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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 August 2010 (05.08.2010)

PCT

(10) International Publication Number
WO 2010/085850 A1

(51) International Patent Classification:
A47J 31/42 (2006.01) *A47J 42/44* (2006.01)
A47J 42/40 (2006.01)

(21) International Application Number:
PCT/AU2010/000087

(22) International Filing Date:
29 January 2010 (29.01.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2009900315 29 January 2009 (29.01.2009) AU

(71) Applicant *(for all designated States except US)*: **BREVILLE PTY LIMITED** [AU/AU]; Building 2, Port Air Industrial Estate, 1A Hale Street, Botany, New South Wales 2019 (AU).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **PSAROLOGOS, Con** [AU/AU]; 47 The Glen Road, Bardwell Valley, New South Wales 2207 (AU). **DAVENPORT, David** [AU/AU]; 12A Seville Street, Lane Cove, New South Wales 2066 (AU). **HOARE, Richard** [AU/AU]; 3 Avian Crescent, Lane Cove, New South Wales 2066 (AU).

(74) Agent: **MOLINS, Michael**; Suite 5, Level 6, 139 Macquarie Street, Sydney, New South Wales 2000 (AU).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

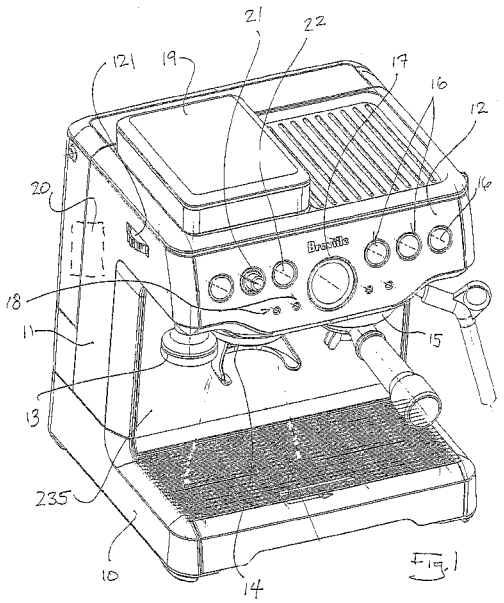
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

WO 2010/085850 A1

(54) Title: ESPRESSO MACHINE WITH GRINDER DOSING CONTROL



(57) Abstract: An espresso machine has a built-in coffee grinder. An electrical switch toggles between a one cup dose and a two cup dose, The switch works in conjunction with a dose strength adjustment. Alteration of the dose strength adjustment alters the dose strength for both the one cup of two cup dose settings. The internal coffee grinder dispenses into a portafilter that is held in a hand free support cradle. In some embodiments, the upper burr head of the grinder is retained by a bracket. The combination of upper burr head and bracket allows the upper burr head to removed and replaced without having to re-set the grind size.

Espresso Machine with Grinder Dosing Control

Field of the Invention

The invention relates to espresso machines and more particularly to an espresso machine with a built-in coffee grinder and a number of features that enhance and compliment the operation of that grinder.

Background of the Invention

The invention provides automation, sophistication and ease of use to consumers seeking an espresso machine with a built-in coffee grinder. It should be understood that the features forming the present disclosure may be used together in or in combination depending on a host of factors such as consumer preference and cost.

Objects and Summary of the Invention

It is an object of the invention to provide an espresso machine with a built-in coffee grinder.

In selected embodiments an electrical switch toggles between a one cup dose and a two cup dose. The switch works in conjunction with a dose strength adjustment. Alteration of the dose strength adjustment alters the dose strength for both the one cup of two cup dose settings.

In other embodiments, an internal coffee grinder dispenses into a portafilter basket that is held in a hand free support cradle.

In other embodiments, the cradle cooperates with a switch that is activated by the portafilter. A single depression of the switch with the portafilter automatically dispenses a dose that is pre-established by the setting of and adjustable with the dose strength adjustment. If the same switch is depressed continuously rather than momentarily, the grinder will operate until the switch is released or a maximum pre-determined grind time is reached.

In particularly embodiments of the invention, the portafilter is supported below the coffee grinder by a support cradle. The cradle is adapted to hands free operation and is optionally adapted to funnel or focus grinds into the filter basket, minimising overspilling when filling the basket.

In some embodiments of the invention, the upper burr head of the grinder is retained by an upper burr bracket. The combination of upper burr head and burr bracket allows the upper burr head to removed and replaced without having to re-set the grind size.

In some preferred embodiments, the coffee grinder further comprises a constricted area that leads to a grind chute. The constricted area acts to reduce the volume of the ejected ground coffee particles thus reducing inadvertent overfilling of the portafilter basket.

In other selected embodiments, the grinder is associated with a coffee bean hopper. The hopper may be removed from the machine without beans falling through the bean feed opening. A safety mechanism prevents the grinder from operating unless the hopper is in place.

In yet other embodiments, the espresso machine comprises a separate and removable tamper that may be attached to the machine and used in place or removed by the user.

In further embodiments, the machine further comprises a drip tray that collects liquid and spilt coffee grinds separately. The separation of dry from wet waste reduces sink blockages.

In yet other embodiments the espresso machine comprises a pullout storage tray that is normally concealed, but revealed when the drip tray is removed.

Brief Description of the Drawing Figures

In order that the invention be better understood, reference is now made to the following drawing figures in which:

Figure 1 is a perspective view of an espresso machine according to the teachings of the present invention;

Figure 2 is an elevation of some of the user controls associated with the machine depicted in Figure 1;

Figure 3 is a perspective view of a portafilter and cradle;

Figure 4 is cross sectional detail of the cradle and portafilter;

Figure 5 is a side elevation of the portafilter inserted into the cradle;

Figure 6 is a partially cross sectioned top plan view of the portafilter and cradle;

Figure 7 is a partially cross sectioned top elevation of the cradle and portafilter showing the portafilter depressing an activator;

Figure 8 is a front perspective view of the portafilter and cradle;

Figure 9 is a bottom plan view of the cradle;

Figure 10 is a front elevation of the cradle with the portafilter removed;

Figure 11 is a perspective view of the grinder, gearbox and chute;

Figure 12a is a cross sectional detail of the grinder illustrating the constriction area;

Figure 12b is a perspective view of the conical burr grinder casing as integrated with the motor and gearbox casing and illustrating the discharge opening for grinds;

Figure 12c is a perspective view of the grinder casing illustrating the flow path of the grinds out of the grinder and through the tapered chute;

Figure 12d is an exploded perspective of the removable upper burr and upper burr bracket;

Figure 13 is a bottom plan view of a hopper;

Figure 14 is a side elevation of hopper shown in Figure 13;

Figure 15 is a perspective view of the hopper depicted in Figure 13 with the lid removed;

Figure 16 is a bottom perspective view of the hopper;

Figure 17 is a perspective view of the machine's hopper receiving recess;

Figure 18 is a bottom perspective view of the recess area depicted in Figure 17;

Figure 19 is a perspective view of a portion of the chassis illustrating the location of the tamper and its receptacle;

Figure 20 is a cross sectional view of the chassis and removable tamper;

Figure 21 is an exploded perspective of the drip tray and drip tray cover;

Figure 22 is a cross section through the drip tray and drip tray cover;

Figure 23 is a cross sectional view of the drip tray and storage tray, both fully inserted into a stationery carriage associate with the espresso machine;

Figure 24 is a cross section of the carriage and storage tray with the drip tray removed; and

Figure 25 is a cross sectional view through perforations in the drip tray.

Best Mode and Other Embodiments

As shown in Figure 1, an espresso machine with built-in coffee grinder comprises a base 10 that supports a carriage within which is contained a drip tray with cover and a concealed storage tray. An upright portion 11 extends from the base 10 and supports a ledge 12. The underside of the ledge features a removable tamper 13, a portafilter support cradle 14 that is located below an internal coffee grinder and the group head or brew head 15. The front face of the ledge comprises various user controls 16, a pressure gauge 17 and various indicators 18. A removable bean hopper 19 discharges beans into the internal grinder. An internal microprocessor 20 receives the various user inputs and operational parameters produced by the machine's internal sensors and using these, controls the operation of the grinder, indicators and the machine's boiler, hot water and steam systems.

As shown in Figure 2 the user operated grind controls include a variable dose strength adjustment knob 21 and a dose toggle switch 22. The dose strength adjustment knob is in this example a variable resistor with 11 discreet settings. In this example, settings are communicated to a microprocessor that uses the settings to control the operation of the built-in grinder's electrical motor. Each of the discreet or continuous settings determined by the strength adjustment knob 21 corresponds to a duration of operation of the grinder. In effect, less operation time means less grinds and thus weaker coffee and longer operation of the grinder results in more coffee

being delivered to the portafilter and thus a stronger brew. It will be appreciated that, for example, a linear resistor may be used in place of a rotary one and digital controls may be employed in more sophisticated examples.

The dose toggle switch 22 toggles between single cup and double cup dose settings. The toggle switch 22 is associated with, for example, two indicators 23, 24. In this example, the indicators 23, 24 are LED indicators that indicate whether a single cup dose 23 or double cup dose 24 has been selected by the user operating the dose toggle switch 22.

The micro processor that is controlled by the dose strength adjustment setting 21 will apply the strength adjustment setting to both the single and double cup dose time settings that are used to control the grinder. Accordingly, operation of the strength adjustment setting 21 while the toggle 22 is set for a single cup dose will result in a comparable dose adjustment being automatically made when the toggle is changed to a double cup dose. Similarly, strength adjustments made when the toggle is set for a double cup are remembered by the microprocessor and applied appropriately to single cup doses. The microprocessor applies an algorithm or get stored values from, for example, a look-up table or the like.

The dose strength adjustment setting 21 is desirable for at least two different reasons. First, normal manufacturing tolerances within the machine's coffee grinding heads result in differences in the outputs of different machines. The dose strength adjustment allows this inconsistency to be rectified with a relatively simple user adjustment. Further, the grind size is determined by, for example, the distance between the burrs and the grinder and because this distance is user adjustable, adjustments in the duration of the operation time of the grinder are required to compensate for the variation in grind size setting. For example, coarser grinds will provide a greater output (by weight) for a given operating time than when set to a finer grind. That is, finer particles take longer to grind. Enough range is provided in the dose strength adjustment 21 to deal with the full range of user selectable grind size settings.

As shown in Figure 3, the portafilter 30 is retained by a filling cradle 31 while fresh grinds from the grinder are being dispensed into it. The cradle 31 comprises a "U" shaped receiving opening 32 flanked by a symmetrical pair of

wings 33. An upper surface 34 of the cradle is formed with a dispensing opening 35 that cooperates with a generally "U" shaped guide channel 36 that leads grinds toward the portafilter's filter basket (not shown in Figure 3). The portafilter 30 has circular upper periphery 37 for receiving the filter basket. The upper periphery 37 is surrounded by, for example, three equally spaced tabs 38. The tabs 38 are used to engage the portafilter with the brew head during brewing operations. The brew head has helical slots that receive the tabs and which promote sealing of the filter basket against the underside of the group head when the portafilter is rotated into its final or brewing position.

The tabs 38 are also used to support the portafilter in a hands free manner while ground coffee is being dispensed into it. As shown in Figures 4-8, the rear tabs, being the ones closest to the portafilter's handle are supported by tapered ledges 39 that extend from the lower extremity of the wings 33. The ledges 39 taper from a maximum width toward the front of the cradle to a minimum width at the rear or deepest part of the cradle opening 32. As shown in Figure 6, the two rear tabs 61, 62 are at least partially if not fully supported by the ledge 39 when the portafilter is inserted into the cradle 31. In this orientation, the front tab 63 is adjacent to a reciprocating actuator 64 that cooperates with an electrical switch such as a microswitch. The actuator 64 has a curved front surface 65 that cooperates with the front tab 63. The actuator 64 fits within and slides relative to an opening 66 formed in the cradle between the wings 31. As shown in Figure 7, the portafilter 30 may be advanced against the actuator 64 so that the actuator's switch can be operated in this way.

In a preferred embodiment, advancing the portafilter 30 against the actuator 64 (momentarily) and then releasing it sends a signal to the microprocessor that causes an automatic filling of the filter basket by actuating the grinder for a specified or preset time. This time depends on the setting of the dose strength adjustment setting 21 and the dose toggle switch 22. Pressing the front tab 64 of the portafilter against the actuator 64 and holding it continuously in the position depicted in Figure 7 causes the microprocessor to operate the grinder until pressure on the actuator 64 is

released manually or a predetermined operating time for the grinder is reached.

The rear tabs 61, 62 of the portafilter, when resting on the ledges 39 of the wings 31 act as a pivot point. The weight of the portafilter's handle 30a causes an imbalance that is resisted by an internal downward facing ledge 41 formed above the front tab 42 when it is inserted into the cradle 31. In this way, the imbalance caused by the weight of the handle is resisted and the portafilter remains stable in the cradle, even when the user is not holding it in place.

As shown in Figures 3 and 9, the dispensing opening 35 of the cradle includes an arcuate or curved rim portion 45. This curved portion of the opening 35 is located toward the front of the filter basket when the portafilter is inserted into the cradle. The curved portion 45 of the opening 35 cooperates with the curved guide channel 46 so that grounds are deposited toward the front half 91 of the filter basket rather than the rear half 92. These features contribute to the stability of the mound formed by the dispensed grinds, making spilling less likely.

As shown in Figure 11, the espresso machine contains an internal coffee grinder 110. The grinder 110 comprises an upper burr 111, a lower burr 112, a motor and gearbox case arrangement 113, a user grind size adjustment mechanism and a dispensing chute 115. In this example, a conical burr grinder is used. Thus, the lower burr 112 is rotated by the motor and its gearbox with respect to the stationery upper burr head 111. The upper burr head 111 is removably retained by an upper burr bracket 116. The upper burr bracket 16 locates the removable upper burr head in a predictable and repeatable way relative to the fixed lower burr head 112. The upper burr head 111 is retained in the upper burr bracket 116 by a retaining ring 117 that carries a folding grip 118 that can be deployed and twisted so as to free the ring 117 from the bracket 116 allowing the upper burr head to be removed, maintained or replaced. The entire upper burr bracket may be rotated and thus displaced from the lower burr by a first adjustment gear ring 119. This gear ring 119 is rotated by a smaller or second adjustment gear 120 carried on the underside of a user adjustment dial 121. The user adjustment dial and its second gear 120 are supported for rotation by the housing of the motor and gearbox. Thus,

rotation of the adjustment dial 121 causes a linear displacement of the upper burr bracket and hence the upper burr 111. The closer the upper burr head 111 is to the lower burr head 120, the finer the grinds that are created. As shown in Figure 12a, the receiving cavity 125 located below the burrs of the grinder features an exit opening 126. This exit opening 126 leads into a constriction area 127 that extends between the discharge opening 126 and the opening into the dispensing chute 115. In some embodiments, the constriction area 127 has parallel side walls that are configured to gently compress rather than disperse the grind particles. This light compression of the particles reduces the velocity and volume of the discharge and reduces the accumulation of static electricity in the particles and their interaction with the polymeric chute 115. Thus, grinds are discharged in a more compressed or compact way into the filter basket of the portafilter. This minimises the amount of spillage from the filter basket.

As shown in Figure 12b, the motor, gearbox and part of the conical burr grinding assembly are contained within a unitary case 113. An upper portion of that case contains a recess 113a for receiving the lower burr 112. A discharge or exit opening 126 is formed into a side wall of the recess 113a. The case 113 also contains journal support structures 113b for supporting the user adjustment dial 121 and any gear train associated with it.

As shown in Figure 12c, the ground coffee particles circulate within the casing 113 until such time as they enter the constriction area 127 prior to discharge from the tapered chute 115. Note that chute 115 terminates in a generally "D" shaped port 115a that cooperates with the configuration and shape of the dispensing opening 35 formed in the filling cradle 31 (see Figure 3). With reference to Figure 11, it can also be appreciated that the chute 115 is provided with a removable cover 115b that is attached by clips 115c, allowing the interior of the chute to be accessed for cleaning or maintenance.

As shown in Figure 12d, the upper burr head 111 is removably retained by the upper burr bracket 116. In this example, the bracket 116 contains male internal bayonet features 166a that cooperate with female bayonet features 117a formed around the external circumference of the upper burr head 111. This allows for a positive mechanical engagement that is repeatable and

predictable, facilitating the removal and reinsertion of the upper burr head 111 into its burr bracket 116.

As shown in Figures 13-16, the espresso machines internal grinder is supplied with coffee beans from a removable, external hopper 150. The hopper 115 comprises a bean reservoir 131, a coupling portion 132, a coupling mechanism and an optional transparent cover 141.

In this example, the coupling portion 132 is generally cylindrical and fits within a cooperating opening formed on an upper portion of an espresso machine. The receiving opening for the coupling portion 32 includes a pair of recesses for receiving reciprocating sliders 161 that extend radially from the cylindrical side walls of the coupling portion 132. As shown in Figure 13, the underside 133 of the coupling portion 132 has one or more discharge openings 134 that can be blocked by a rotating shutter. The shutter is operated by a dial 151 that extends through a cover 152 within the reservoir 131. Rotating the dial 151 closes the shutter and simultaneously causes the safety sliders 162 to retract into the coupling portion 132. Retraction of the sliders 161 from the cooperating openings in the receiving portion of the espresso machine allows the hopper to be withdrawn, the shutter having already been closed to prevent beans from being inadvertently discharged. Retraction of the sliders from their cooperating openings in the espresso machine also deactivates an electrical switch associated with one or both receiving openings which has the effect of de-energising or locking out the power supply to the grinder's motor, thus rendering the grinder inoperative until such time as the hopper is reinstalled and the dial is twisted. Installation of the hopper by twisting the dial causes the sliders to extend and thus rendered the grinder's motor operative. This arrangement is a safety feature that prevents the grinder's motor from being operated unless the hopper is securely in place.

As shown in Figures 17 and 18, an upper portion of the espresso machine features, for example, a top cover 170 having a recess 171 for receiving the body of the hopper and opening 172 for receiving the coupling portion of the hopper. The recess 71 features a pair of openings or sleeves 173 for receiving the sliders. As shown in Figure 18, a microswitch 181 is mounted under the cover, adjacent to one or both of the receiving openings 173. The

microswitch 181 cooperates with the espresso machines micro processor for the purpose of disabling the grinder's motor once the sliders are retracted.

As shown in Figures 19 and 20, the chassis 191 of the espresso machine supports a removable coffee tamper 192. In this example, the chassis 191 includes a frontal overhanging ledge 193. The ledge 193 has openings 194, 195 for receiving relevant portions of the machine's grinder and group head. The underside of the ledge 193 also features a tapered recess 196 for receiving a removable tamper 192. The tamper 192 has an elongated handle 197 that is tapered to cooperate snugly with the receiving recess 196. A magnet 198 is located in association with the recess 196 and preferably on or adjacent to the uppermost extremity of the recess 196. The coffee tamper 192 features a metallic cap 200 that is attracted by the magnet and assists in retaining the tamper within the recess 196. The tamper 192 has an enlarged head 201 that is used to compress ground coffee into the filter basket. It can be used in the orientation depicted in Figures 19 and 20, that is, inserted into the recess. In the alternative, it can be removed and reinserted 202, at will, by the user. In preferred embodiments, the tamper and its recess are located conveniently adjacent to the coffee grinds dispenser, as indicated by the relationship between the recess 196 and the opening in the chassis for the grinder 194 shown in Figure 19.

The espresso machine also supports a removable drip tray and drip tray cover as shown in Figures 21 - 23. The cover may be located under a grille (not shown). As shown in Figure 21, the drip tray 210 comprises a facia 211, side walls 212 and a rear wall 213 that define a liquid receptacle 214. The receptacle 214 has a cooperating drip tray cover 215. The cover 215 has a depressed area 216, the floor of which is perforated 217. The perforations are preferably tapered, having a larger diameter at the undersurface 231 and smaller diameter at the upper surface 218 of the drip tray cover. The perforations are adapted to trap coffee grinds above the tray, not letting an excessive amount of grinds into the receptacle 214. Thus, liquids trapped in the receptacle 214 can be disposed of in a kitchen sink without discharging an excessive amount of grinds into the sink. The depressed area 216 is subdivided by a barrier or wall 219. Waste grinds associated with the coffee grinder and tamper generally fall to the left of the wall 19 because the grinder

and tamper are located to the left of and above this wall. The brew head is located to the right of and above the wall 219 (see Figure 1). Thus, the perforated floor 220 on the right hand side of the wall 219 features one or more larger openings 221 that allowed brewed coffee waste to more easily flow into the receptacle 214. The tray also features a receptacle level indicator 222 that can be read through an opening 223 formed in the cover, in registry with the indicator 222.

As shown in Figure 23 the drip tray 210 slides into and out of a receiving carriage 230 that is fixed with respect to the espresso machine and preferably located at a lowermost portion or base 10 of the espresso machine. The drip tray 210 is adapted for reciprocal motion 231 relative to the carriage 230. As shown in Figure 23, the rear wall 213 of the drip tray has a rear surface 232 from which extends a hook feature or upturned lip 233. The upturned lip 233 is adapted to receiving a hook feature or cooperating downturned lip 234 formed on an exterior of a side wall of a storage tray 234. The storage tray 234 is also adapted for reciprocal sliding motion within the stationery carriage 230. As shown in Figure 23, both the storage tray 234 and the drip tray 210 are fully inserted into the carriage 230. In this orientation, the perforated portion of the drip tray is generally exterior to an adjacent external front surface 235 of the espresso machine. Thus, the storage tray 234 and the rear of the drip tray are concealed behind the front surface 235. In this orientation, the depressed, perforated area of the drip tray cover (see Figure 21) is external to the before mentioned surface 235, but the remainder of the drip tray and its cover, together with the storage tray 234 are effectively concealed within the espresso machine.

A one or more small bumps, protrusions or raised lip 240 is formed into the upper surface of the floor 241 of the carriage 230. The protrusion 240 is external to the front surface 235 of the espresso machine. During its reciprocal motion 231, the underside of the drip tray does not contact the protrusion 240 however, because the drip tray and the storage tray are interconnected by the hook-like features 233, 234, the storage tray will be carried forward with the drip tray when the drip tray is removed from the machine. As shown in Figure 24, the storage tray 234 will eventually be carried forward by the drip tray (not shown) until a forward lower edge 241 of

the storage tray contacts the protrusion 240. This will cause the front of the storage tray 234 to rise or lift relative to the upturned lip 233 of the drip tray. Thus, upon contract with the protrusion 240, the storage tray becomes disconnected or decoupled from the drip tray at approximately the time that its front edge 243 protrudes externally of the adjacent front surface 235 of the espresso machine. This makes full removal of the concealable storage tray by the user easy. Repositioning of the storage tray into the carriage and urging it toward the rear of the carriage using the drip tray causes the hook-like features 233, 234 to engage thus establishing a coupling between the drip tray and the storage tray that is required for subsequent removal of the storage tray.

Figure 25 illustrates a cross sectional detail of the perforations found on the drip tray cover 215, particularly in the depressed area 216 provided in the example depicted in Figures 21 – 23. As shown in Figure 25 the circular perforations 250 are tapered 251 having the smaller diameter 252 on the upper surface 253 and the larger diameter on the lower surface 254. In this example, the hole diameter 255 at the upper surface is about 2.2mm. The rim of the upper opening may be radiused. As illustrated in this example, the taper is a downward opening taper of approximately 20 degrees 256.

While the present invention has been disclosed with reference to particular details of construction, these should be understood as having been provided by way of example and not as limitations to the scope spirit of the invention.

What is claimed is:

1. In an espresso machine with a built in coffee grinder, the improvement comprising:
a filling cradle for holding a portafilter;
the cradle comprising a generally U shaped opening for receiving the portafilter in a hands free manner while grounds are dispensed into it .

2. The espresso machine of claim 1, wherein:
the cradle is adjacent to an actuator that cooperates with the portafilter when the portafilter is in the cradle;
the actuator causing a signal to be sent to a microprocessor when it is activated by the portafilter;
the signal causing coffee grounds to be dispensed into the portafilter.

3. The espresso machine of claim 2, wherein:
the signal causes the grinder to operate for a predetermined time.

4. The espresso machine of claim 1, wherein:
the portafilter is supported against imbalanced pivoting in the cradle by a downward facing ledge formed adjacent to the cradle.

5. The espresso machine of claim 1, wherein:
the cradle has a dispensing opening located toward a front of a filer basket of the portafilter, the opening causing grounds to be deposited toward a front half of the filter basket, thus contributing to the stability of a mound formed by the grounds.

6. The espresso machine of claim 1, wherein:
the portafilter has tabs for engaging the brew head;
the tabs including a front tab;
the front tab serving to act against the actuator.

7. In an espresso machine with a built in coffee grinder, the improvement comprising:
a user operated variable coffee dose adjustment and a dose toggle;
the user operated variable coffee dose adjustment sending a first signal to a microprocessor;
the dose toggle sending a second signal to the microprocessor that is indicative of a user requirement for either one or two doses;
the microprocessor using the first and second signals to determine a duration of operation of the grinder.

8. The espresso machine of claim 7, wherein:
the dose toggle is associated with an indicator that indicates wether a single cup or double cup dose has been selected.

9. The espresso machine of claim 7, wherein:
the microprocessor will apply the first signal and deliver a comparable dose per cup when the dose toggle is changed from one to two doses.

10. The espresso machine of claim 7, wherein:
the grinder is adapted to deliver a user selectable variable grind size.

11. The espresso machine of claim 7, wherein:
the grinder is a conical burr grinder.

12. The espresso machine of claim 7, wherein:
the grinder is a burr grinder and an upper burr head is retained by a bracket that allows the upper burr head to be removed and replaced in a repeatable way relative to a lower burr head.

13. In an espresso machine with a built in coffee grinder, the improvement comprising:
a removable hopper comprising a bean reservoir and a coupling portion;

the coupling portion adapted to fit within a cooperating receiving opening formed on the espresso machine;
the receiving opening including at least one recess for receiving a reciprocating slider that extends from a side wall of the coupling portion ;
an underside of the coupling portion having one or more discharge openings that can be blocked by a shutter;
operation of a user contol closing the shutter and simultaneously causing the slider to retract allowing the hopper to be withdrawn.

14. The espresso machine of claim 13, wherein:
retraction of the slider also deactivates an electrical switch associated with the receiving opening;
the switch locking out a power supply to a motor that drives the grinder, thus rendering the grinder inoperative until such time as the hopper is installed.

15. The espresso machine of claim 13, wherein:
there are two opposing sleeves for receiving the slider and a second slider;
the switch being a microswitch mounted adjacent to at least one of the sleeves.

16. The espresso machine of claim 13, wherein:
the shutter is a rotating shutter.

17. The espresso machine of claim 13, wherein:
the slider retracts into the coupling portion.

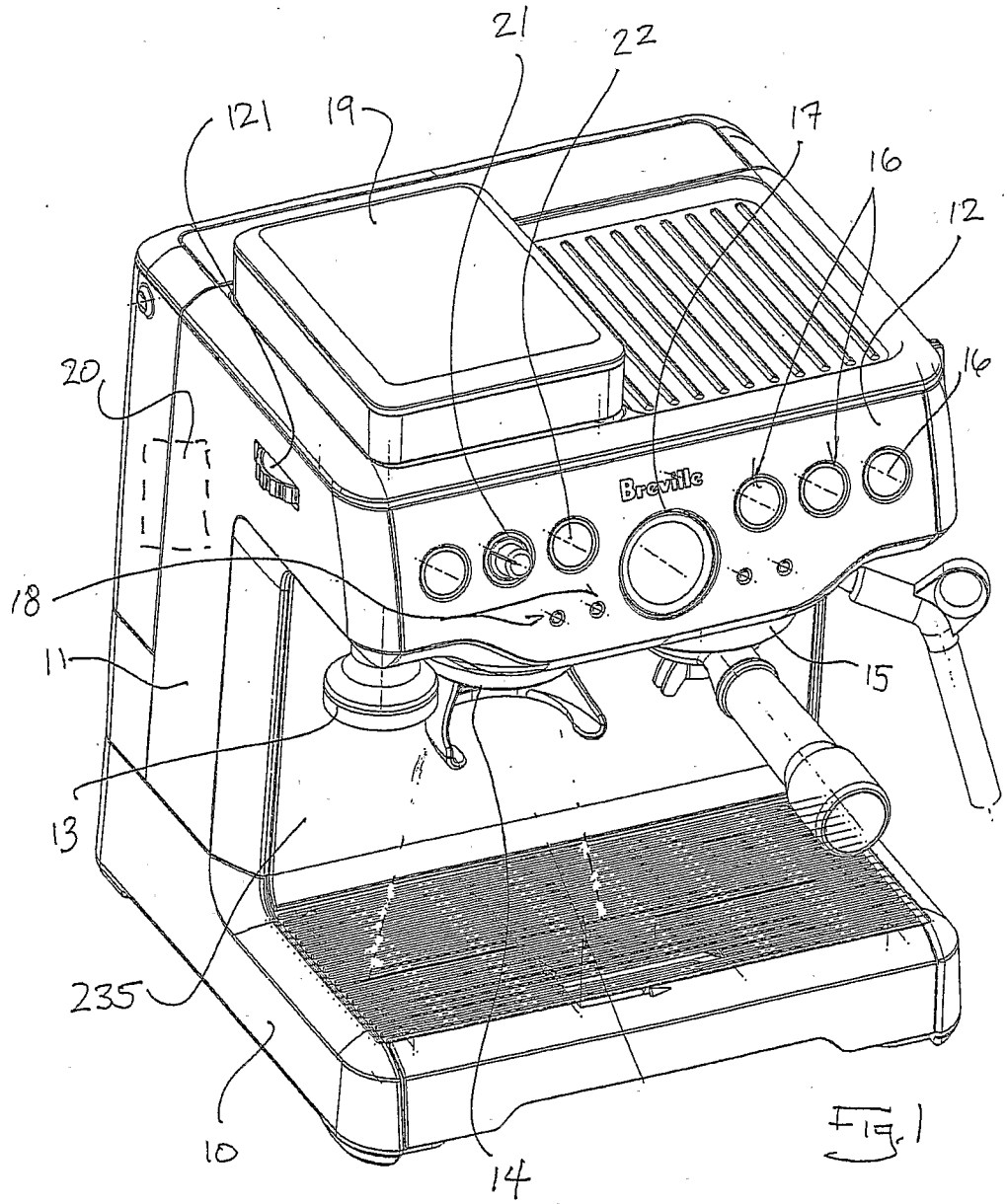


Fig. 1

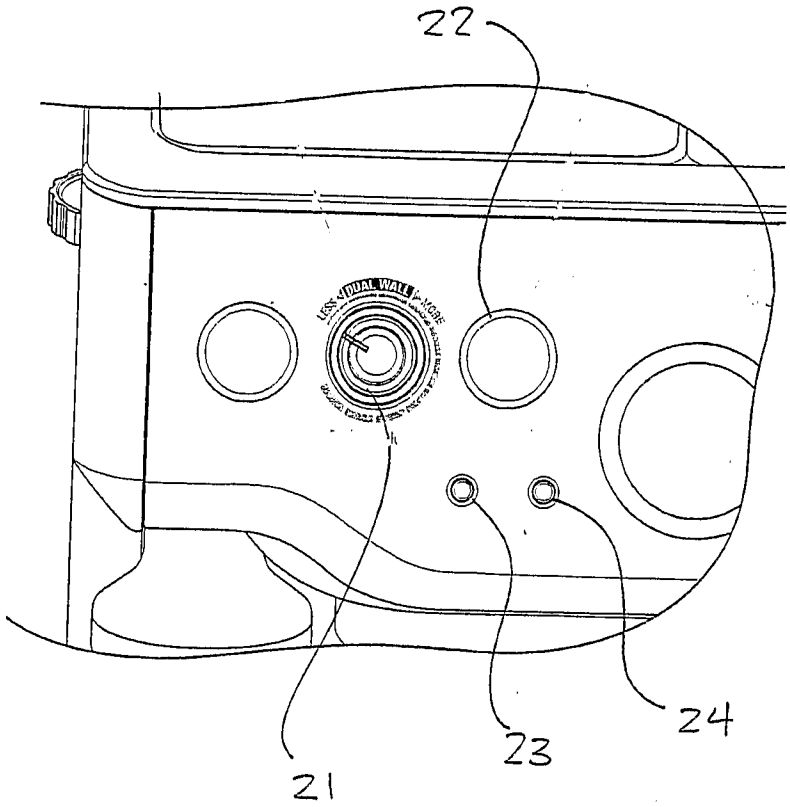


Fig. 2

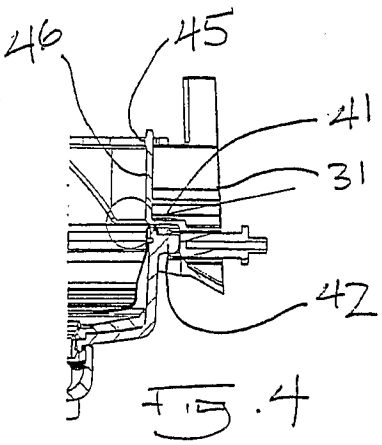


FIG. 4

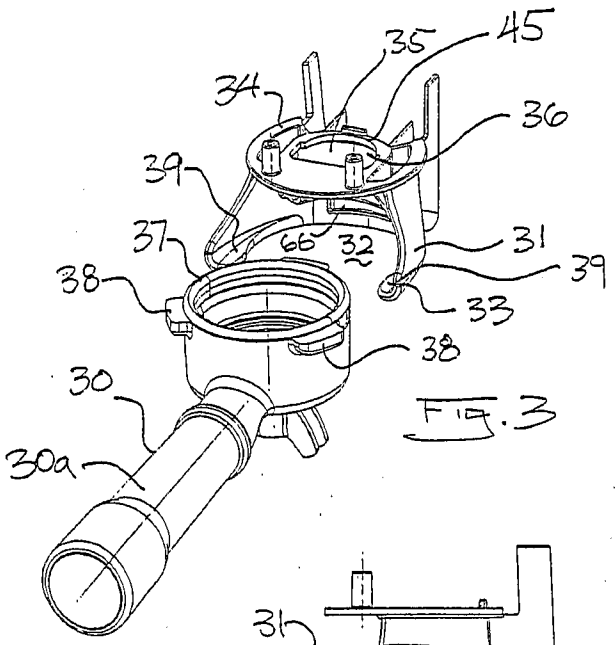


FIG. 3

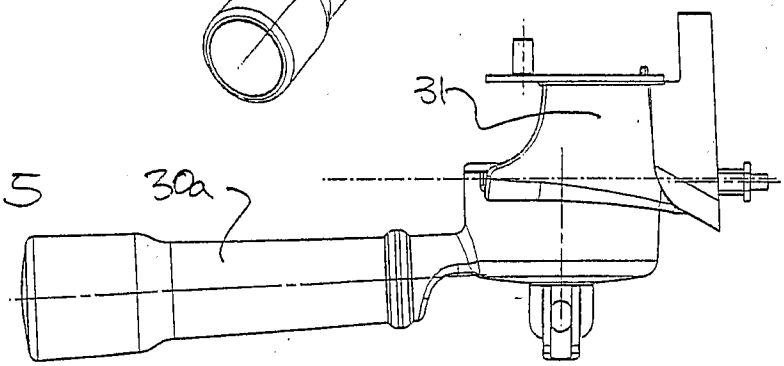


FIG. 5

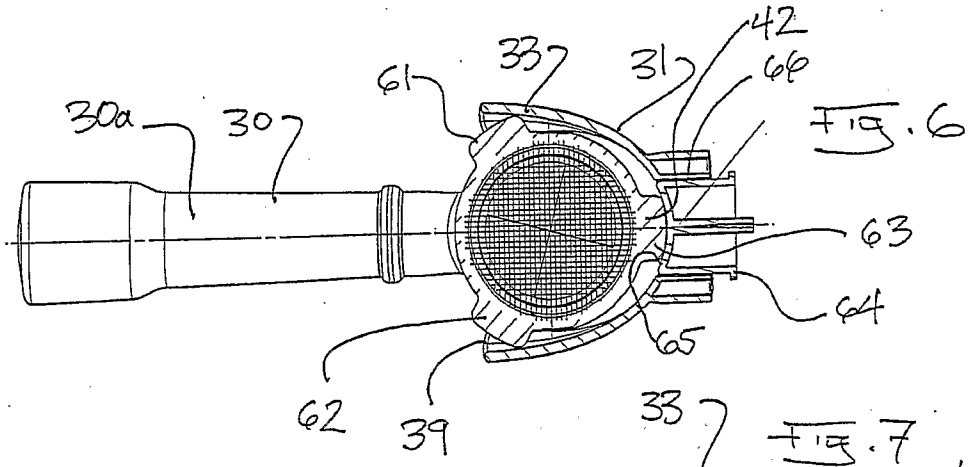


Fig. 6

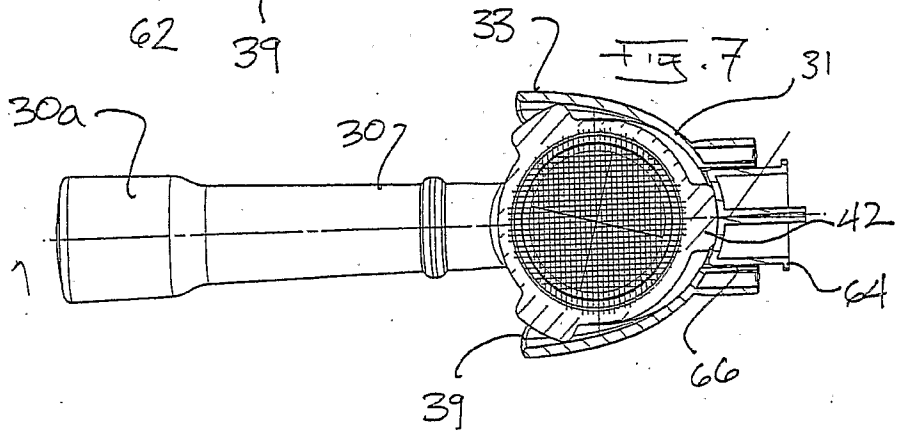


Fig. 7

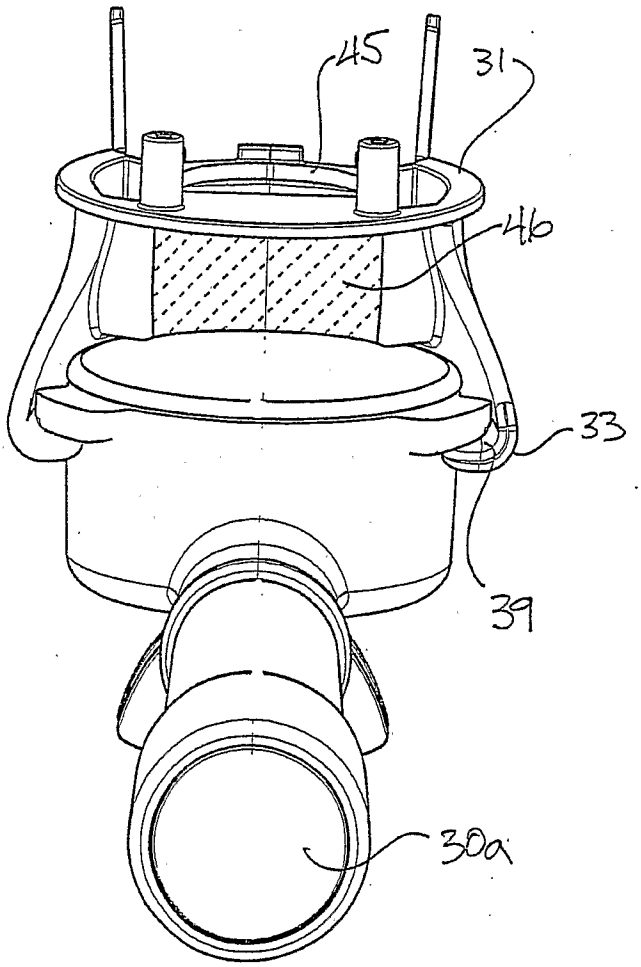


Fig. 5

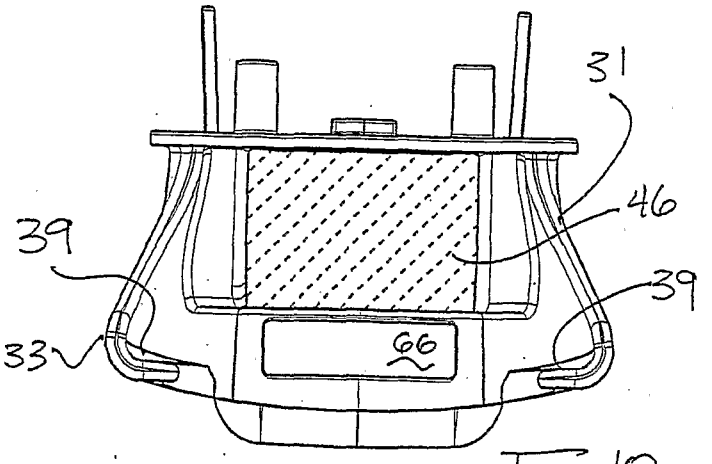


Fig. 10

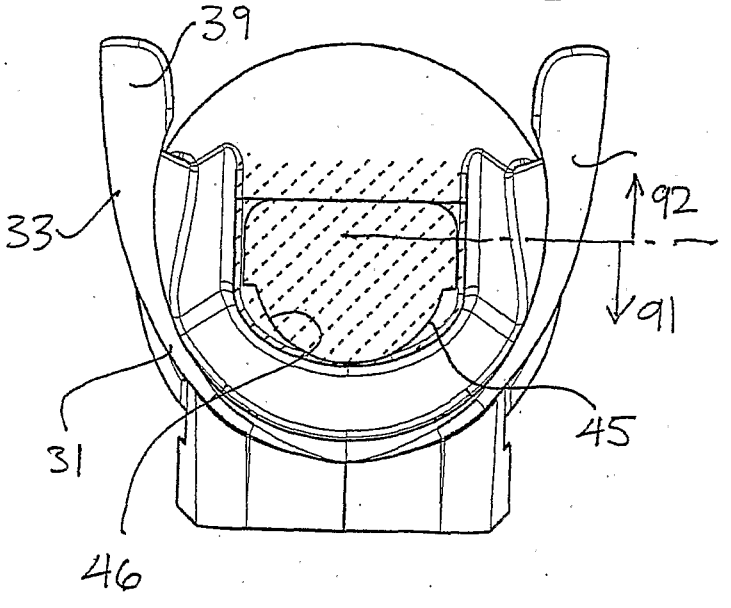


Fig. 9

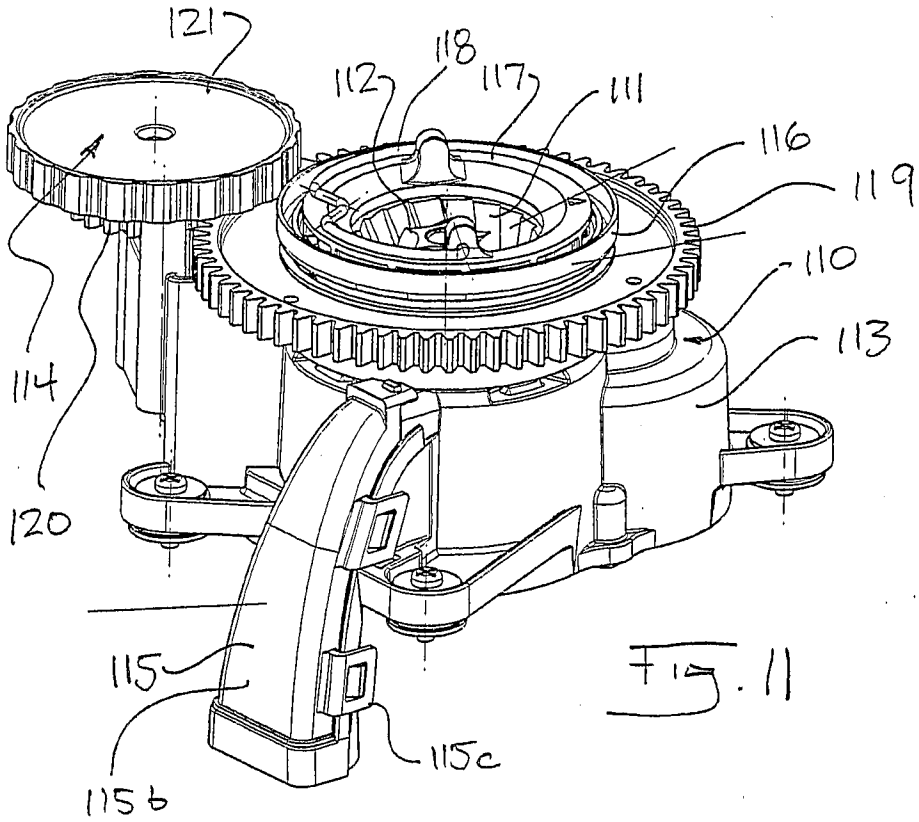
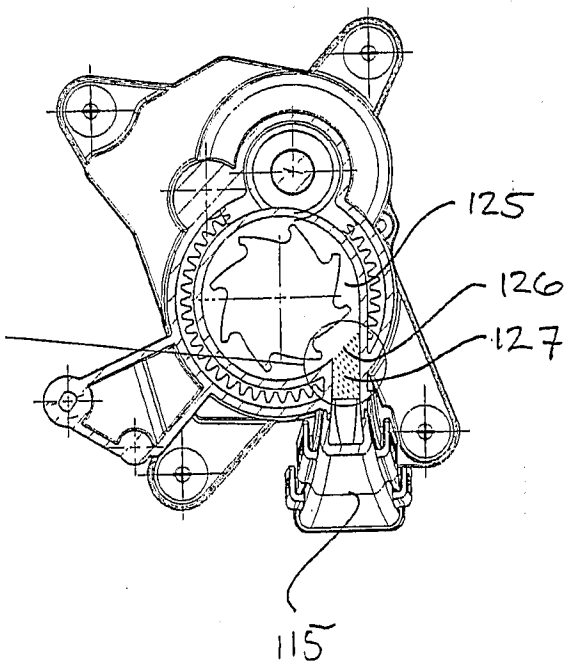


Fig. 11

Fig. 12a



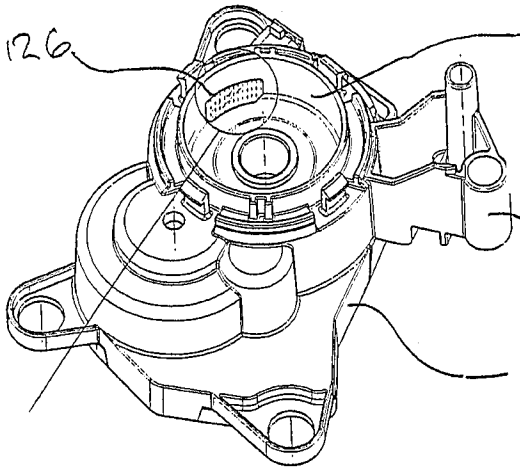


Fig. 12b

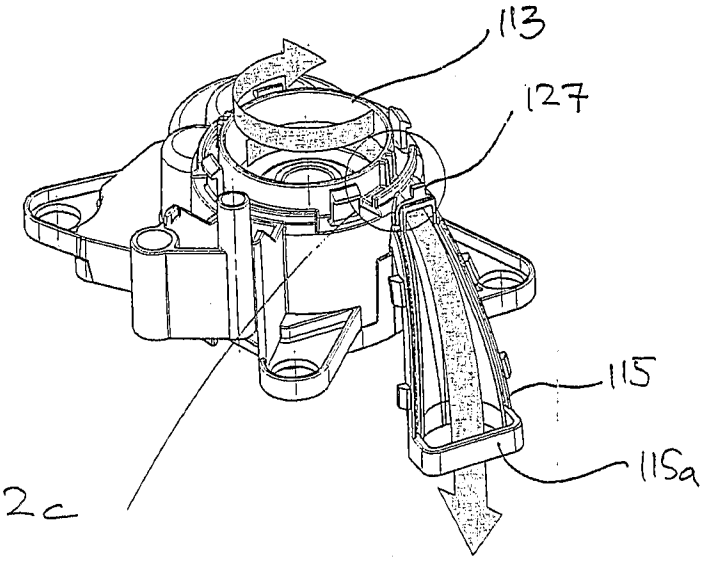


Fig. 12c

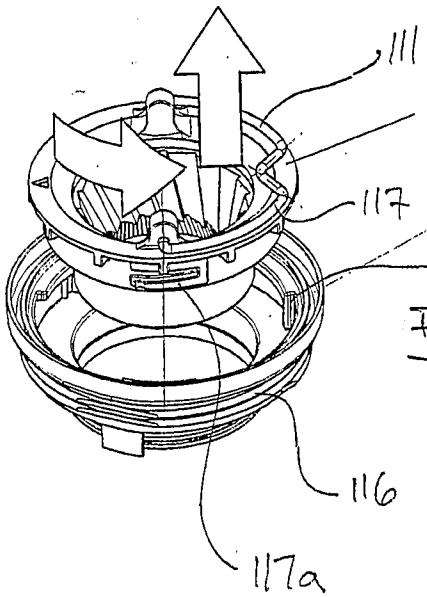


Fig. 12d

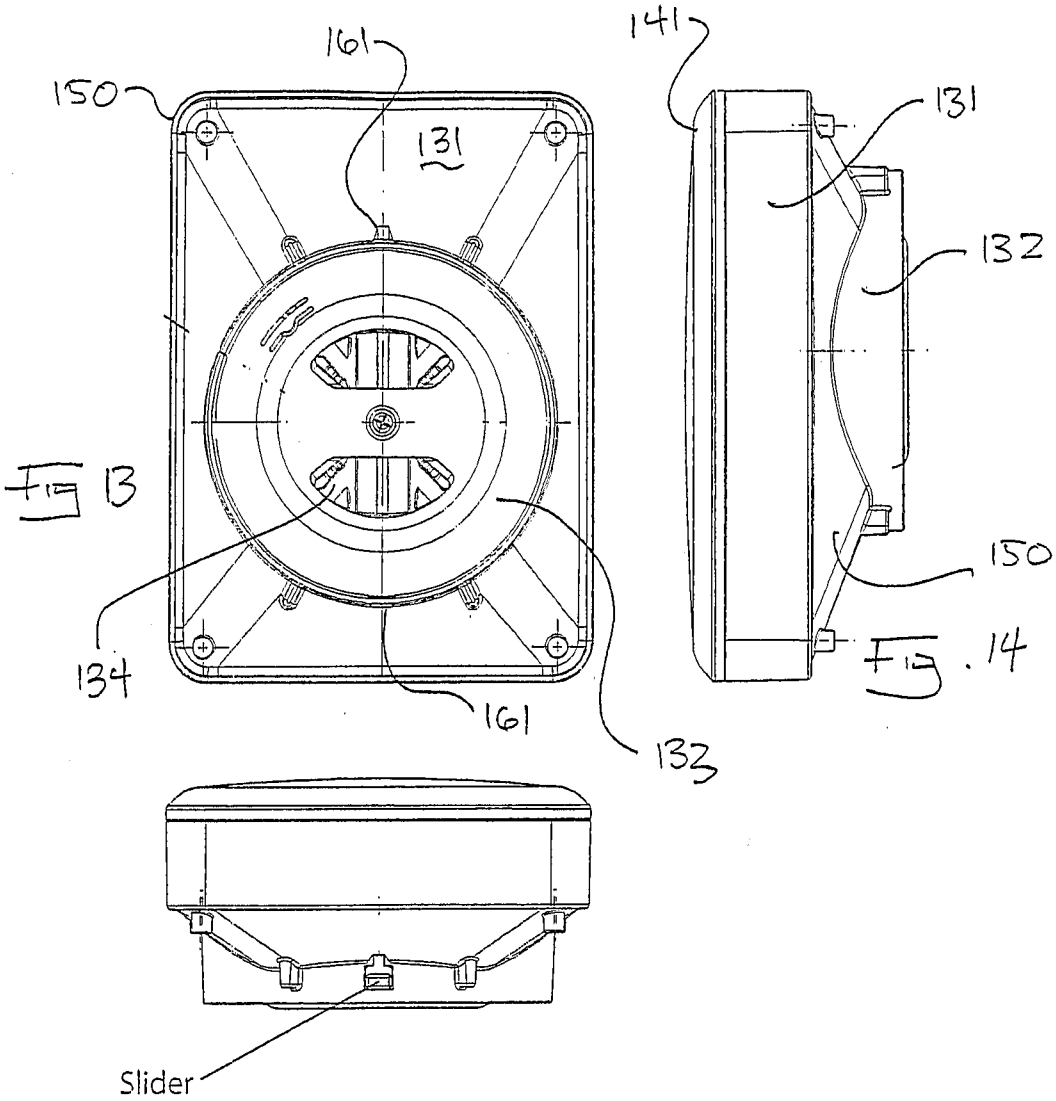


Fig 13

Fig. 14

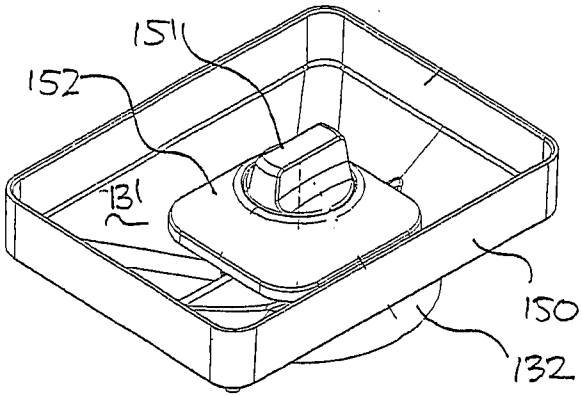


Fig 15

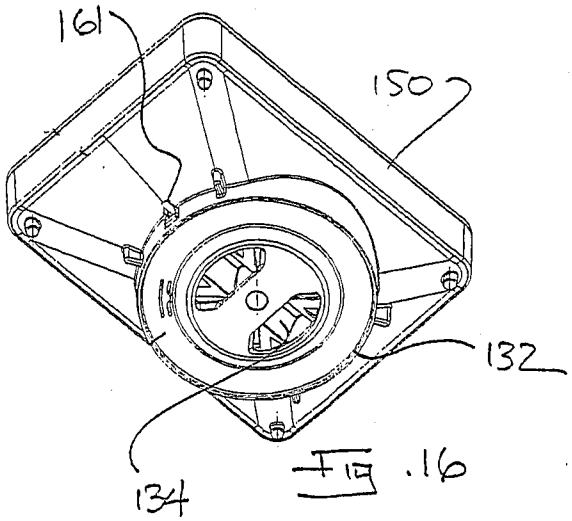


Fig .16

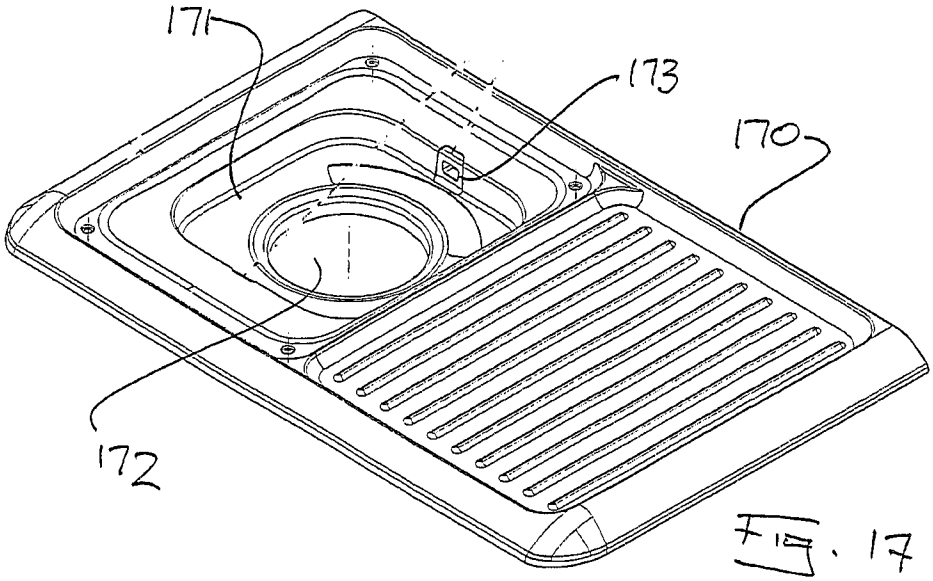
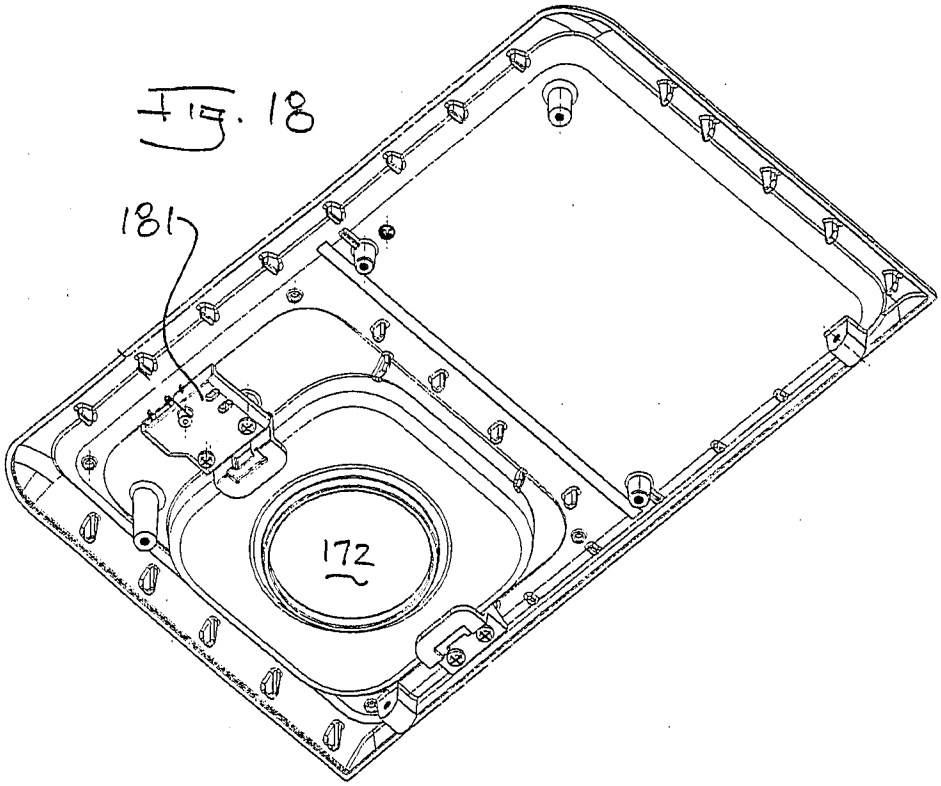


Fig. 17

Fig. 18



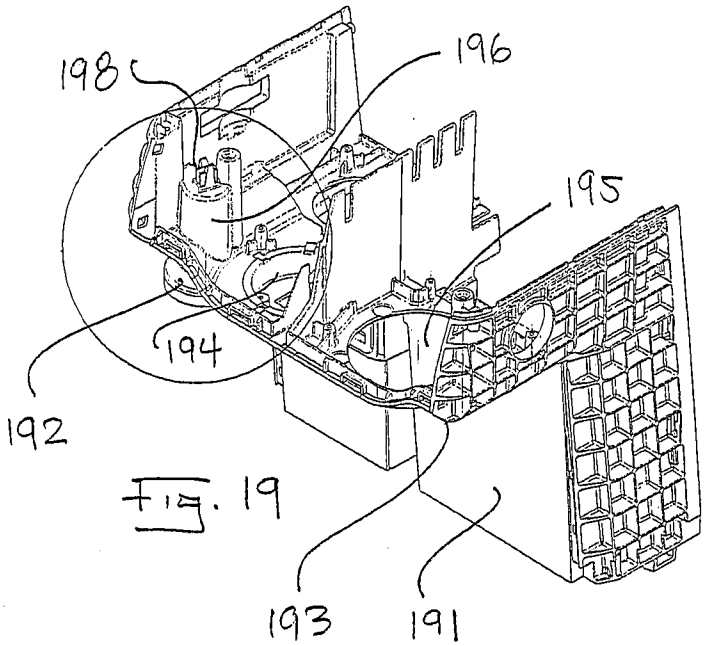


Fig. 19

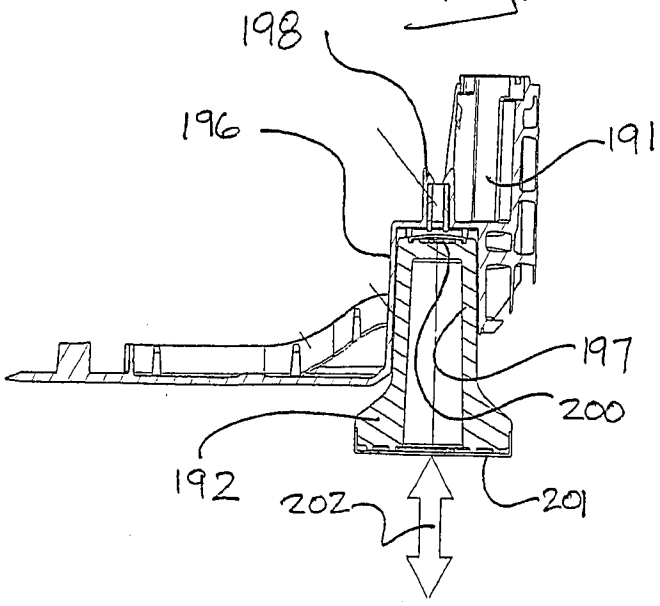


Fig. 20

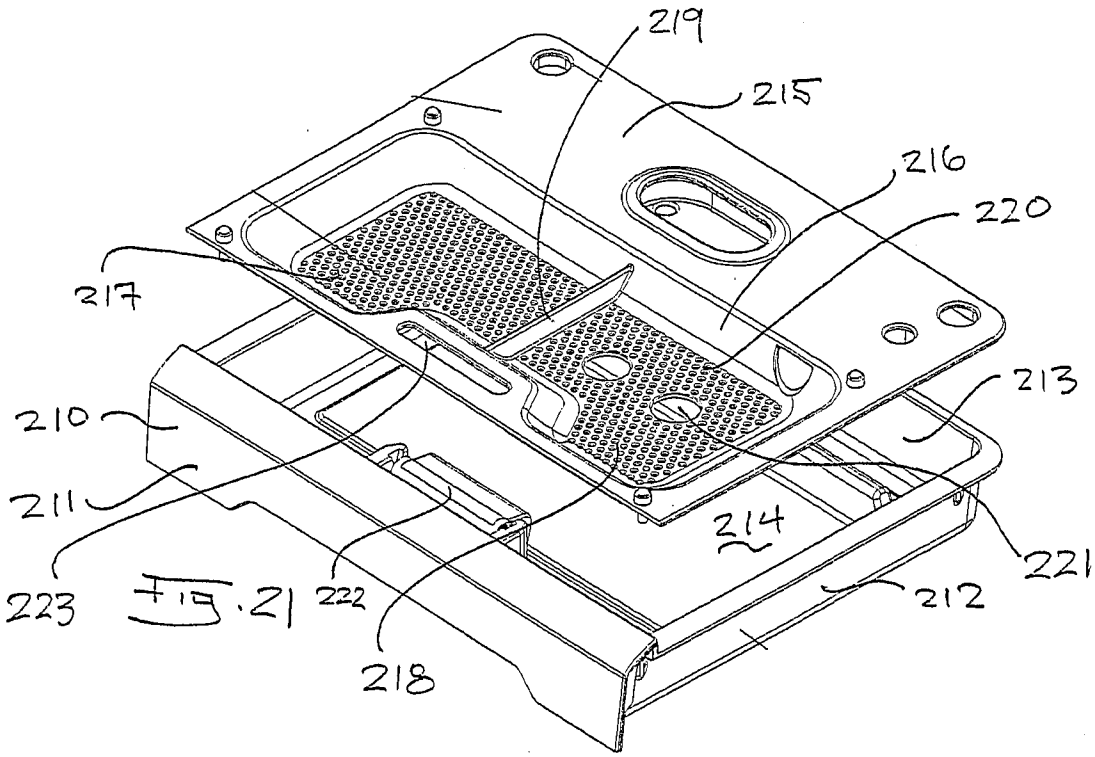


Fig. 21

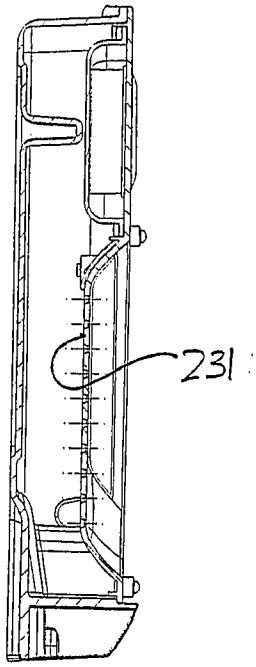


Fig. 22

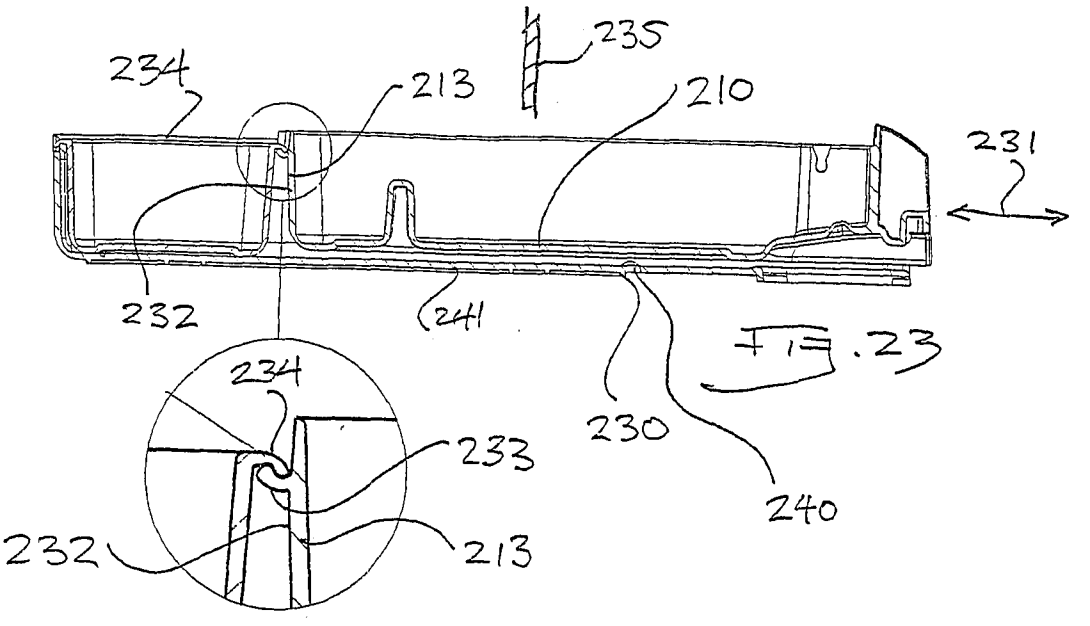

235
234
213
210
231
232
241
230
240
234
233
232
213

Fig. 23

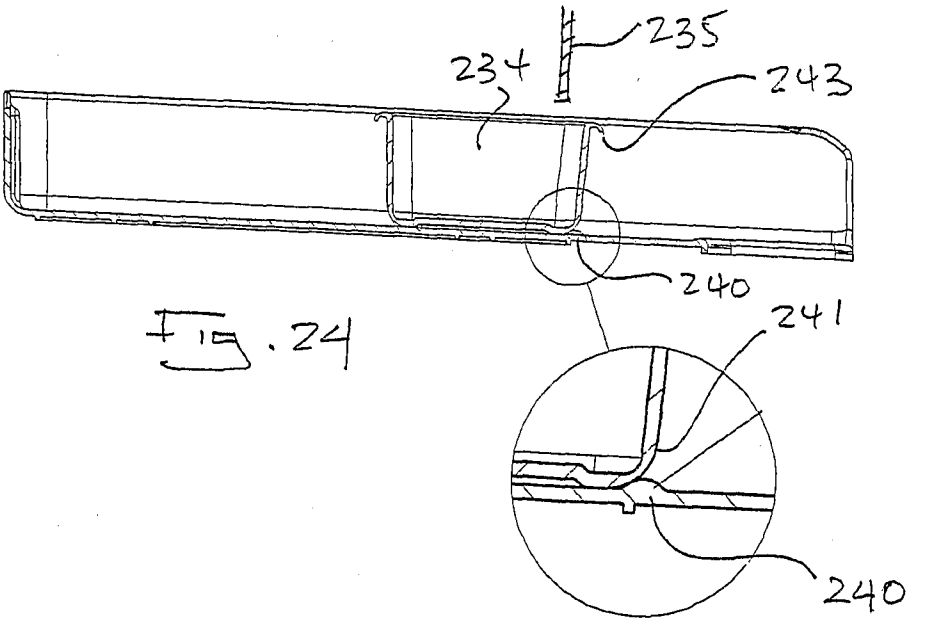

235
234
243
240
241
240

Fig. 24

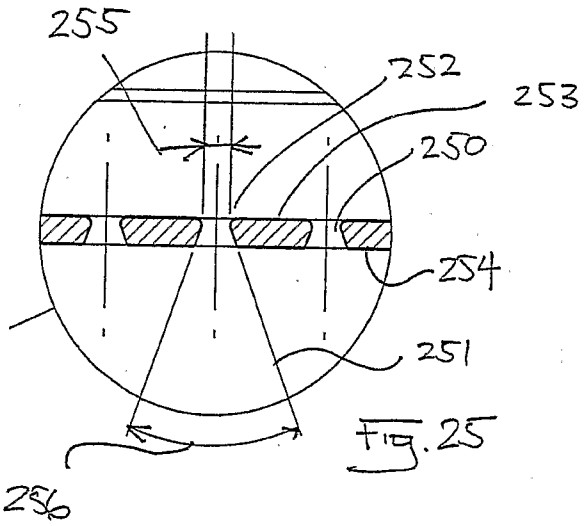


Fig. 25

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2010/000087

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A47J 31/42 (2006.01) *A47J 42/40* (2006.01)

A47J 42/44 (2006.01)

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)

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 practicable, search terms used)
Google, WPI, EPODOC (doserless, "hands free", balance, portafilter, a47j31, a47j42, u_shape+, fork, cradle)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
L, X	Operating Instructions K30 TWIN Espresso Grinder [retrieved on 3 March 2010]. Retrieved from the internet <URL:http://www.mahlkoenig.de/file/download/default/id/2428> Published December 2008 as per page 29 – see in particular the figure on page 6	1-6
X	Single Espresso Grinder [retrieved on 3 March 2010] Retrieved from the internet <URL:http://web.archive.org/web/20080719070932/http://www.globalcoffee.com.au/CoffeeMachines/Commercial/Tranditional/Mahlkonig_K30ES.aspx> Published on 19 July 2008 as per Wayback engine – see in particular the figure on p1	1-6
A	US 5,615,601 A (EUGSTAR) 1 April 1997 – see in particular the abstract and fig.6	

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 March 201004 March 2010	- 8 APR 2010 - 8 APR 2010

Name and mailing address of the ISA/AU	Authorized officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	**TIM GILLETT** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : +61 2 6222 3671

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2010/000087

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please see the supplemental boxes

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: **1-6**

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Supplemental Box
(To be used when the space in any of Boxes I to IV is not sufficient)

Continuation of Box No: III

LACK OF UNITY

This International Application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept.

In assessing whether there is more than one invention claimed, I have given consideration to those features which can be considered to potentially distinguish the claimed combination of features from the prior art. Where different claims have different distinguishing features they define different inventions.

This International Searching Authority has found that there are different inventions as follows:

- Claims 1-6: An espresso machine comprising a cradle with a generally U shaped opening comprises a first distinguishing feature.
- Claims 7-12: An espresso machine comprising a variable dose adjustment toggle which modifies the duration of grinding comprises a second distinguishing feature.
- Claims 13-17: An espresso machine comprising a removable hopper comprises a third distinguishing feature.

PCT Rule 13.2, first sentence, states that unity of invention is only fulfilled when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding special technical features. PCT Rule 13.2, second sentence, defines a special technical feature as a feature which makes a contribution over the prior art.

Each of the abovementioned groups of claims has a different distinguishing feature and they do not share any feature which could satisfy the requirement for being a special technical feature. Because there is no common special technical feature it follows that there is no technical relationship between the identified inventions. Therefore the claims do not satisfy the requirement of unity of invention *a priori*.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2010/000087

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	5615601	DE	29502596U	EP	0727166

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX