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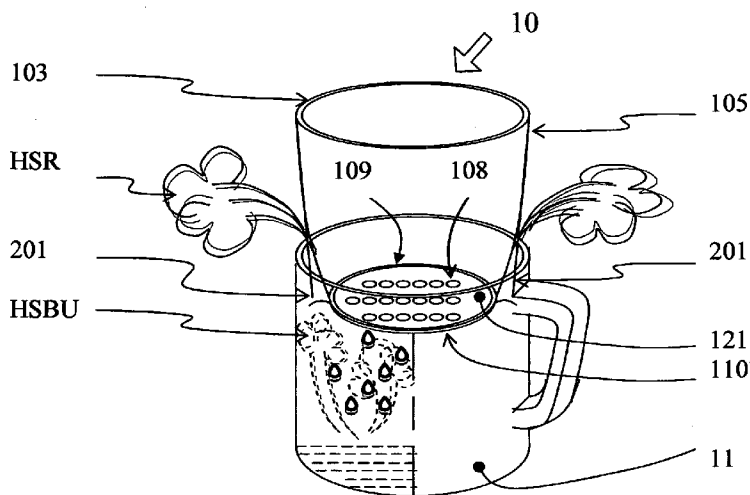


Fig. 1

(57) Abstract: The invention relates to a disposable infusion product for making a beverage including a filter cup (10) composed of a water permeable material and having on the base (110) of the cup a plurality of perforations (108) as a time control mechanism for flow of liquid. The filter cup (10) includes four concave vents (201) being set on the lower part of the outer side wall (105) of the filter cup (10) to provide relief for hot steam build up (HSBU) that occurs and which could slow down the drip down process when two cups are telescopically engaged in a liquid receiving container (11). A supporting sit-on-ring (233) telescopically engages above the liquid receiving container.



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## **INSTANT EXTRACTION CUP**

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### **CROSS-REFERENCE TO RELATED APPLICATION**

This application claims the benefit of U.S. Provisional Application Serial No. 60/926,393, filed on 25 April 2007 entitled "INSTANT EXTRACTION CUP," which is incorporated herein by reference in its entirety.

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### **BACKGROUND OF THE INVENTION**

#### 1. Field of the Invention

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The invention relates to disposable hot beverage brewing apparatuses, such as for coffee, tea and herbal products. More particularly, the invention relates to hot beverage disposable containers that contain filter papers that trap solids within the container yet enable fluid to pass. The liquid penetrability has been designed through the cup's holes/cutting areas that allow the liquid to penetrate into a lower reservoir cup at a consumer's time limit preferences. The arrangements of how many holes or how big the cutting area will result in how long the extraction should take place (e.g. 2 minutes; 3.5 minutes; or 5 minutes).

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Ultimately, this invention has been designed to provide a proper time and space to provide a stirring movement in a pre packaged 3 in 1 (i.e., coffee, sugar and powder creamer) coffee mix product that comes in a small sachet for one serving. The time and space to properly stir is critical in a 3 in 1 coffee mix preparation. Without stirring, the powder creamer that has been homogenously mixed with sugar and coffee, when in contact with hot water will form fat layer (shield effect) that makes the hot water hard to penetrate into the rest of the mixture. The 3 in 1 coffee mix will become clogged and will form a glutinous like compound which makes the extraction process improperly done. Thus, to have a brewing apparatus that allows proper stirring is important especially in a pre packaged beverage mixture that contains powder creamer as one of its major ingredients.

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## 2. Description of related Art

5 Coffee has been consumed and is known as the oldest beverage in many parts of the world. Thus, there are various devices that have been used to brew coffee. Traditionally, coffee grounds have been brewed in a coffee pot (infusion). Later on, people preferred to brew in electric drip coffee machine due to its conveniences. Moreover, due to the advance of spray-dried  
10 technology, instant coffee also has been a choice to many people. These are fair methods to enjoy a cup of coffee; however each one of them has their own drawbacks due to timing, mobility and the fullness of the taste and aroma.

In a percolator/coffee pot, a small amount of coffee grounds is repeatedly boiled to squirt liquid over the grounds which gives an over burnt taste and  
15 tends to also over extract the beverage. In short, it contributes bitterness and astringency to the final result. Electric drip coffee machines have won the heart most average households throughout the world. However famous, it is not portable and mobile enough to be used outside the house. People like average office workers (that don't have their own coffee maker or a person that prefers  
20 a different blend from that provided), dormitory students, and long distance commuters have only little advantages over electric drip coffee machine. Instant coffee is the fastest method amongst the other previous method to prepare a cup of coffee. However, the major drawback for instant coffee is that it is more expensive to make. As a general guidance, 1 kg coffee instant equals  
25 to 2kg - 2.6kg of coffee beans. Also, the typical majority still believe that instant coffee (processed coffee) has inferior quality in its flavoring ingredient in comparison to the natural fresh ground coffee. As such, flavor and sophistication are sacrificed for convenience.

Many brewing apparatuses for tea, coffee and herbal drink have been  
30 developed. One such apparatus (**Calagui; Juanito B. (Passaic, NJ), July 24, 2001, US Patent No. 6,263,781**) is a cup receptacle with filter element that is configured to engage to the ridge of the interior of the cup receptacle. This apparatus does separate the indigestible coffee ground during brewing process. However, it passes and extracts very fast when one tries to pour hot  
35 water into it. The apparatus cannot hold the hot water which is required to be properly in contact with the coffee ground for a certain amount of time. As a result the coffee beverage will definitely taste weak (coffee term: under extract). Unable to hold the hot water with a pre-mix of coffee ground, creamer and

sugar even for a brief moment also renders stirring the beverage impossible. Thus, a pre-packaged 3 in 1 coffee mix is not suitable when using this apparatus. On the other hand, in order to achieve a better tasting coffee beverage, one would have to exert great patience in only pouring hot water into the apparatus repeatedly in small quantities. By standing near the brewing apparatus and repeatedly pouring small amounts of hot water during a process that could last more than 10 minutes, it is hardly a perfect way to get a decent cup of coffee beverage. Furthermore, when the coffee grounds inserted into the cup receptacle before the filter element ridged and the hot water poured, the apparatus does prevent the coffee ground being consumed, however, it will also spoiled the coffee taste and aroma. This is because the coffee ground is still in contact with hot water that will continue to be extracted despite of the separation. The correct extraction process required not more than the recommended time (4 to 8 minutes depend on the coffee ground coarseness). When it takes too long or over the suggestion time, more unfavorable ingredients that will cause bitterness to the taste and some astringent smell that spoil the coffee aroma will also get extracted.

Releasing hot steam heat trapped during brewing process is a crucial step. It is especially important when the receptacle employs a telescoping assembly in order to perfectly sit onto the reservoir cup. This assembly creates a firm hold on the brewer cup but on the other hand it leaves no escaping route for the hot steam

created from the pouring down near-boiling hot water. The trapped heat will accumulate and form resistant forces in pushing the heat up, thus, slowing or interfering the dripping down process generated by gravity forces. In moderate condition, it slows the dripping down process but it can even immobilize the process in extreme an condition which depends on the degree of the hot water being used and material used in filtering. One of such apparatus that does not have a hot steam releasing vent for the sitting-on beverage brewer in the prior art is **Hayes; Susan M.** (New York, NY) **4,520,716**.

Many brewing devices have failed to accommodate pre mix or pre packaged beverages such as 3 in1 coffee mix and 3 in 1 tea mix. It is because many of the brewing devices have been ignoring the critical need to *stir* during preparation of such product containing powder creamer as one of its major ingredients. One brewing method that uses a filter paper pouch or bag such as US Patent 5,478,581 (**Christie; Hugh P.** (Hyde Park 5061, AU), **Wallace; Allan K.** (Hindmarsh 5007, AU) is example of how difficult if not impossible it is

to get the 3 in 1 coffee mix or tea mixture (presumably contained in the pouch method) thoroughly diluted and extracted. This is due to the fat from the powder creamer creating a shield effect that prevents the hot water from further penetrating into the rest of the mixture. A product in this category can be  
5 categorized as a close-brewing system. In this system, the user is not allowed to perform any kind of modification on the product. This system offers no flexibility to the user either to add or to reduce, for instance, the quantity of the coffee grounds into the pouch/bag.

US Patent no. 4619830 (Napier; Edward D. Scarborough, Ontario, CA)  
10 discloses a brewing apparatus that employed an open-brewing-system that offers a user more flexibility either to add or to reduce, for instance, the quantity of the coffee ground, sugar or powder creamer into the beverage. However, its supporting stick/rod in the middle of its top opening has made it uneasy or troublesome for the user in performing a proper stirring motion during beverage  
15 preparation.

Each of the prior art disclosed, has shown one or more drawbacks which make them until now *not* a mass product or method to brew "coffee to go". The invention improves upon the other deficiencies inherent in the prior art and yields an inexpensive, novel, disposable, flexible, mobile, easy to utilize, more  
20 accurate (based on brewing time recommendations from coffee experts) brewing apparatus for the public.

### BRIEF SUMMARY OF THE INVENTION

25 Coffee, tea and herbal products are very sophisticated products. Each required a certain special treatment to get its utmost benefit. Since, all required hot water to extract the sophisticated ingredient contained therein, using a correct brewing apparatus is critical. This invention has been designed to give an accurate result in brewing time.

30 Habitually, a large number of coffee drinkers prefer to add sweetener and cream to their coffee beverage. For such drinkers, there has been a desire to avoid the necessity of separately adding sugar and creamer. For example, such persons would desire the convenience of a single serve pre packaged mixture containing "real" roasted ground coffee, sweetener and creamer.  
35 Unfortunately, previous attempts at products containing a mixture of coffee, creamer and sugar particles within filter elements have been disappointing.

Thus, there is a need for a compact, inexpensive, unitary and mobile apparatus with filtering element for accommodating such pre packaged beverage mixture

for preparing an infusion beverage such as coffee, tea or the like. Such pre packaged mixture would be placed in the brewer cup along with hot water for a time sufficient to allow the coffee to brew. The need and necessity to measure each one of the pre mentioned ingredient then would be avoided.

5 This invention has four primary goals. One is to offer to the public an apparatus that correct and accurate, based on written recommendation from Specialty Coffee Association of America, concerning "*how long*" coffee ground should be in contact with hot water in order to prepare an excellent cup of coffee beverage. Two is to provide an open system brewing apparatus that allows the  
10 public to have more flexibility to choose what kind of ingredients to be brewed. Three is to provide a brewing apparatus that has a hot steam releasing vent and also that can be positioned snugly on top of a regular coffee mug or disposable paper cup. Four is to provide brewing apparatus that is easily stirable in brewing 3 in 1 pre packaged powder beverage that contain powder  
15 creamer as one of its major ingredients.

A cup container comprises a disposable liquid permeable brewing filter that has an open top and partial closed bottom. It is made of coated paper, or polyethylene, or polystyrene, or biodegradable substances including but are not  
20 limited to substances such as modified and or unmodified organic fibers and or pulp and or starch or any combination thereof that has number of holes or cutting areas on the bottom of the cup. The number of holes or cutting areas is the time control mechanism which produces a critical role in controlling the flow of the liquid from this invention to the bottom of a reservoir cup or mug. Each  
25 hole represents 28.26 millimeter square. Although the size is perfect to create raindrop size droplets, the hole/cutting area can be varied in size. Preferably, the perforation of the invention comprises an arrangement of about 16.9% (diameter of ( $\emptyset$ )15 mm) to 9.1% ( $\emptyset$  11 mm) by ratio to the brewer's cup bottom base (4183.3 mm<sup>2</sup>); more preferably from about 7.5% ( $\emptyset$  10 mm) to 3.7% ( $\emptyset$  7  
30 mm); more preferably still, from about 2.7% ( $\emptyset$  6 mm) to 0.68% ( $\emptyset$  3 mm).

Furthermore, in one alternative, the shape of the brewer's bottom base opening area can be modified into many kinds of shapes. Such modification to the bottom base of the brewer cup is desirable to enhance its aesthetic  
35 appearances include, but are not limited to, triangle, rectangle, oval, diamond, flower petal, star, circle, heart, crescent, fan, nonagon, octagon, pentagon, decagon, and hexagon, or any combination thereof.

The cup's bottom has been designed with four concave shapes that are inwardly curving which, in this embodiment, are used to release hot steam buildup during brewing process. When disposed on a coffee mug these corners allowed hot steam that is accumulated on the reservoir cup to be escaped. The vent is important to create a resistant-free environment of the liquid flow from top to bottom during brewing process. The number of petal shape corner can be maximize or minimize accordingly to the desired output of hot steam released rate.

When telescopically positioned on a regular coffee mug or similar that has a top inner side opening range between 7.2 cm in diameter to 7.5 cm in diameter, it will fit snugly on the cup without any holder. For a mug that has inner side top opening with diameter of 7.6 cm to 8 cm, it utilizes an attachable thin polystyrene sheet on the bottom of the outer side of the cup which is position on the bottom. The number of thin polystyrene sheets can be used from one sheet to more than one accordingly to the reservoir cup top opening width. Furthermore, for a bigger diameter mug such as a cappuccino mug that is larger than 8 cm, it uses a perfectly fit sit-on-ring which is rounded in shape and has three supporting jagged legs. All of above mentioned designs are applied to hold the cup receptacle firmly with the reservoir cup and provided some fair mobility during brewing process.

The filter paper or other porous material attaches onto the bottom of the cup assembly through hot seal or food grade starch. The heat seal is applied about 5 mm width circling along the outer edge of the filter paper onto the cup's bottom. The 5 mm heat seal width provides some stretching flexibility to form a better pressure point during droplets drip-down process. One alternative embodiment to re-use the cup assembly and throw away the used filter paper in order to preserve natural resources for a better clean environment can be achieved if the filter paper can be easily peeled off by user. With the 5 mm heat seal width design, the user can peel the used filter paper more easily as it is only attached to a small number of areas on the cup's bottom base. The hot seal can be done because the commercial filter paper contained Poly Ethylene on one of its side. When applied to heat, PE material melts and become part of the cup assembly.

A comparison has been made between “multiple holes/cutting arrangement” and “one single cut arrangement” in the table 1.

Cup's Base Area:  $r = 36.5\text{mm}$

$$3.14 \times 36.5\text{mm} \times 36.5\text{mm} = 4183.265 \text{ mm}^2$$

Hole Area:  $r = 3\text{mm}$

$$3.14 \times 3\text{mm} \times 3\text{mm} = 28.26 \text{ mm}^2$$

5 **Testing Procedure:**

Two cups that have an exact size are being used in this test. One is with holes punctured in the bottom and the other has a closed bottom. The punctured cup will be used to measure the rate it reaches 120 ml on the measuring container, while the other cup as a measurement standard which hold 170 ml water. The cup has been pre-wetted with hot water by passing it through in order to get the filter paper ready to the testing process. The time was taken with a stopwatch when the water level reached 120 ml on the measuring container.



**Table 1. Multiple Cutting Arrangement Vs. One Single Cutting Arrangement**

No. of Holes	Multiple holes/cutting areas Arrangement		Hot Water (HW) Reach 120 ml at 00:00:00	One single cut with rectangular shape Arrangement		Hot Water (HW) Reach 120 ml at 00:00:00
	Sum. in mm <sup>2</sup>	Holes to Base Ratio %		Sum. in mm <sup>2</sup>	Cutting to Base Ratio %	
1	28.26	0.68%				
2	56.52	1.35%				
3	84.78	2.03%				
4	113.04	2.70%	0:20:03	11mm x 10.28mm = 113.08	2.70%	0:29:12
5	141.3	3.38%				
6	169.56	4.05%				
7	197.82	4.73%				
8	226.08	5.40%				
9	254.34	6.08%	0:12:05	15mm x 15.07mm = 226.05	5.40%	0:16:21
10	282.6	6.76%				
11	310.86	7.43%				
12	339.12	8.11%				
13	367.38	8.78%				
14	395.64	9.46%				
15	423.9	10.13%	0:07:88	18mm x 18.84mm = 339.12	8.11%	0:09:69
16	452.16	10.81%				
17	480.42	11.48%				
18	508.68	12.16%				
19	536.94	12.84%				
20	565.2	13.51%				
			0:03:85	23mm x 24.58mm = 565.34	13.51%	0:08:53

As can be seen in Table 1, the brewing receptacle with multiple holes arrangement has a more stable result than in the other arrangement. And also with the same ratio, multiple holes arrangement has proved to be faster than one single cut arrangement. It is because every cutting area has a pressure point on the middle of that opening. When the filter paper gets wet from the hot water and receives gravity forces, the filter paper will stretch a little and arch in a way to form a pressure point where most of the liquid drips during brewing process. In conclusion to our test, the greater the number of outlets, the faster it will allow the liquid to pass through the filter paper into the reservoir cup/mug.

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10 The test also showed that one single cut arrangement, for example with 13.51% ratio, has a slower rate (8 second and 53 milli second) result in reaching the 120 ml marking level than 20 multiple cutting arrangement (3 second and 85 milli second) that also has a same ratio. The one cutting arrangement has also proved to be less stable and unreliable as a time control mechanism.

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The invention generally provides a disposable brewing apparatus made of inexpensive material such as coated paper board or polystyrene or polyethylene and filter paper. In one alternative, it can also be used to preserve natural resources when just the filter paper is the only part of the entire assembly to be discarded after use.

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### **DESCRIPTION OF THE DRAWINGS**

25 Fig. 1 is a perspective view of the coffee brewer positioned above a coffee mug that has a 7.2 cm top opening;

Fig. 2 is a vertical sectional view of the coffee brewer positioned above a disposable standard 12 OZ paper cup that has 7.6 cm top opening;

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Fig. 3 is a vertical sectional view of the coffee brewer, showing filter paper peel-able semi circular polar and the 5 mm seal area;

Fig. 4 is a top view of the coffee brewer;

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Fig. 5a is a bottom view of the coffee brewer;

Fig. 5b is a bottom view of the coffee brewer with peel able half-perforation;

Fig. 5c is a perspective view of the coffee brewer in a full height position on an accordion structured;

5 Fig. 5d is a perspective view of the coffee brewer in a flattened position on an accordion structured;

Fig 6 is a perspective view showing the bottom of the coffee brewer with Multiple Holes Cut Arrangement;

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Fig. 7 is a perspective view showing the bottom of the coffee brewer with One Single Cut Arrangement;

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Fig. 8 is a vertical sectional blow-up view of a pressure point created during filter paper stretched forming an arc;

Fig. 9 is a perspective view of the ring support with three legs; and

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Fig.10 is a perspective view of the filter cup son the supporting ring with three legs on top of a reservoir cup that has a greater than 8 cm top opening;

## **DETAILED DESCRIPTION OF THE INVENTION**

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As best seen in FIG. 1 and 2, a drip-type coffee, or herbal or tea brewer apparatus comprises a disposable cup 10 which can be made from material include but is not limited to a group consisting of polystyrene compounds, plastic, organic and or non organic Bio-degradable polymer, and or modified and or unmodified organic fibers and or pulp and or starch and or coated paperboard and or a combination thereof. Referring to the cup, it is seen that it has a partial closed bottom 110 that has an outer diameter about 7.3 cm and sidewalls 105 tapering outwardly towards the top open mouth 103 that has an outer diameter about 8.5 cm. The filter cup 10 is constructed of a water permeable or porous material, preferably commercial filter paper 121 which has substantial durability when it is in a wet condition, and which is coated with Polyethylene on one side and comparatively inexpensive so that it can be discarded after a single use. The filter paper 121 is attached to the bottom base

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110 of the filter cup 10 through heat seal or food grade starch or ultrasonic sealing system or supersonic sealing system. The filter cup 10 is designed with plurality number of holes 108 on its bottom base 110 as a time control mechanism which is fundamental to brew different kind of ingredients as each  
5 ingredient seems to be needed different time limit to be properly and correctly extracted. The area to be hot seal is as wide as around 5 mm along the rim of the circular shape of the filter paper.

Each hole 108 of the invention represents 28.26 mm<sup>2</sup>. Although the size of the  
10 hole/cutting area 108 can be varied, this size is perfect to create natural water droplets size. The accumulation of the water on the pressure point 625 is turned into its maximum size before it starts to drop down as a droplet which falling into a range between 3mm in diameter to 8mm. The droplet size when  
15 reached to its maximum size does not change accordingly with the perforation change into a bigger size. Therefore to keep it in the maximum range of droplet size will become the most effective way to control drip down process in this type of filter brewer. This is one critical point that set apart this invention from the other inventions that has bigger or too small perforation outlet arrangement. Arrangement of the holes or cutting areas 108 is designed to be separated at  
20 least 3 mm apart from each hole. This is important to create an individual droplet 630 (Fig.6) without interference from another droplet 630 which is positioned too close to one and another, in order to maintain a standard dropping rate. As gravity draws down the liquid from top to bottom, all of the holes or cutting areas 108 will get about the same force and release it at about  
25 the same rate. In other words, the hole/holes 108 receive about the same energy released from the gravity force or spread evenly to each and every hole 108. The major benefit of this design is that it creates an independent and uniform size of droplets. As learned from trials, the more standard the dropping rate the more precise its function as a time controlling mechanism. Also the  
30 more output to release gravity force the faster it is in accommodating a faster brewing rate.

As best seen in the Fig. 6 and Fig. 7, a pressure point 625 developed on each and every opening/cutting area when the hot water poured down on the filter  
35 cup 10. The gravity force pushes down the hot water which in its natural way forms an arch shape that has the lowest point that we refer to pressure point 625 on the filter paper 121. There is a plurality of pressure points 625 in Fig.6, while the embodiment of Fig. 7 has only one. Although bigger in cutting size,

pressure point 625 in Fig. 7 results in unstable and unpredictable droplets 630. On the other hand, the pressure point in Fig.6 which resulted from multiple holes arrangement is more predictable and, as set forth in Table 1, proved to be more stable.

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The heat seal area 109 (Fig. 3 and Fig. 4) is applied at about a 5 mm width circling along the outer edge of the filter paper 121 onto the cup's bottom 110. The 5 mm heat seal width provides some stretching flexibility to form a better pressure point 625 (Fig. 8) during the droplets drip-down process. The hot seal is possible because the commercial filter paper 121 contains Poly Ethylene on one of its sides. When subjected to heat, the PE material melts and become part of the cup assembly.

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Furthermore, to ensure a resistant-free flow of the liquid from top filter cup 10 to the bottom of the reservoir cup, this invention provides a hot steam escaping route. The filter cup 10 provides four (4) hot steam escaping vents 201 (Fig. 1 and Fig. 5a) on its lower part of the outer sidewall 105. The accumulated hot steam has been a problem in brewing devices that are telescopingly assembled. The hot steam trapped in the lower liquid receiving cup has been one culprit of the slower extraction process. Throughout our trial using a perfectly fit telescopingly assembly with no gap between the two cups, the trapped hot steam has accumulated into a massive force pushing up and thus delayed the drip down process. This indicates that the gravity force is not working in this condition as it is supposed to be. Therefore, releasing the trapped hot steam enables the liquid to flow from top to bottom in a resistant-free manner. The invention has four concave shapes vent 201 that are inwardly curving as deep as about 6 mm; as wide as about 1 cm and tapered upwardly as high as about 2.5 cm. Thus the vent 201 main functions are to avoid pressure build-up which can prolong the brewing time during brewing process in the reservoir mug. When disposed on a coffee mug these vents 201 allowed hot steam that is accumulated on the reservoir cup to be escaped (Fig.1). The number of petal shape corner can be maximize or minimize accordingly to the desired output of hot steam released (HSR) rate. When viewed from bottom (Fig.5a), the filter cup 10 looked like flower with four petal shape.

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The filter cup 10 uses the least filter paper 121 amongst any other similar product and is especially most efficient when compared to a tea bag for brewing tea beverage. Throughout our trial for brewing tea beverage, this

invention embodiment that has six (6) holes arrangement resulted in about two minutes brewing time which is the same as that recommended in most tea bag brewing methods. For comparison, most tea bag requires 13.140mm<sup>2</sup> (with a length of 146mm and width 90mm) of filter paper while this invention needs only 4183 mm<sup>2</sup> (3.14 x 36.5mm x 36.5mm) filter paper that is 300% more efficient than most tea bag assemblies in using filter paper. Furthermore, in pursuing even more efficiency with highly precision machinery, an individual hole sealing system is possible to be applied. For example, each individual hole 108 with diameter of 5 mm needs only one circular filter paper with diameter of 7 mm to be entirely covered. With this fabricating method, one can save up to 75% of current use (4183.3mm<sup>2</sup>) and almost 1400% (13140 mm<sup>2</sup> divided by 923 mm<sup>2</sup>) more efficient than most of the tea bag requirements in using filter paper. It is because its requirement of filter paper 121 can be adjusted accordingly to the number of cutting areas/holes and brewing time limit requirement. A six (6) holes arrangement needs only 922 mm<sup>2</sup> of filter paper that can be tracked from the following calculation; 7 mm<sup>2</sup> filter paper to be sealed into 6 cutting areas/holes that would equal to  $3.14 \times 7\text{mm} \times 7\text{mm} = 154 \text{mm}^2 \times 6 \text{ holes} = 923 \text{mm}^2$ . Thus, with more flexible arrangements of the number of holes in order to accomplish a certain extraction need, the filter cup 10 is not wasting any unnecessary filter paper 121 like the other brewing methods.

When telescopically engaged into the mouth of the reservoir cup or mug 11 that has a top inner side opening range between 7.2 cm in diameter to 7.5 cm in diameter, the filter cup 10 will fit snugly on the reservoir cup without any holder. For snugly sitting on top of the mug that has inner side top opening with diameter of 7.6 cm to 8 cm, the filter cup 10 uses attachable thin (about 3 mm thick x 2.5 cm x 2 cm) rectangular shape polystyrene sheets 610 (Fig. 2) on the bottom part of the outer side of the cup. The number of thin polystyrene sheets 610 can be used from one sheet to more than one according to the reservoir's cup top opening width. The thin polystyrene sheet 610 can be pre-attached on the filter cup 10 during fabrication or it can be provided with double-sided-tape and attached by user whenever needed. The telescopically engagement of the embodiment is the most practical way to hold the cup receptacle firmly with the reservoir cup and thus provide a unique coffee or tea disposable brewer "On the Go" for the portable public.

In addition to supporting the filter cup 10 onto the reservoir cup or mug 11 that has a larger than 8 cm top opening, the filter cup 10 uses perfectly fit sit-on-ring 233 (Fig. 9 and Fig. 10) which is rounded in shape and has three supporting jagged legs 238 that each has a length about 3.5 cm. Each of the supporting legs 238 is positioned at about one third of the ring's circumference. Each of the supporting legs 238 has a predetermine jagged part on its base 239 which is positioned to lock the filter cup 10 onto the larger top opening of the reservoir cup during the brewing process. The material being used for this supporting sit-on-ring 233 can range from sturdy plastic, paper base, wooden, bamboo, or a composite of various metal substances. The supporting ring 233 has a width 235 of about 1 cm which is tapered outwardly which and further has a top diameter 236 of about 7.5cm and a bottom diameter 237 of about 7.3cm.

In an alternative embodiment, the filter cup 10 is constructed to include, but is not limited to, material such as plastic and or polymeric, where only the filter paper is to be peeled-off **by pulling the semi circle 505** ( Fig. 3 – 4) and discarded after each brewing cycle, thus preserving natural resources. The durability of this invention can also be prolonged to a further level of effectiveness and efficiency when the cup is made from, but is not limited to, material such as Poly Ethylene and or Poly Styrene or the combination thereof having a well know durability. With using these materials, the economic value of the cup itself will become very insignificant due to its capability to be used over and over again. The only part that is discarded throughout the brewing cycle is the filter paper 121 that is easy to be recycled. This invention significantly promotes a clean environment through recycling only the part that is important to the brewing process and allowing the supporting material (the cup assembly 10) to be used again and again. The hot seal of filter paper 121 onto the paper, polystyrene, or polyethylene cup is easily done. A simple tool like solder that is inexpensive and considered as an average household tool can be modified into a food grade (stainless steel) heating tip and used to seal the filter paper 121 onto the bottom 110 of the filter cup 10. Another alternative is to use a same shape and size of HVS paper or protection material commonly used in ironing to prevent the conventional solder from directly touching the filter paper 121. The filter paper is seal-able because it contains Poly Ethylene on one of its sides. When applied to heat, Poly Ethylene melts and attaches to the bottom of the cup and becomes part of the cup. As one brewing is done, the cup is reusable. All it needs is to be thoroughly and properly washed and rinsed. The filter paper has been cut in circular shape with two predetermined

semi circles 505 on each of its poles (Fig. 3-4) that is used to ease the peeling off process of the filter paper 121 after washing. It is easier to peel off the filter paper 121 when it is wet. After drying, a new filter paper is ready to be sealed onto the cup which creates another reusable new brewing device.

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A standard coated paper cup, unless punctured, is encapsulated by a thin layer of Polyethylene substances to prevent any non-food grade material contained in the paper itself from contaminating the beverage contained into the cup. Therefore, in one alternative, especially for the coated paper cup, there is a process of re-coating the punched perforation inner side wall with water proof and heat resistant material such as polyethylene including, but are not limited to, any kinds of food grade wax, resin, organic or synthetic polymer, modified or unmodified sugar base coat-able substances. The method of re-coating includes but is not limited to brush, spray, and or immersion.

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A further alternative to avoid a recoating process after puncturing the perforation 108 on the paper cup's base 110 is to change the paper cup's base 110 material to material including, but not limited to, polystyrene, biodegradable substances such as modified and or unmodified organic fibers and or pulp and or starch and or polyethylene. During fabrication, the cup's base 110 made of polystyrene and or biodegradable substances and or polyethylene is fed into the paper cup forming machine to be integrated into a new combination of cup that has a paper coated wall 105 and polyethylene and or biodegradable substances and or polystyrene bottom base 110. With this combination, the need to coat the perforation 108 is eliminated because the material being used is food grade. One more benefit is that the new combination cup reduces the need to punch the perforation 108 during fabrication. This is because the perforation 108, made with material such as polyethylene and or polystyrene, is formed in a mold that has a predetermined number of perforations during forming the cup's base 110.

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Another alternative for making the cup's perforation 108 very flexible to be used in any type of extraction, is to form a maximum number of half-perforations 107 (Fig. 5b) allowed on the bottom of the cup's base 110. The perforation is formed into a half cut 107 with a small part 107a. (about one fifth of its total base area) bulging out from the filter cup's base 110 to allow easy pull-off or peel-off when necessary by one in preparing a specific need of brewing. The

35



half cut 107 is structured with many small-cut-and-gaps along the outer edge of the perforation but does not puncture it loose from the filter cup's base 110. Although some small leaking may appear from the un-peeled perforation, this method allows a user to custom peel-off any number of perforations he/she  
5 desires in order to perform his/her specific brewing need.

Further still alternatively, to save rack space on the retailer shelf and to provide a single pack of filter cup + coffee/tea + sugar + creamer into one single sachet, the filter cup 10 may be formed into an accordion like structure. The accordion  
10 shape or structure (best seen on Fig. 5c and Fig.5d) of the cup can be formed during fabrication by using a specific molding treatment and or heat treatment and or pressure forming or the combination thereof directly or indirectly influenced in all or in part of the filter cup's wall 105. The accordion shape or  
15 structure of the filter cup 10 can allow the cup to shorten or flatten (Fig. 5d) and thus can be fitted into a single serving pack. When the pack is opened, one can easily pull the flattened cup into a regular height (Fig. 5c) filter cup without altering the cup's main function as a filter apparatus.

In carrying out the operation of the invention, presumably the filter cup 10 has  
20 been assembled in the manner described and illustrated, and is supported on top of the mug. As seen in Fig. 1, a small pre-mix sachet that contained about 25 grams of ground coffee 612 plus sugar plus powder creamer is opened and poured onto the filter cup 10. When the hot water reaches a suitable degree, the hot water is then poured into the filter cup 10 and fills the cup almost to the  
25 top opening 103. The drip down process starts immediately but still provides enough time to do the stirring movement on the mixture. A back and forth stirring movement of about 30 seconds to one minute is required when the hot water is fully filled in the filter cup 10. A proper stirring movement is crucial to break the shield effect of the fat layer created when in contact with the hot  
30 water. When the stirring process is done, the user only needs to wait until the mixed beverage has dripped down entirely onto the coffee mug. Furthermore, the filter paper 121 has trapped all the unextractable ingredients on the assembly of the filter cup 10. The beverage brewed in the filter cup 10 seeps through the filter paper, drips down the other side thereof into the mug. Once  
35 the water level is low and the drip down process is considered slow on the filter cup 10, the filter cup 10 can be easily pulled out and discarded. Instantly, the coffee beverage can then be consumed.

It is emphasized that the filter cup 10 can accommodate a reasonable volume (160 ml) of hot water required for brewing one serving of coffee or tea beverage (which usually only requires about 150 ml) on one single pouring. Moreover, the filter cup 10 is designed to provide easiness on the pouring effort even on  
5 the larger cup with at most two simple pourings. There is no need to pour a small volume and then wait and then repeatedly do the same thing until the beverage is ready to consume, like some existing brewing methods that use filter elements.

10 It is also emphasized that the arrangement of the holes/cutting areas 108 on the bottom base 110 of the filter cup 10 can be arranged by the plurality of outlets to result in a drip time in a range of about 1 minute to 13 minutes or longer depending on the specific need of brewing ingredient and time. The size of the hole/cutting area can be also modified into larger or smaller sizes to  
15 satisfy with a specific brewing requirement. The shape of the opening or cutting area can be differentiated into many forms (such as company logo; characters; company's Icon or the like) as to make it fancier and enhanced its aesthetic appearances.

20 The specifics of the invention described before mentioned will be understood as an illustration purpose and example embodiments purpose to the invention. Numerous modifications and alterations are within the competency for a person skilled in the art to employ the shown embodiment utilizing functionally equivalent components to those shown and described, without departing from  
25 the scope of the invention. For example, the shape and volume of the cup receptacle can be varied. Furthermore, the appearance of the hot steam escaping vent and the cup receptacle can also be varied to most any diameter desired. The scope of the invention, however, encompasses larger versions of the apparatus adapted for making more than one cup of coffee at the time. In  
30 addition, the scope of the invention includes use of non-disposable materials. All such modifications are intended to be included within the scope of the invention as defined by the appended claims.

35 When the coffee brewer shown and described is adapted for preparing an individual serving of coffee or tea or the like, the filter cup 10 may be approximately 4.7 cm high and have an open upper surface approximately 8.5 cm in diameter and a lower partially open bottom 7.3 cm in diameter.

## Complete List of Numerals of Elements:

	HSR	Hot Steam Released
5	HSBU	Hot Steam Build Up
	GF	Gravity Force
	10	disposable cup
	11	reservoir cup or mug
	110	partial closed bottom
10	105	outer sidewalls
	103	top open mouth
	201	hot steam concave shape vents
	121	filter paper
	108	holes or cutting areas
15	625	pressure point
	630	liquid droplets
	109	heat seal area
	610	polystyrene sheets
	612	Coffee ground
20	233	perfectly fit sit-on-ring
	238	supporting jagged legs
	239	jagged part of supporting leg
	233	supporting ring
	235	width of supporting sit-on-ring
25	236	top diameter of supporting sit-on-ring
	237	bottom diameter of supporting sit-on-ring
	505	peel-able semi circle
	107	half-perforations
	107a.	a small bulging part to peel half perforation
30		

What is claimed is:

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1. A beverage brewer, adapted to discharge fresh extractable ingredients to a liquid receiving container there below comprising:

10 a disposable brewing cup comprising a cup of reduced size having an open top and having a liquid pervious bottom, adapted for holding a quantity of an infusible material for a certain time limit to allow a stirring action before dispensing the brewed beverage there from into the liquid receiving container;

15 at least one sheet of filter element sealed along at least 1mm width to a rim of a bottom base of the brewing cup by a non-toxic meltable substance contained within the filter element and thereby sealed unto the bottom base of the brewing cup;

at least one natural size of water droplet creating perforation whereupon the predictable manner of the drip can be used to measure the drop rate

20 at least one flow restricting perforation whereupon the liquid will flow in a restricted manner to influence a time limit preferable for the extractable ingredient to flow to the liquid receiving container there bellow \;

at least one concave shape vent disposed on a lower part of an outerwall of the said brewing cup;

25 at least one vent-providing polystyrene sheet positionable on the lower part of the said brewing cup; and

a sit-on-ring having means to support the brewing cup on the liquid receiving container, said means to support comprising:

30 a tapered annular shape ring; and  
three jagged supporting legs.

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2. The device as set forth in claim 1 wherein said brewing cup is normally employs a certain standard quantity of liquid and a certain standard quantity of extractable ingredient to yield a standard volume of beverage.

- 5 3. The device as set forth in claim 1 wherein said brewing cup is fabricated from a material selected from a group consisting of polystyrene compounds, plastic, organic Bio-degradable polymer, non organic polymer, modified and unmodified organic fibers and or pulp and or starch and coated paperboard.
- 10 4. The device as set forth in claim 1 wherein said brewing cup is fabricated from a combination of material selected from a group consisting of polystyrene compounds, plastic, organic and or non organic Bio-degradable polymer, and or modified and or unmodified organic fibers and or pulp and or starch and coated paperboard.
- 15 5. The device as set forth in claim 1 wherein said sealing method of said filter paper is to provide a stretching flexibility required to form a sufficient arc on pressure points.
- 20 6. The device as set forth in claim 1 wherein said perforation is structured to be adapted to about the maximum size of the water droplet when applies in a similar brewing cup with the similar water volume and gravity force.
- 25 7. The device as set forth in claim 1 wherein said lower wall of said brewing cup is circular in cross section.
- 30 8. The device as set forth in claim 1 wherein said brewing cup is adapted to receive a supply of liquid and is liquid permeable throughout the perforation.
9. The device as set forth in claim 1 wherein said perforations are arranged at least one millimeter apart from one to another.
10. The device as set forth in claim 1 wherein each of said perforation has an area of about 28.26 millimeters square.
- 35 11. The device as set forth in claim 1 wherein said filter element is heat-sealed over an area as wide as about five millimeters circling along the outer edge unto the bottom base of said brewing cup.

12. The device as set forth in claim 1 wherein said vent is arranged on the brewing cup lower part of the outer sidewall.

5 13. The device as set forth in claim 12 wherein said vents are spaced equally unto four cross sectional sides of the brewing cup

10 14. The device as set forth in claim 12 wherein said vent comprises an inwardly concaved corner as deep as six millimeters, and as wide as one centimeter that tapers upwardly as high as two and half centimeters of said brewing cup outer wall.

15 15. The device as set forth in claim 1 wherein said vent-providing polystyrene sheet is attachable unto said bottom part of the outer side of the brewing cup.

20 16. The device as set forth in claim 15 wherein said vent-providing polystyrene sheet is rectangular in shape with an approximate three millimeter thickness, a length of about two and half centimeters, and a width of about two centimeters.

25 17. The device as set forth in claim 1 wherein said supporting sit-on-ring is annular in shape, said supporting sit-on-ring being telescopically adapted unto the lower portion of said brewing cup for supporting said brewing cup above the liquid receiving container, upper portions of said supporting sit-on-ring are tapered downwardly, are arranged with a width of 1 cm tapered outwardly which has top diameter of 7.5cm and bottom diameter of 7.3cm.

30 18. The device as set forth in claim 17 wherein said supporting legs are positionable unto the top of said reservoir cup, and include a jagged locking part extending therefrom to engage unto the top opening of said reservoir cup and thereby retain said brewing cup in place at a fixed orientation within said liquid receiving container.

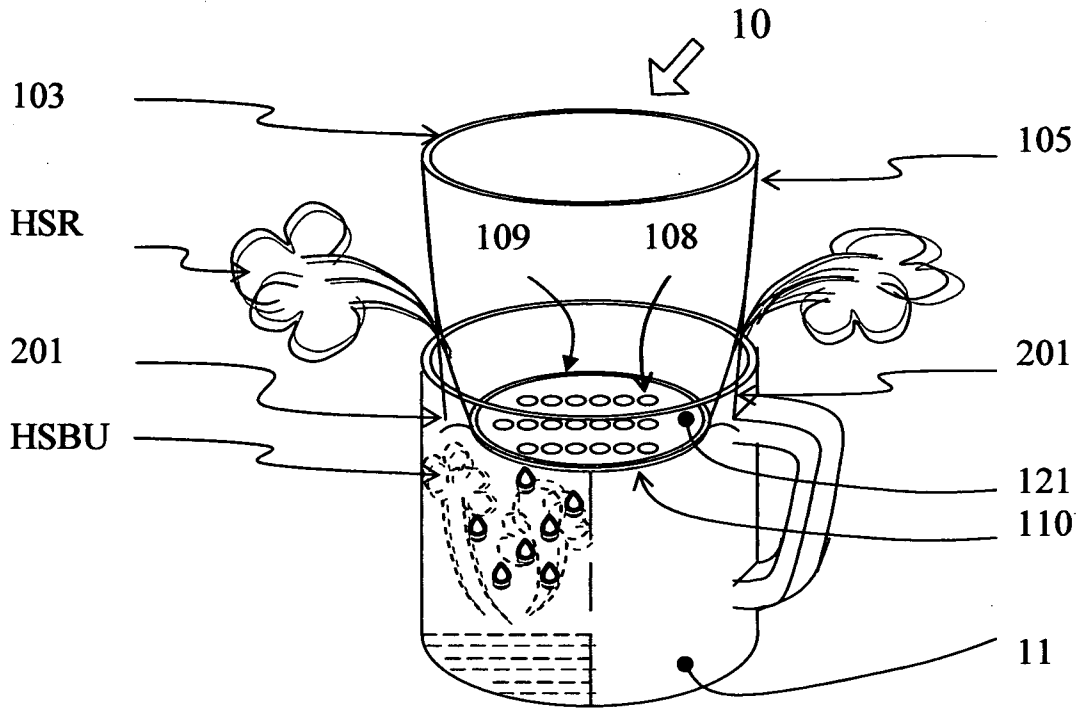


Fig. 1

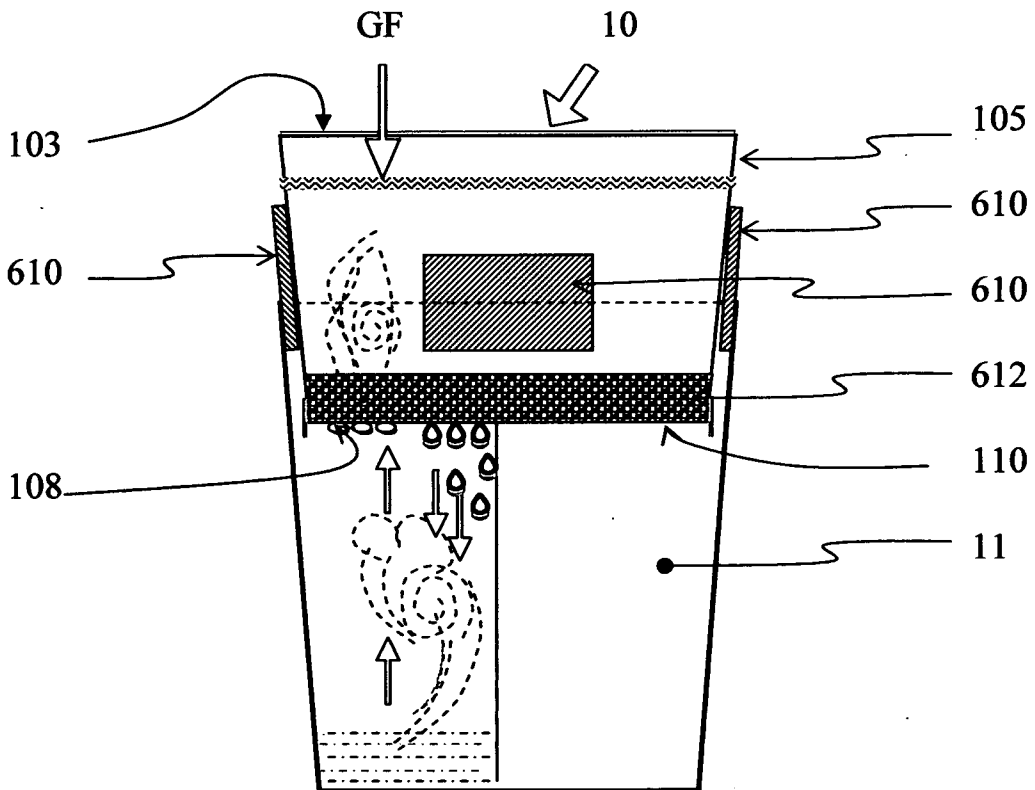


Fig. 2

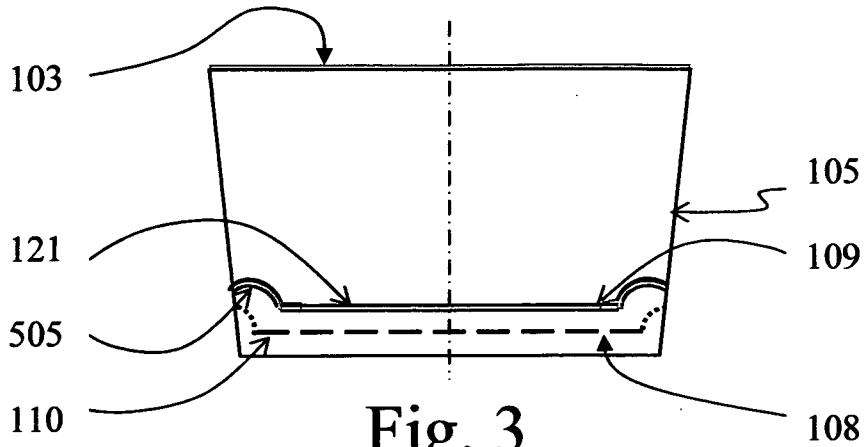


Fig. 3

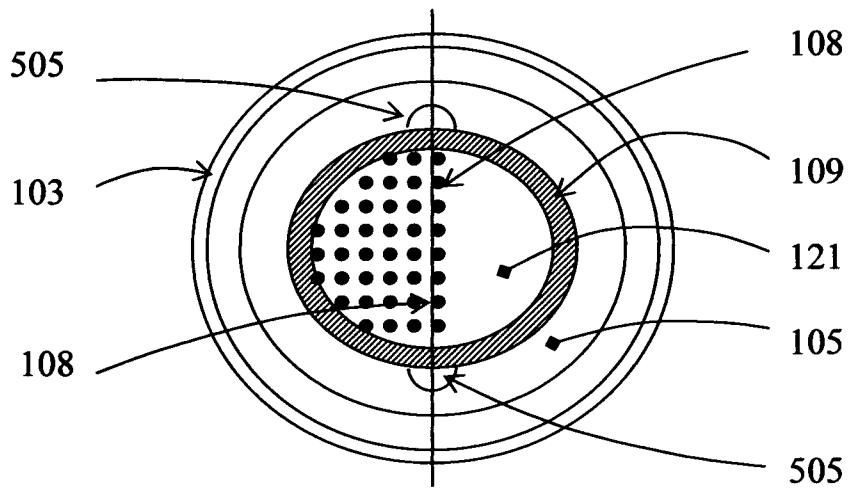


Fig. 4

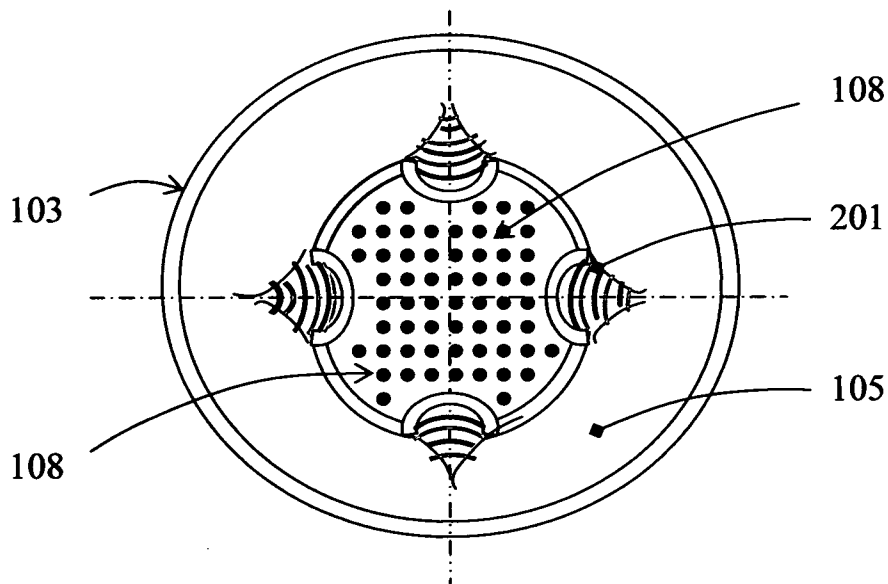


Fig. 5a



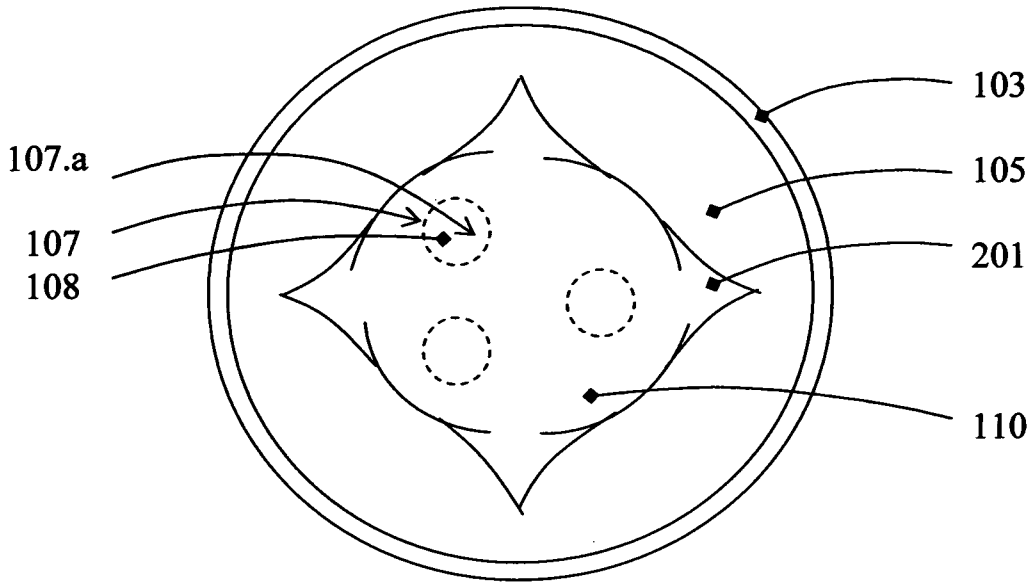


Fig. 5b

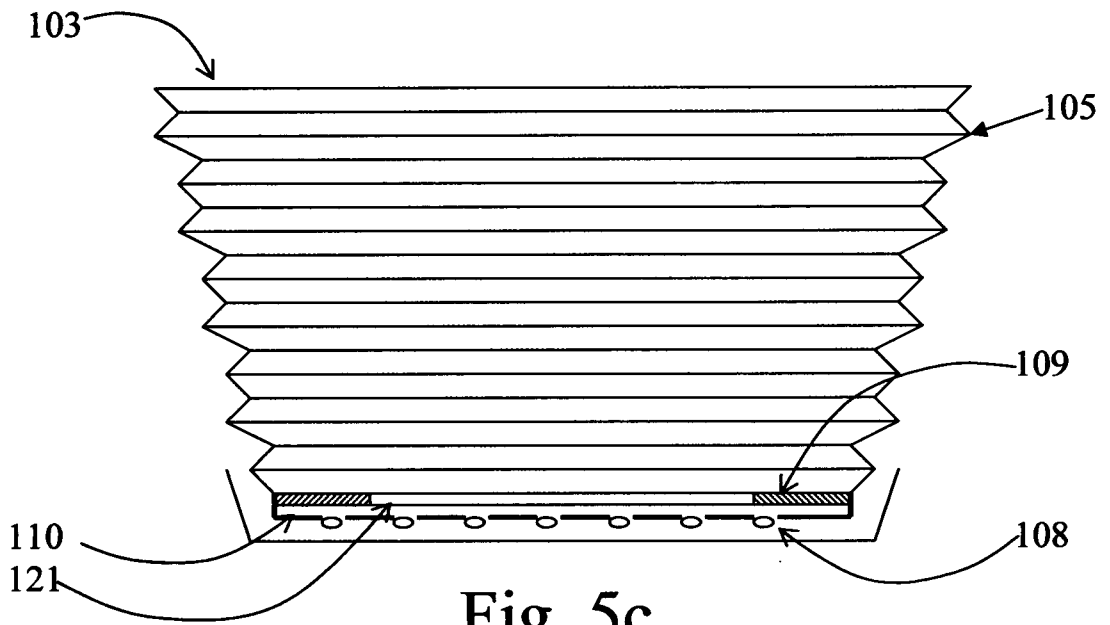


Fig. 5c

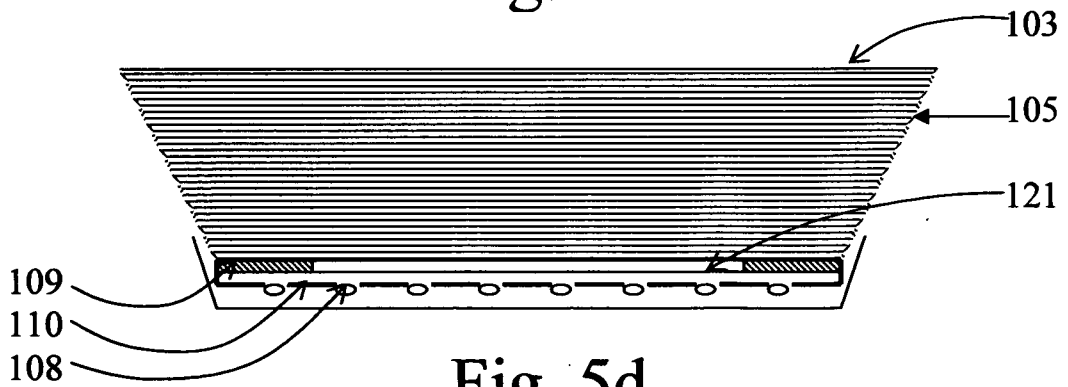


Fig. 5d

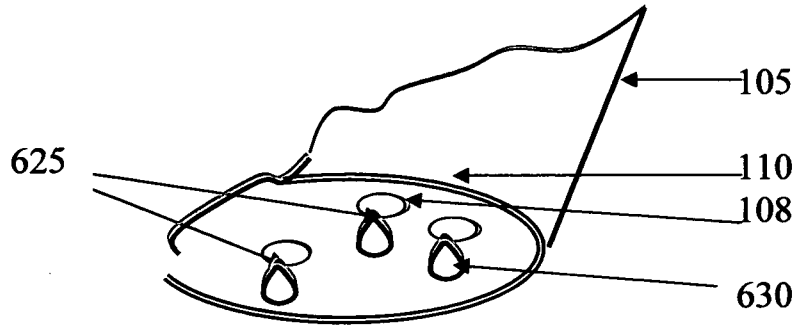


Fig. 6

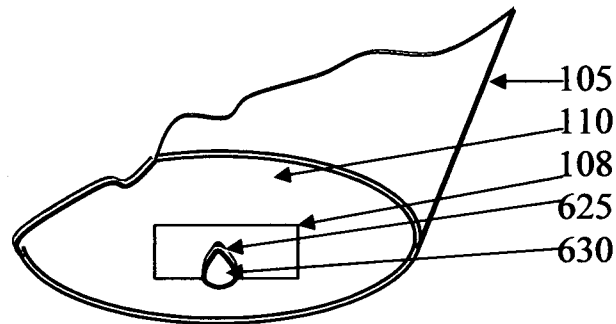


Fig. 7

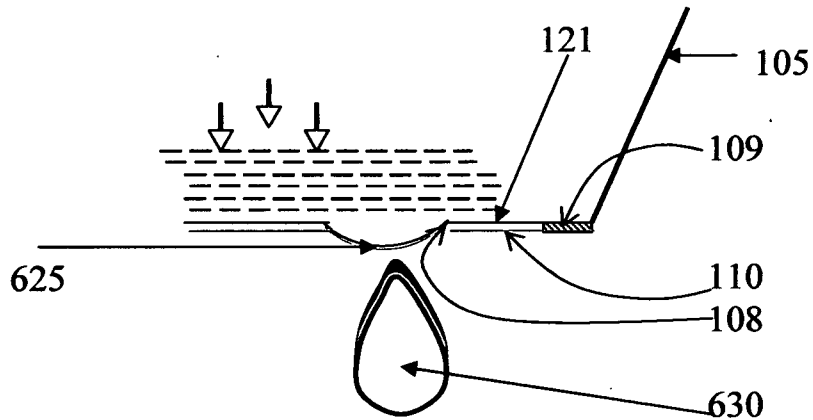


Fig. 8

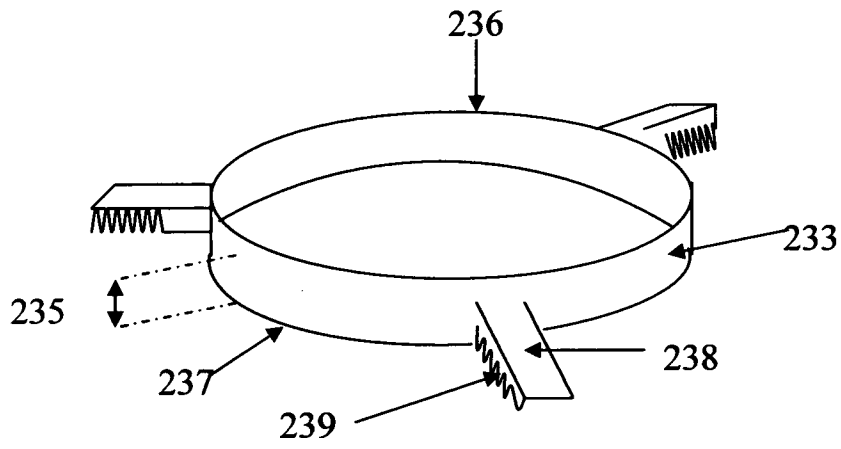


Fig. 9

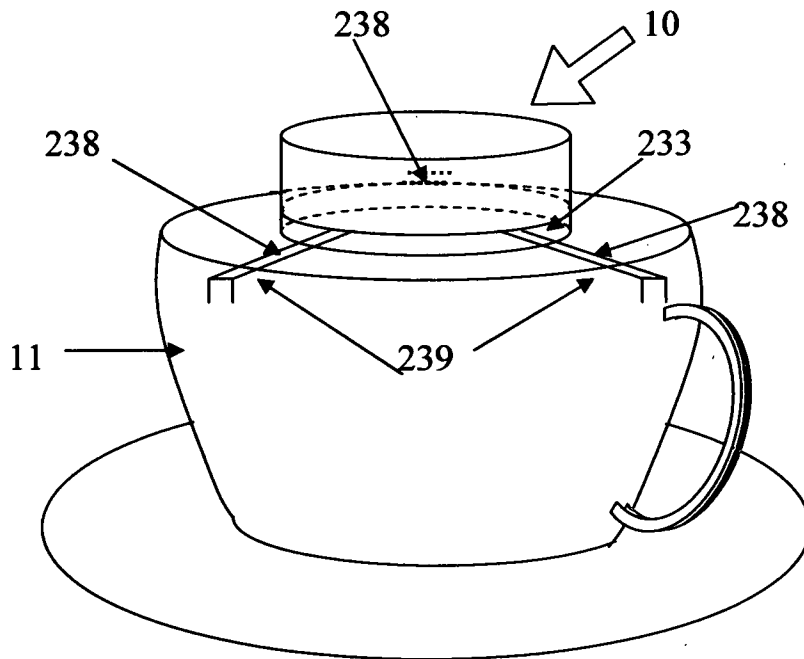


Fig. 10

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/ID2008/000002A. CLASSIFICATION OF SUBJECT MATTER  
INV. A47J31/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 867 880 A (PELLE THEOS R [US] ET AL) 19 September 1989 (1989-09-19)  column 3, lines 16-49 column 4, lines 6-52 figures 2, 3A, 3B	1, 2, 6-10, 12, 13
A	WO 03/065858 A (FARNGE CO LTD [JP]; IKOMA TATSUO [JP]) 14 August 2003 (2003-08-14)  abstract; figure 8	1, 2, 7-11, 17, 18
A	FR 914 538 A (BASTIEN ANDRÉ) 10 October 1946 (1946-10-10) page 1, lines 9-13	1, 6

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

13 June 2008

Date of mailing of the international search report

11/07/2008

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/ID2008/000002

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4867880	A	19-09-1989	NONE	
WO 03065858	A	14-08-2003	AU 2002230209 A1	02-09-2003
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