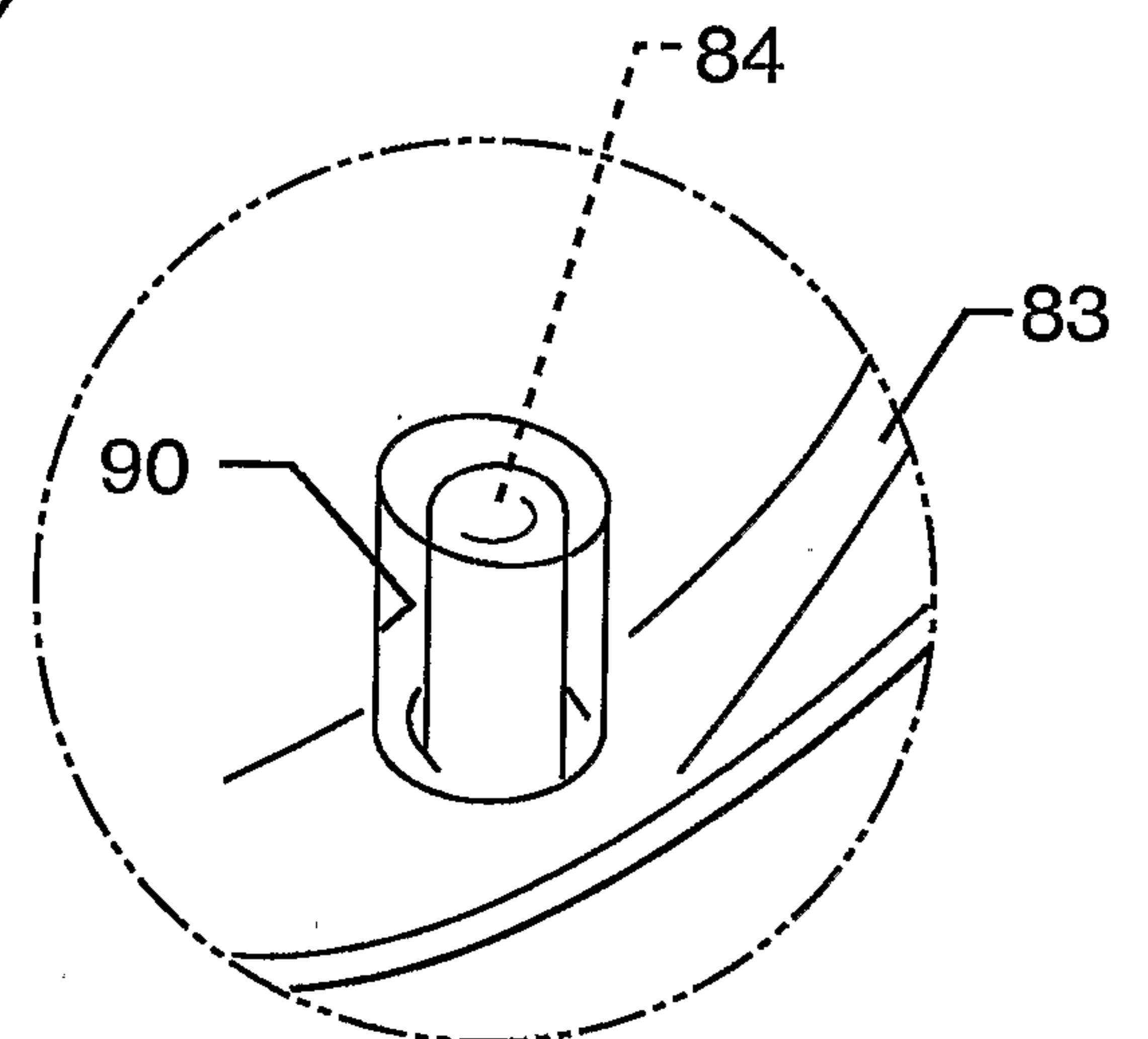
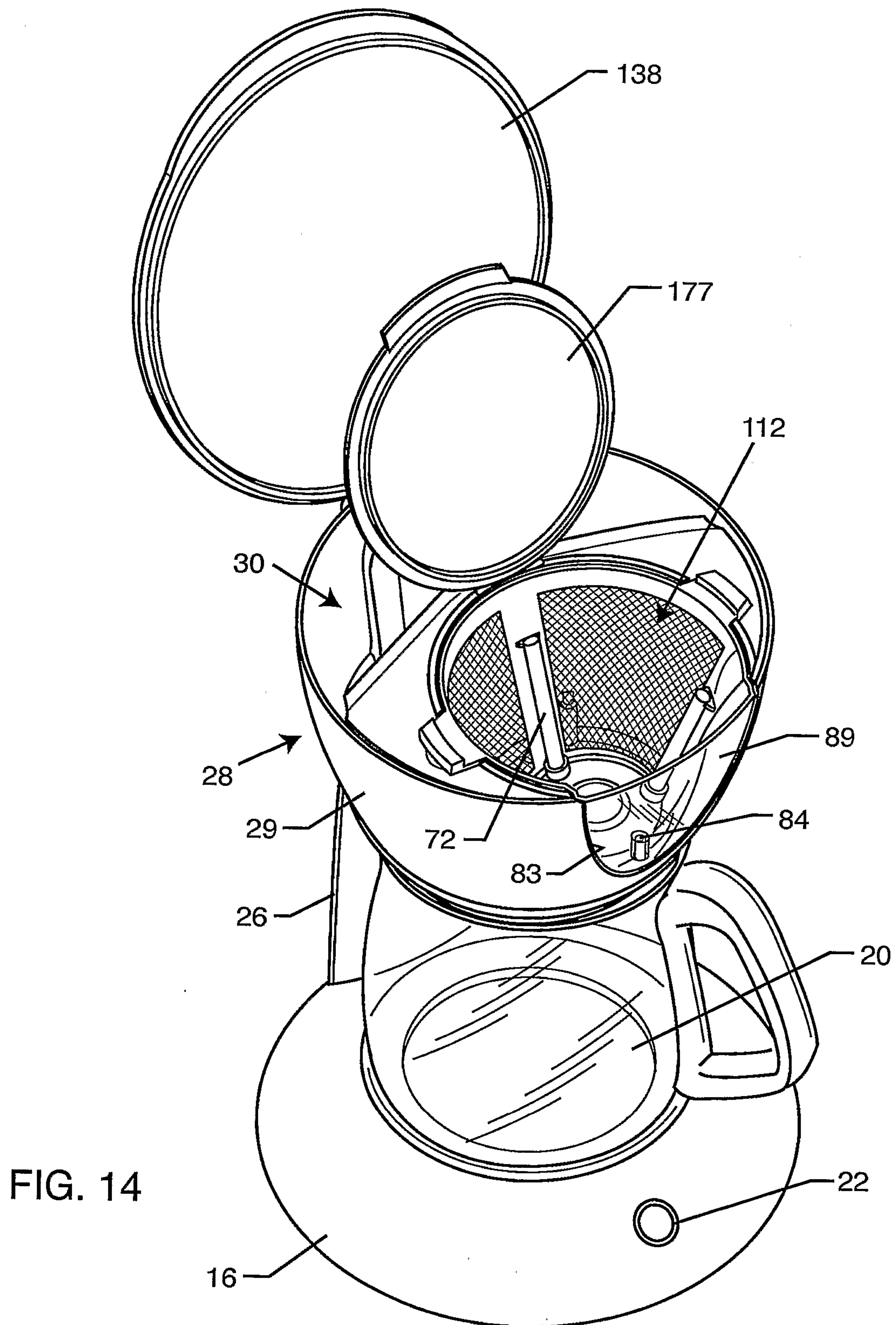


FIG. 13



9 / 13



10 / 13

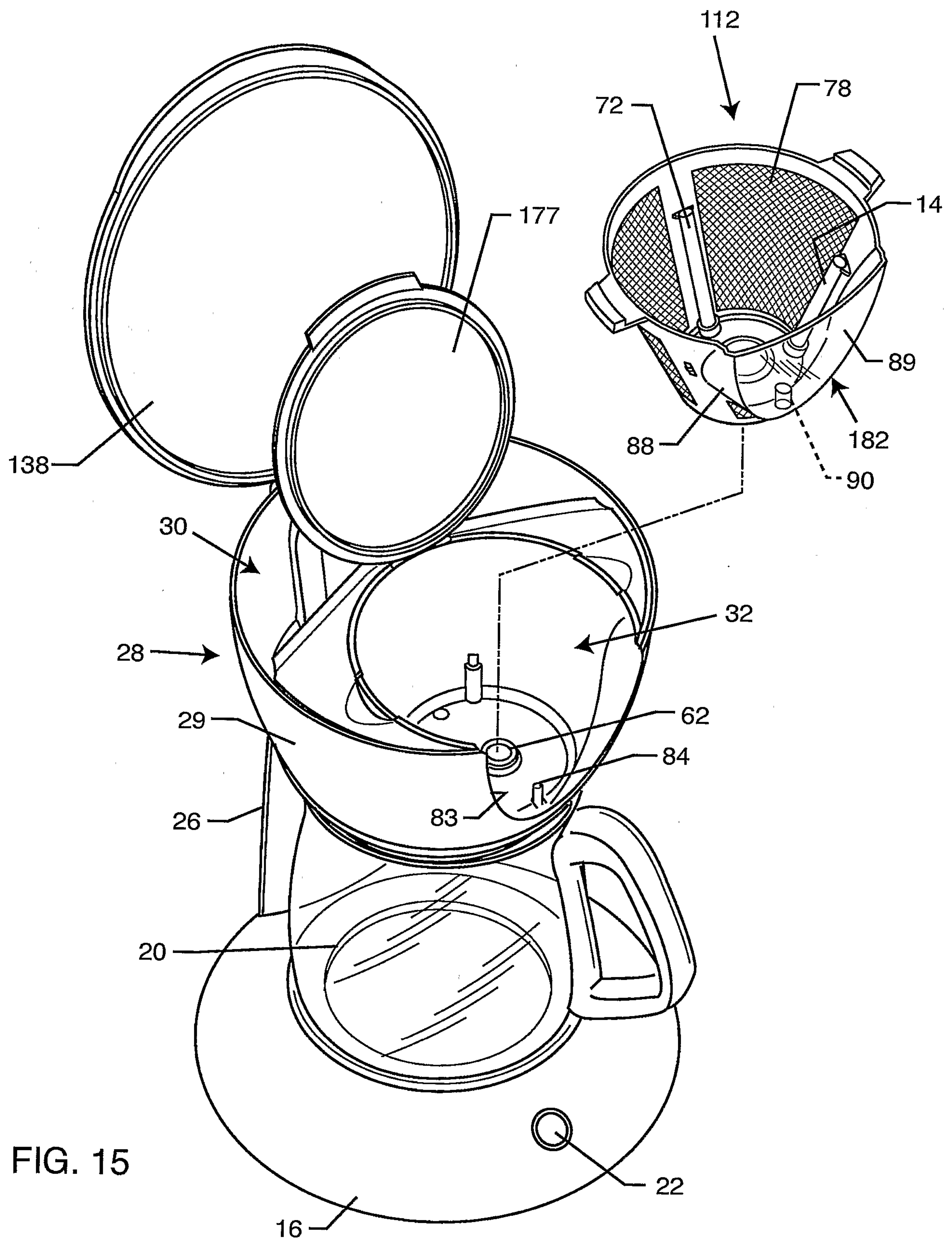


FIG. 15

11 / 13

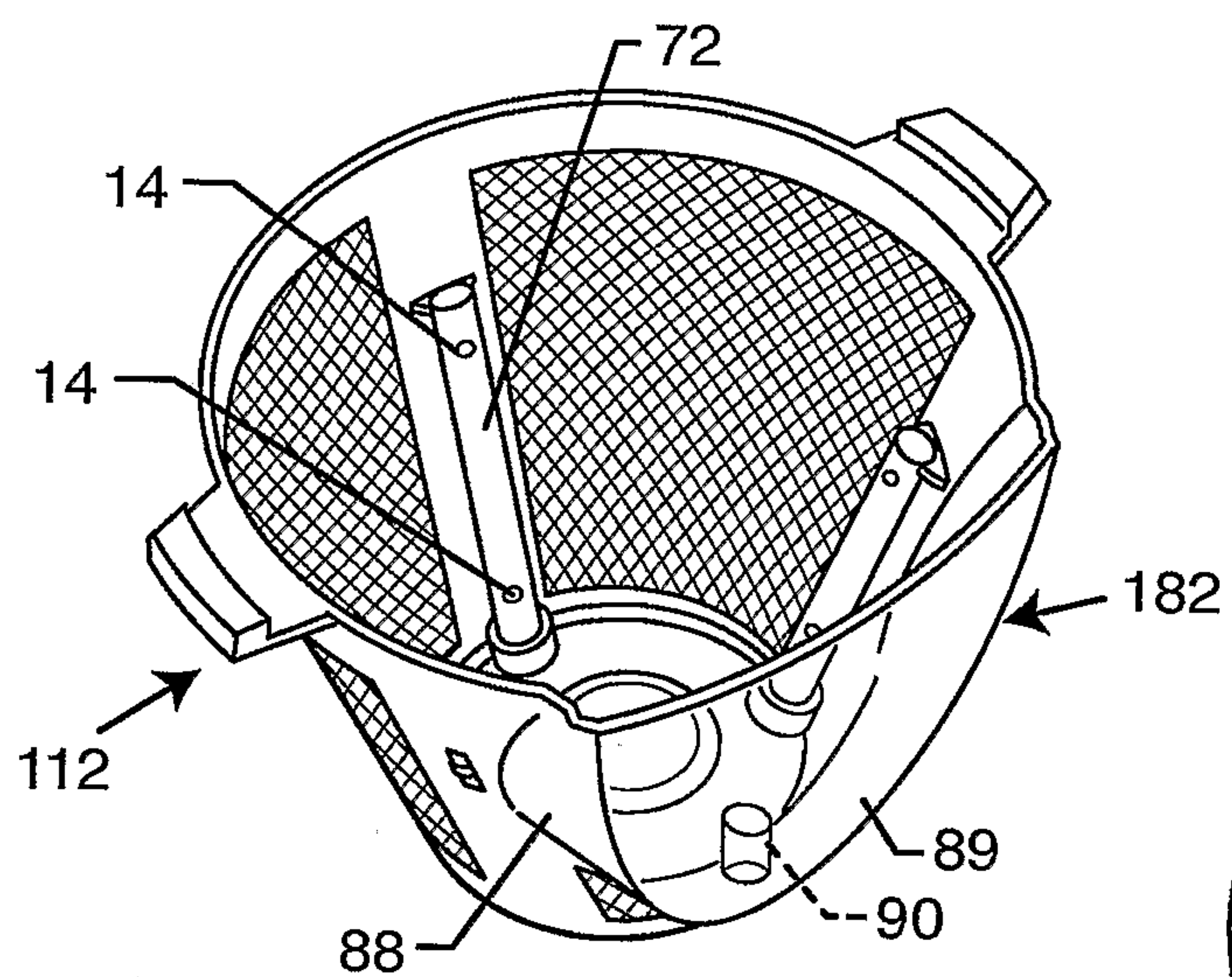


FIG. 16

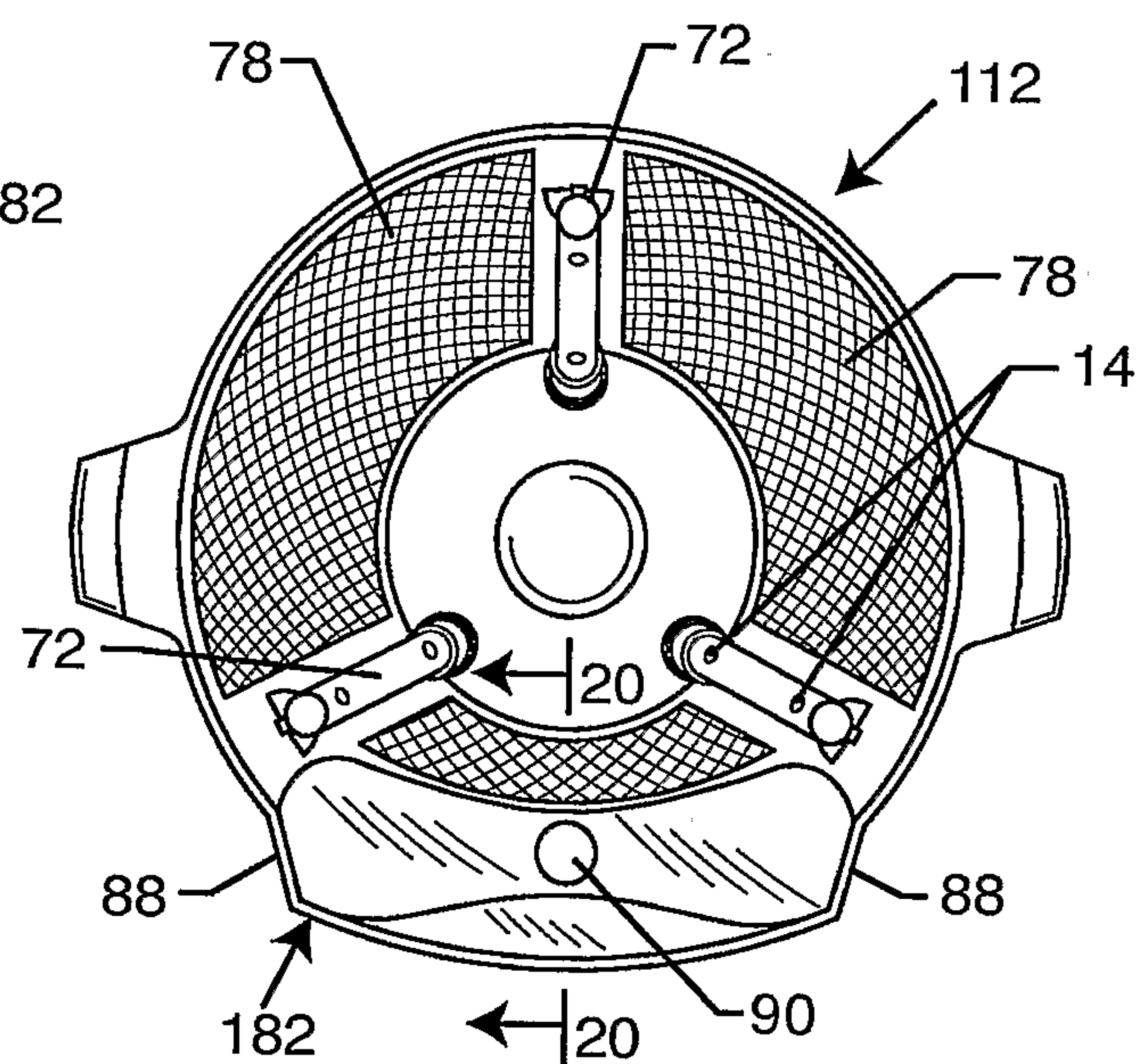


FIG. 17

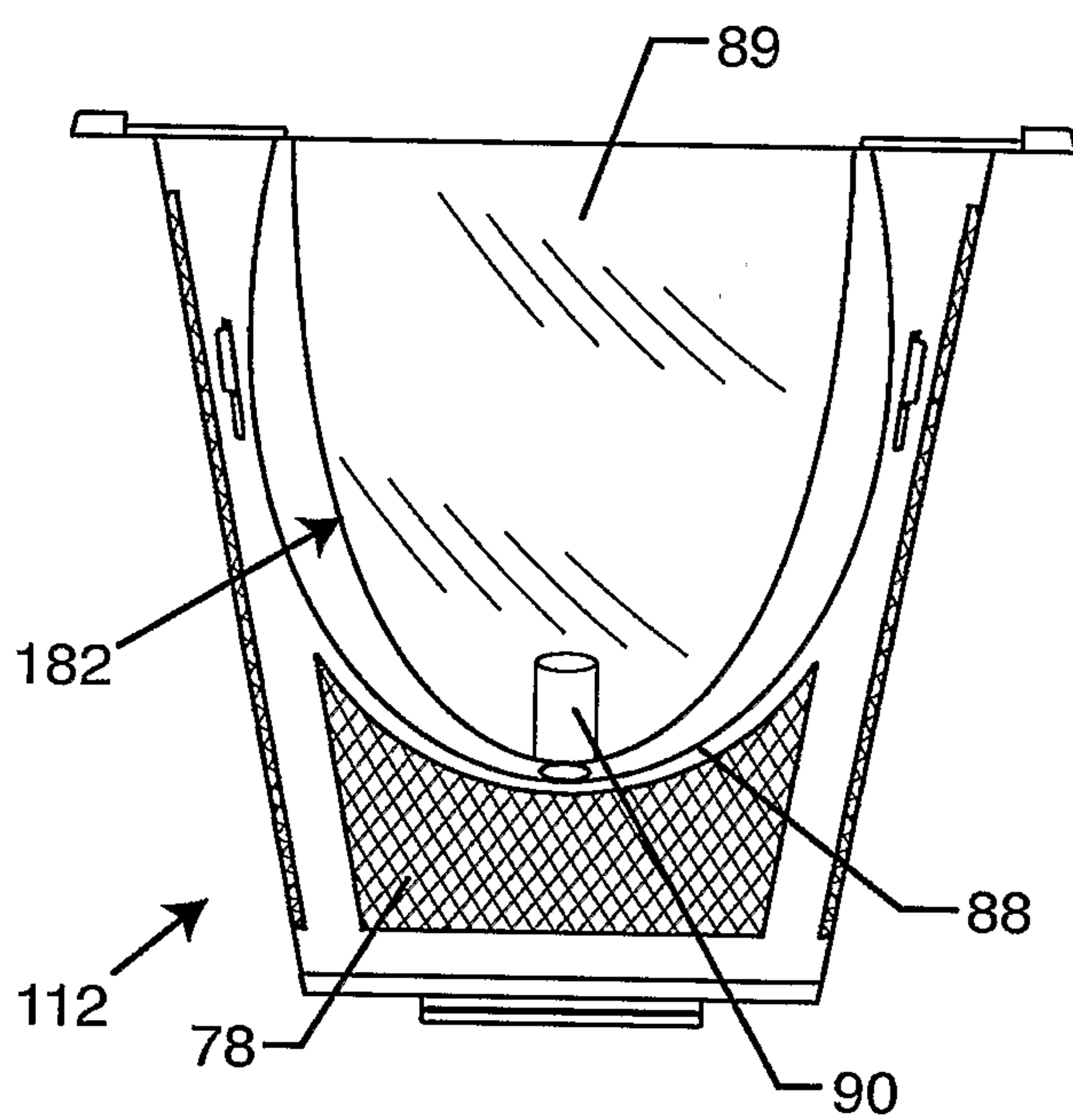


FIG. 18

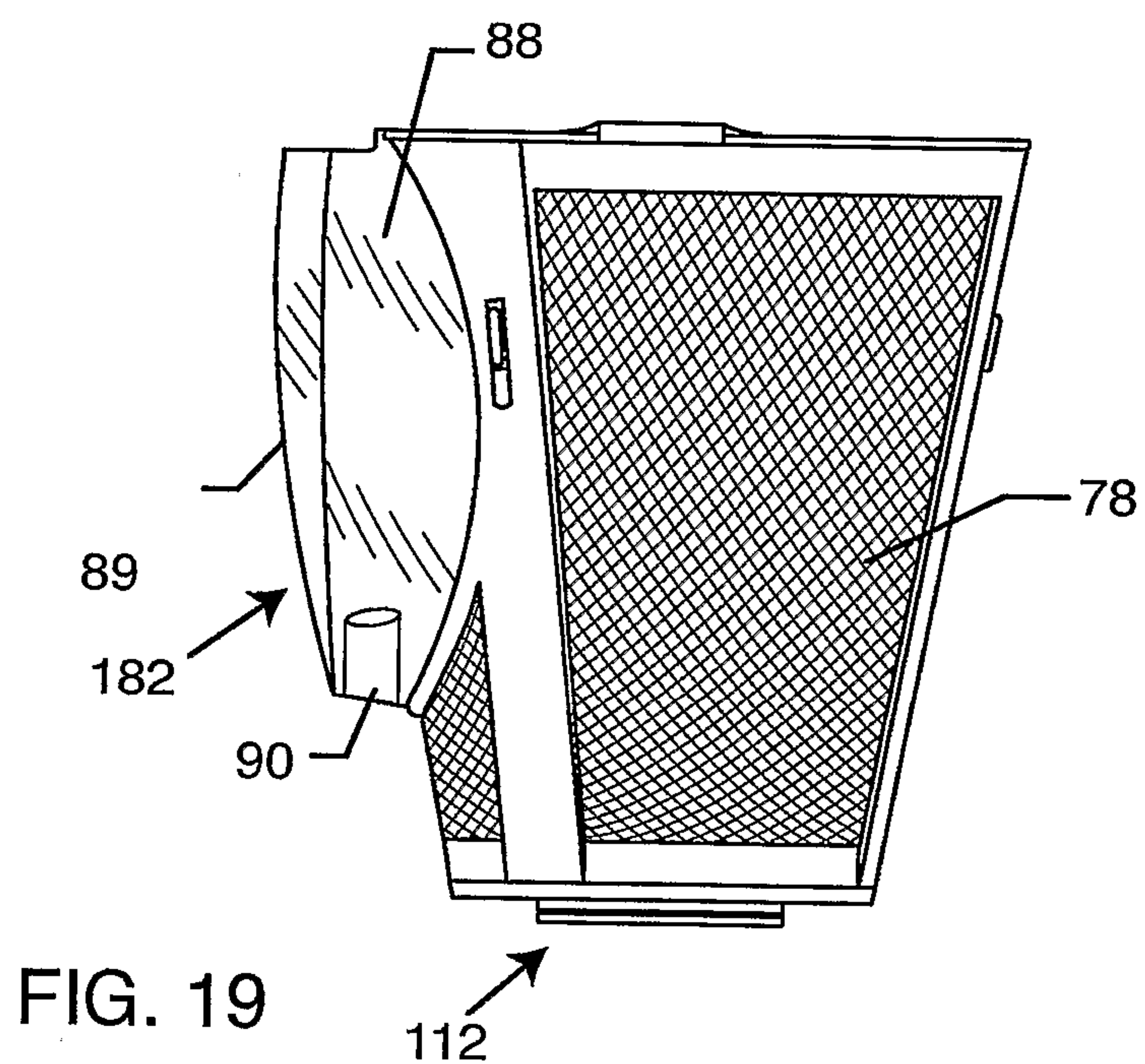


FIG. 19

12 / 13

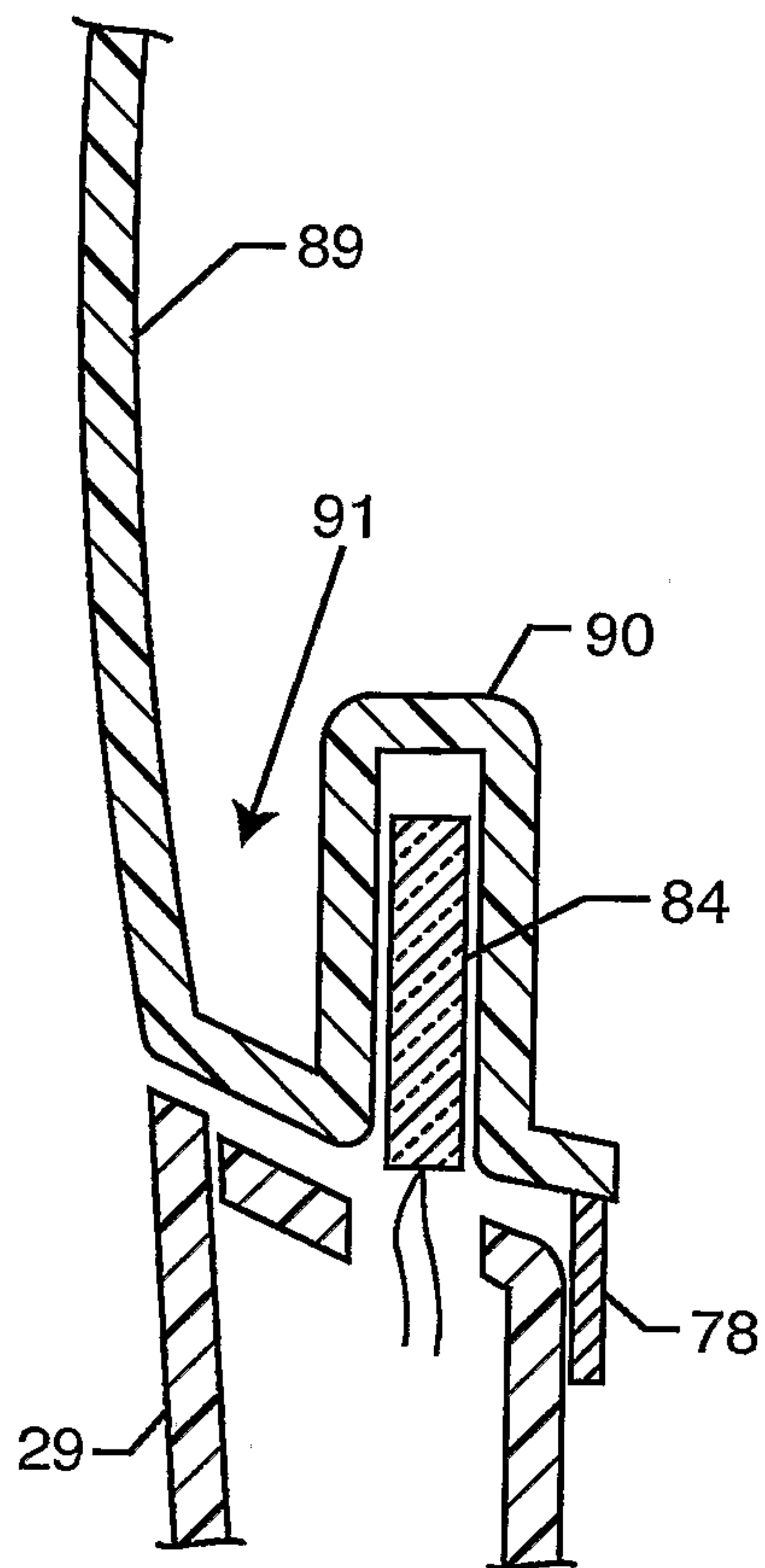


FIG. 20

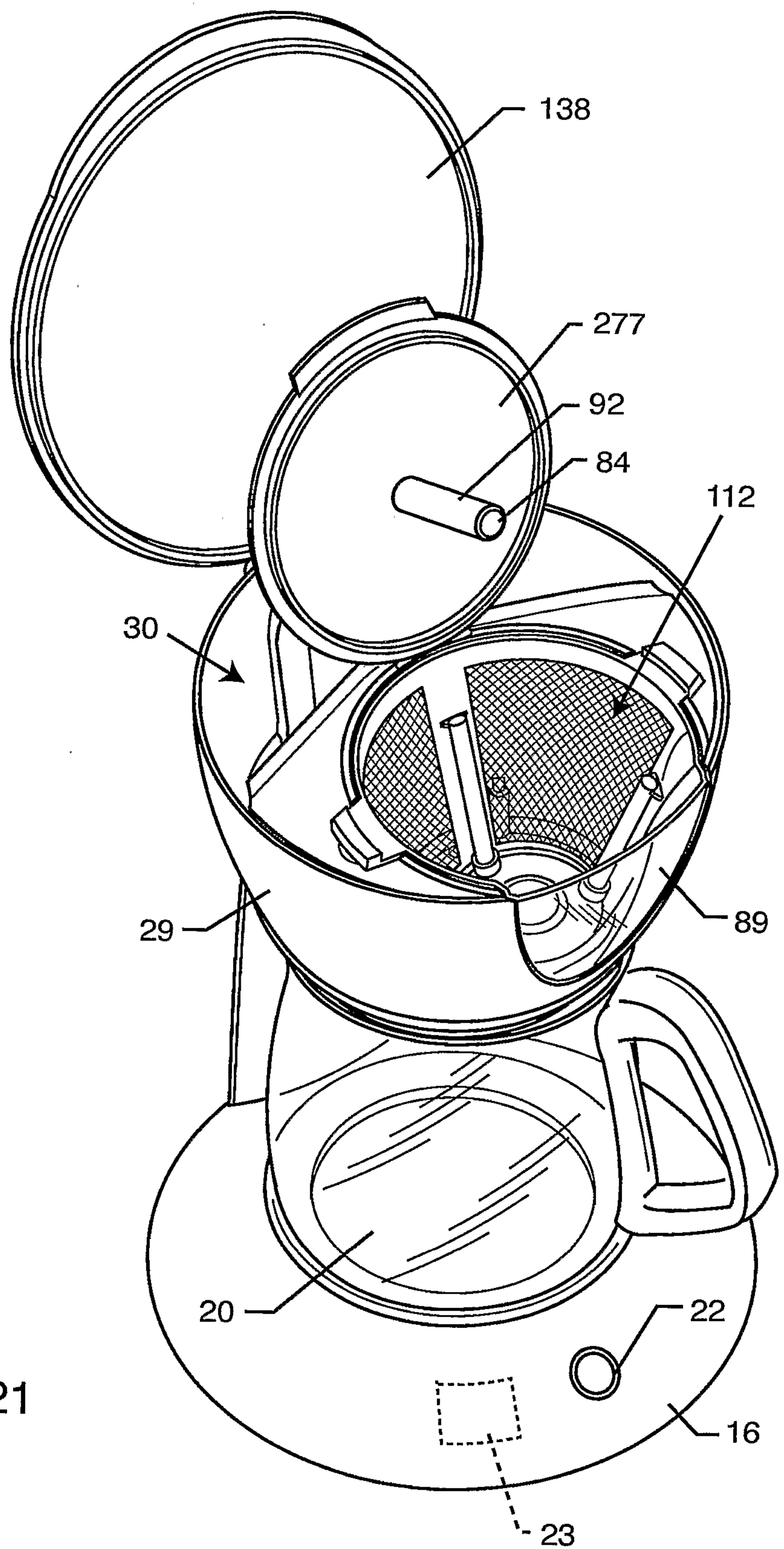


FIG. 21

13 / 13

