

PATENT SPECIFICATION

DRAWINGS ATTACHED

833,100



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COMPLETE SPECIFICATION

Improvements in or relating to Devices for the preparation of Infusions, especially Coffee Infusions

- We, ALESSANDRO BALLARINI, CARLO BALLARINI and EMILIO BALLARINI, all Italian citizens of 3, Via Bozzolo, Rivarolo Mantovano, Province of Mantova, Italy, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the follow statement:—
- 5 This invention relates to a device for the preparation of infusions and of the kind actuated by a flow of water rising under pressure through the substance to be infused.
- 10 Previously proposed devices of the rising water flow type are constructed in such a manner that no satisfactory results are obtained when the amount of prepared infusion is to be varied. In other words, if a device of this kind is made to give six cups of infusion, then it does not operate with the same efficiency when three cups only are required, that is, when the filter means is loaded with a quantity of ground substance which is for example one half of that required to give the whole quantity of infusion. In fact, the container for the ground substance has a fixed capacity and a predetermined quantity of ground coffee or other substance can be duly packed therein, whereas with a smaller amount of ground substance a similar packing cannot be obtained, to provide a suitable resistance to water percolation, as is required to provide sufficient contact time between the water and ground substance because all aromatic, active and flavouring compounds of coffee or other substance are removed or extracted by the hot water. When the required degree of packing has not been attained in the holding and filtering chamber, the aforementioned disadvantages increase as the quantity of ground substance is decreased, since in this latter case a precipitation of the infusion in the lower container will occur. Moreover, since the previously proposed devices do not have a filtering area suitable for different quantities of ground substance to be treated, the quantity of grounds present in the infusion increases as the charge of ground substance is decreased, even when care is taken to have such charge duly packed.
- 45 Account is to be taken also of the fact that a conventional device, designed for preparing six cups of infusion may be left inoperative for long periods, as it cannot be efficiently utilised for preparing one or two cups of infusion, and such idle time may result in oxidation and the possible growth of moulds, whereby a disagreeable smell and taste are imparted to the infusion when the said device is next used.
- 50 It is also to take into account that in the already known devices—for instance, of six cup capacity—it is not possible to balance the pressure prevailing in the lower container and in the ground substance holder or "basket", whereby—above all when only a small quantity of water is used for preparing the infusion—the pressure that is built-up within the container, not so much owing to evolution of steam, but mainly to powerful expansion of the large air volume, quickly attains the limit at which said small quantity of water is forcibly percolated, at a relatively low temperature, through the ground substance, and a very poor infusion is thereby obtained.
- 55 According to the present invention we provide a device for preparing infusions, especially coffee infusions, and of the type operated by a flow of water rising through the substance to be infused, comprising two containers tightly interconnected, one being a lower water container and the other an upper infusion container, and means to hold the ground substance, coffee, for example, and to allow water to percolate therethrough, inserted between said two containers, in which said means comprises a controllably movable member, which may be moved to and locked at different levels in order to vary the capa-
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city of the ground substance chamber, and a further member, also movable and operatively connected with the first-mentioned member having a filter wall of which the filtering area varies in accordance with variation in the capacity of the said ground substance chamber.

Many different embodiments of the device according to the invention may be made. Changes may be made in the design and structural features both of the controllably movable members and of the filter means; and the reciprocal arrangement of said associated members may also be modified.

According to an advantageous embodiment of the invention, the members of the device which may be controllably moved and locked at given levels, in order to have the ground substance holding space varied, consist of a strainer slidably fitted within the "basket" or ground substance holder, and preferably provided with a guide rod or the like slidably fitted into a partially immersed tubular extension of the holder, and formed with suitable members to effect movement of said strainer up and downward to the exact levels required to define the different spaces corresponding to different quantities of ground product, while or the side opposite to guide rod the strainer is provided with filter means, which preferably consists of a tubular element, wherein a suitable number of orifices or perforations is formed. Thus, according to different positions of the strainer and filter means and relative to both the associated surface of holder or basket and the bottom of upper container, different ground product holding spaces are defined, or in other words a chamber of adjustable capacity, to hold different quantities of ground product, is provided.

At least one suitable orifice is formed in the basket, to put the interior of the lower container into communication with the interior of said holder, so that the steam pressures prevailing in said container and in said basket may be conveniently balanced.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 is a vertical section of a preferred embodiment form of the device according to the invention, showing the strainer adjusted at such a level as to cause a decrease in the ground product holding space from a normal six cup capacity to a three cup capacity.

Fig. 2 is a cross-section of device on the line X—X of Fig. 1; and

Fig. 3 is a fragmentary perspective view of the movable members and of filter means in their lowest position in which maximum capacity of holding space is provided.

Referring to Fig. 1, the device A for the preparation of infusions, in this case coffee

infusions, consists of two interconnected containers B, C, made for instance of cast or deep-drawn aluminium. The lower container B contains water, and the coffee infusion is collected in the upper container C. The lower container B is formed with an upper cylindrical extension 10 having an external threaded portion 12, and an abutment or shoulder 14 is formed on the upper edge inside the cylindrical extension 10 for a purpose which will be stated later. A "basket" or holder F is fitted within the container B in a substantially central position and has a cylindrical, solid wall 16 of which upper edge is flanged so as to form a peripheral rim 18 perpendicular to holder axis and resting on the abutments 14, thereby supporting the holder F. The lower end of cylindrical wall 16 is of truncated cone shaped section 20 which has a cylindrical tubular extension 22. The interior space 26 of container B is put into communication with the inside space 28 of holder F through only one opening 24, formed in said section 20 of holder F and the lower end 30 of tubular extension 22 is immersed in a quantity of water D sufficient for preparing three cups of infusion.

A strainer G slidably fitted in the cylindrical section of holder F consists of a circular disc, of suitable thickness, and solid except for a series of perforations drilled adjacent its outer edge. A rod M, of which the cross-section is clearly illustrated in Fig. 2, is centrally secured to lower face of strainer G. The rod M is solid, except for a longitudinal recess 34, formed with seats or notches 36 which are perpendicular to the recess 34. In the present embodiment, six seats 36 are provided, thereby giving six levels, at which the strainer G can be located, and thus providing six different capacities for holder F. Grooves 38, Fig. 2 are cut longitudinally on the outside surface of rod M so that the water is allowed to flow through the tubular extensions 22, or more precisely through the channels as defined by the grooves 38 and the extension 22, and into the holder F, as will be described in more detail later, the inside space of the holder F, as will be described in more detail later, the inside space of the holder F thus being put into hydrodynamic communication with the container B through the extension 22.

A dowel or pin 40 formed on the inside cylindrical surface of the tubular extension 22 co-operates with the recess 34 and can be brought by the user into engagement with any one of seats 36, according to his requirements. In the embodiment shown, the dowel 40 is engaged with the third seat 36 in order to define a space for the required quantity of ground coffee. A filter element H is fitted on the face of strainer G opposite to that to which rod M is fitted, that is, on the upper circular face of same strainer G. The filter element H consists of a cylindrical wall 41,

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having a plurality of perforations 42 drilled perpendicularly to wall face in a number such as to meet the filtering requirements. The filter element H co-operates with the associated lower cylindrical portion 44 of a tubular extension 46, formed on the container C, as described later in more detail. The inside surface of cylindrical wall 16 of container F has a scale 48 which, in the present embodiment, consists of six linear scale divisions, which facilitate correct adjustment of the strainer G to the required level, in order to define a space in the holder sufficient to contain the required quantity of ground coffee.

15 In the embodiment shown, the adjustment has been made on the third scale division from above. The holder F is provided with a further reference sign, such, for example, a recess 50, Fig. 2, or a projection, or the like, formed on the same vertical plane as dowel 40, so that, when the rod M is inserted by the operator into the extension 22, the dowel 40 is brought with certainty into engagement with one of seats 36, and not with one of grooves 38. The upper container C is brought into water-tight connection with the lower container B, by screwing the inside threaded cylindrical section 52 thereon on to the outside threaded section 12 on the lower container B, a resilient packing ring 54 being interposed therebetween. The packing ring 54 is fitted into a circular seat formed adjacent the outer edge of base 56 of container C. The base 56 is shaped as an annular crown, and its thickness is preferably relatively great, in order that the lower container may be conveniently heat insulated from upper container C. The base 56 is connected with the aforementioned cylindrical wall 44, which forms part of tubular extension 46, through which the infusion rises, and is discharged into the cavity 58 of container C through an orifice 60 formed in said extension 46. The inside wall of cavity 58 has a scale 61 which consists of the six linear scale divisions 62, by which the levels of water to be poured into the container B for preparing a quantity of infusion ranging from one to six cups, are defined, said levels being inclusive of the quantity of water as required to act as a "cushion". The device A is completed by a lid or cover 64, while the upper edge of container C is formed with a spout, not shown, through which pouring of the infusion collected within said cavity 58 is effected.

From the above, the advantages of and the operation of the device for the preparation of infusions according to the invention will be apparent. Assuming that the user intends to obtain a quantity of infusion corresponding to three cups, while having available only a device of a far greater capacity, for example, a six cup device, it will be sufficient to pour into the cavity 58 of container C, water up to the level as defined by the third lowest linear division of scale 61, after unscrewing of the container C from container B, and removal therefrom of the holder F, together with the members defining the useful holding space, and with the filter means. The quantity of water thus measured is then transferred into container B, in which it reaches the level shown in the Fig. 1, whereupon the holder F is fitted in position with its flanges 18 resting on the abutment 14. The strainer G, together with the associated members H and M, is then conveniently adjusted. More precisely, the rod M is fitted into the extension 22, thus registering the recess 34 with the dowel 40, so that the rod M can be moved downward in the direction of arrow Y, Fig. 1, until the strainer G is flush with the third mark of scale 48. Then, by turning the strainer G in the direction of arrow Z, Fig. 2, the dowel 40 engages in the selected seat 36, so that the strainer G is locked at the selected level, and defines with its upper face, a space P, Fig. 1, of the size exactly required to contain the quantity of ground substance needed for preparing three cups of infusion, such space being cylindrically shaped and defined by the lower annular portion of strainer G, the upper annular wall or base 56 and the cylindrical side walls 16 and 41 of holder F and filter H respectively. The quantity Q of ground coffee is then charged into such space and suitably packed therein, whereupon the container C is screwed into the container B, and accordingly a given length of filter H is inserted into the cylindrical portion 44 of extension 46. Obviously, only the portion of filter wall 41 underneath the base 56 is then utilized for preparing the infusion, and such operating portion has a number of orifices 42 as exactly required for the percolation of said quantity Q of ground coffee. Thus by adjusting the strainer G and the filter H to different levels, the capacity of space P and the area of operating surface of filter H are correspondingly altered. When the strainer G has been adjusted to its lowest position and registers with the lowest linear division of scale 48 (which may be omitted, since said strainer comes to rest against the holder edge 15), and the dowel 40 is engaged with the uppermost seat 36 (which may also be omitted) of rod M, the maximum capacity of space P is attained, that is, a quantity Q of ground coffee sufficient for six cups of infusion can be placed therein, and accordingly the area of operating surface of the filter H wall 41 is the greatest possible, as the filter H is nearly wholly out of cylindrical section 44, thereby attaining the maximum of its capacity, whereas when the strainer G is moved in a direction opposite to that of arrow Y, up to its highest level, and the members associated therewith are correspondingly positioned, the space P and the operating area of filter wall 41 are decreased down to the minimum of their capacity. After bringing the device A,

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 5 containing the quantity of water D, into contact with a heat source, a steam pressure is built-up whereby, after some time, water will be driven in a direction opposite to that of arrow Y, into the extension 22, through the grooves 38 and the perforated edge portion of strainer G into the ground coffee Q, whereby the active and flavouring compounds thereof are removed or extracted therefrom. Then, the infusion is filtered through the perforations 42 and discharged through the orifice 60 into the cavity 58, the path of water being suitably extended in such a manner as to treat the whole quantity Q of ground coffee. Thus, even with the smallest quantity of ground substance, an infusion is obtained that has a taste and flavour exactly like those of an infusion prepared with the largest quantity of ground coffee, corresponding to six cups of infusion.

10 The orifice 24 is particularly advantageous when small quantities of infusion are to be prepared, say, one or two cups. In fact, due to different compressibility features of water D and the overlying air layer, any increase in the temperature, and thus the higher pressure which is built-up in said air layer, would cause, without the orifice 24, a nearly instantaneous flowing of the small water quantity through the strainer G and filter H. As consequence thereof, only a small fraction of ground coffee would be treated, and a nearly cold infusion would be collected in the cavity 58, whereas by virtue of the orifice 24, the pressures within the container B and within the holder F are conveniently balanced, and consequently, in addition to a pre-moistening action on ground coffee by part of the steam which is discharged through the orifice 24, a much slower filtering action is exerted by the water flowing upwards and which, in the meantime attains its optimum temperature. The use of a thick base 56 serves to prevent overheating and consequent boiling and degradation of the infusion already collected on said base which may be caused by the steam developed when the water cushion, present in the container B, is boiled away for any reason and flows through the extension 22 and perforations 32, whereas by the use of a thick bottom, or otherwise by providing such bottom with a suitable layer of heat insulating material, a sufficient thermal insulation may be obtained.

15 Many combinations of dilution or concentration of infusion may be obtained with the device according to the invention. For instance, a diluted infusion may be obtained by charging the holder with the quantity of ground coffee as required for four cups, and pouring into the lower container the quantity of water required for six cups, while a more concentrated infusion can be obtained by decreasing the quantity of water.

20 In Fig. 3, the strainer G is shown in its lowest position, whereby a maximum of oper-

ating area of filter H is exposed, and a quantity of ground coffee Q as required for preparing the whole quantity of infusion is charged in the holder F.

70 Modifications may be made without departing from the scope of the invention as defined in the following claims.

WHAT WE CLAIM IS:—

1. A device for preparing infusions, especially coffee infusions, and of the type operated by a flow of water rising through the substance to be infused, comprising two containers tightly interconnected, one being a lower water container and the other an upper infusion container, and means to hold the ground substance, coffee, for example, and to allow water to percolate therethrough, inserted between said two containers, in which said means comprises a controllably movable member, which may be moved to and locked at different levels in order to vary the capacity of the ground substance chamber, and a further member, also movable and operatively connected with the first-mentioned member having a filter wall of which the filtering area varies in accordance with variation in the capacity of the said ground substance chamber.

2. A device according to Claim 1, in which the alteration of the capacity of the chamber is obtained by moving a strainer to different levels, which results also in a corresponding change of the operating area of the filter wall.

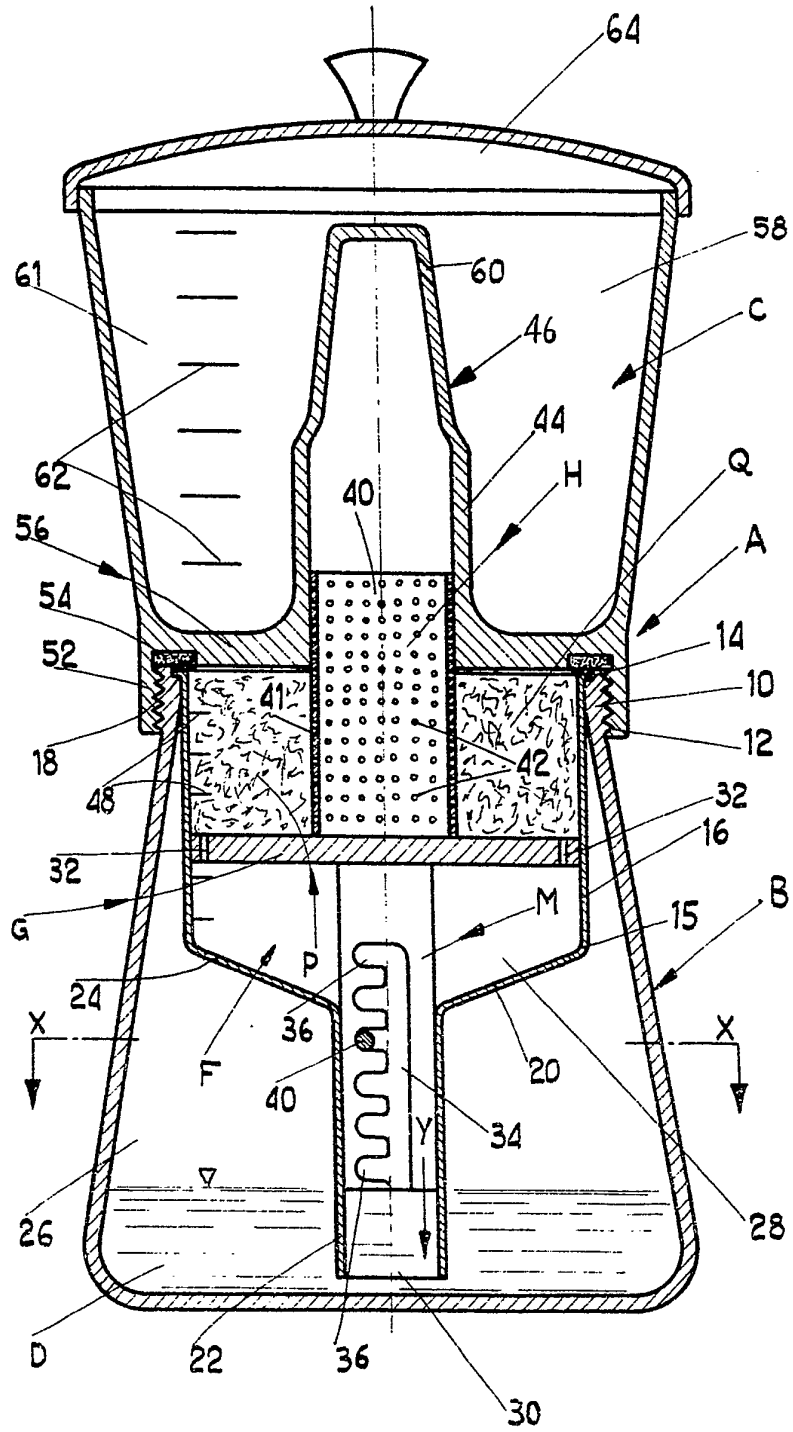
3. A device according to Claim 2, in which the members which may be controllably moved and locked at given levels to define different ground substance holding spaces, consist of a strainer, slidably fitted in an associated "basket" or holder and preferably provided with a guide rod or the like also slidably fitted in a partially submerged tubular extension formed on said holder, said rod being provided with suitable means to accurately position said strainer at different levels and locked in said position, to define the different spaces as required to hold the different quantities of ground substance, said strainer being provided with a filtering means, preferably formed as a tubular member fitted on the face thereof opposite to that of the rod and having a suitable number of perforations whereby, according to the different positions of the strainer and filter means, and in co-operation with the associated holder surfaces and bottom of upper container, different capacities of the ground substance holding space are obtained, so that a variable capacity holding chamber is formed.

4. A device according to Claim 3, in which at least one suitable orifice is formed in the holder surfaces and bottom of upper container, in communication with the inside of said holder, in order to keep the steam pressures prevailing in said container and in said holder suitably balanced until the optimum temperature has been attained by the water.

5. A device according to Claim 3 or 4, in which the guide rod is formed with suitable longitudinal grooves in its outer surface, as well as with a longitudinal recess having a plurality of notches or seats corresponding to the number of levels to which the strainer may be brought, said recess and seats co-operating with a dowel pin or the like formed inside the partially submerged holder extension. 30
6. A device according to any one of Claims 2, 3, 4 or 5 in which the strainer orifices for the passage of water are drilled only adjacent to outer edge of strainer, in order to extend to the utmost the path to be covered by the water within the ground substance chamber. 35
7. A device according to any of Claims 3 to 6, in which the tubular filter means consists of a cylindrical wall, having a plurality of perforations drilled normal to said wall, the latter fitting into a suitable cylindrical portion of a discharge extension formed on the upper container. 40
8. A device according to any of Claims 1 to 7, in which the upper container is provided with a thick base, having a lower annular face which acts as a cover for the ground substance holder, a suitable layer of insulating material being inserted in said base to improve the heat insulation of the upper container relative to the lower container. 45
9. A device according to any of Claims 1 to 8, in which a scale is marked inside the upper container to indicate the water quantities as required for the different amounts of ground substance, a like scale being marked on the holder to indicate the different levels to which the strainer may be moved.
10. A device according to any of Claims 5 to 9, in which angular reference signs are formed on the holder, whereby a suitable co-operation of the dowel pin with the seats formed inside the recess is effected, and incorrect positioning of the strainer rod by insertion of the dowel pin into the grooves which serve as water passageways is prevented.
11. A device for the preparation of infusions, especially coffee infusions, substantially as hereinbefore described with reference to the accompanying drawings.

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Fig. 1



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2 SHEETS

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SHEETS 1 & 2

Fig. 2

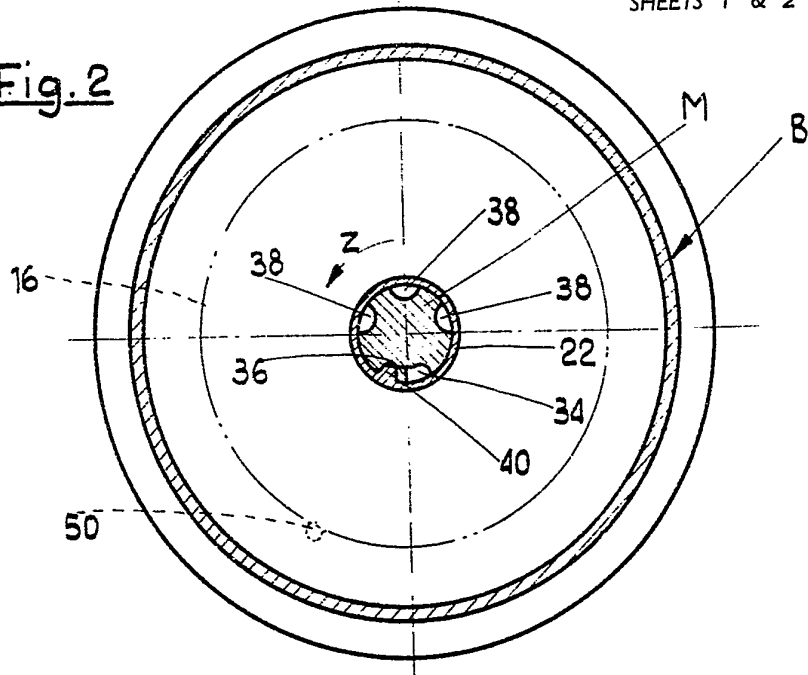
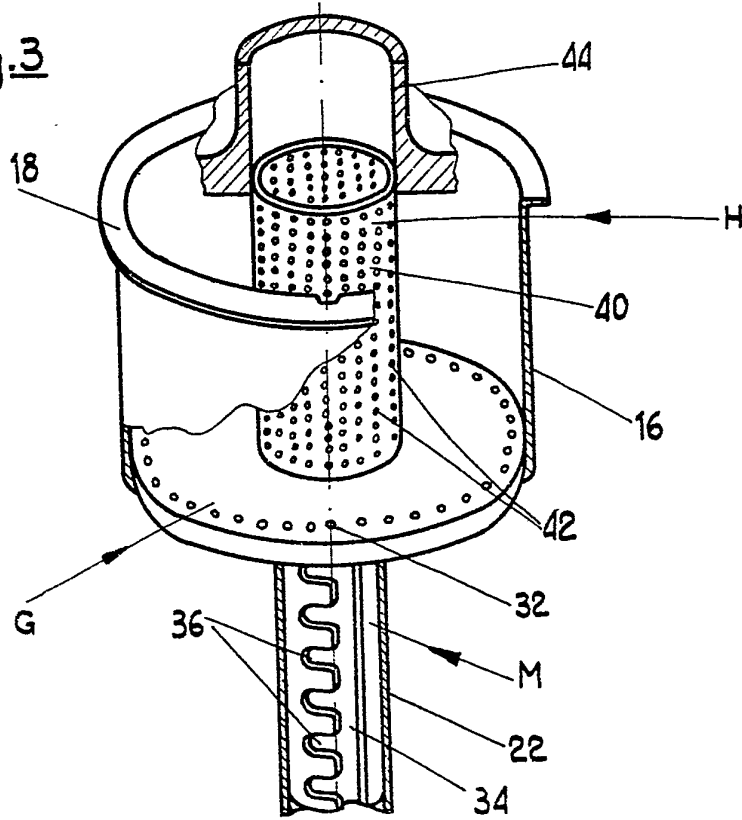


Fig. 3



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 2 SHEETS This drawing is a reproduction of
 the Original on a reduced scale.
 SHEETS 1 & 2

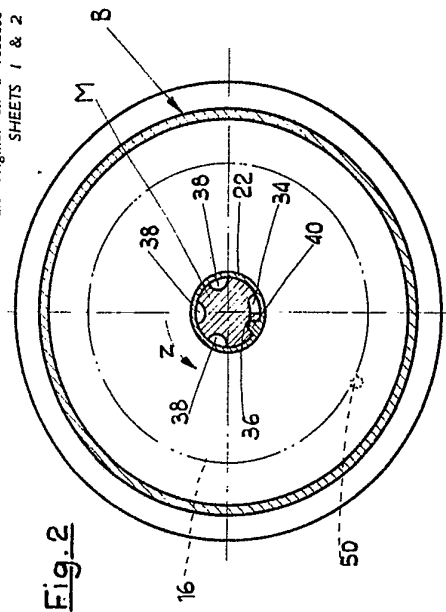


Fig. 2

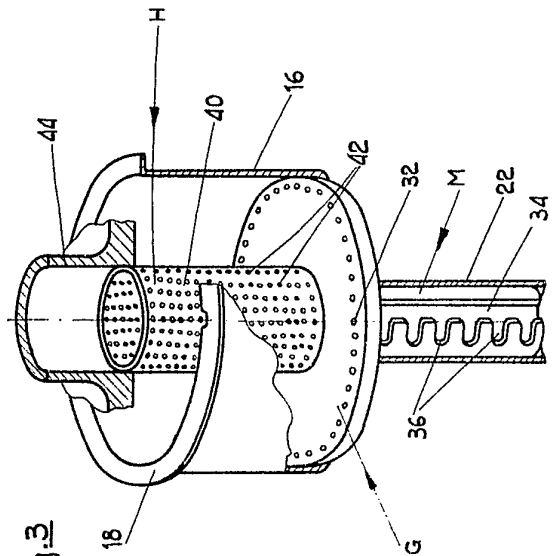


Fig. 3

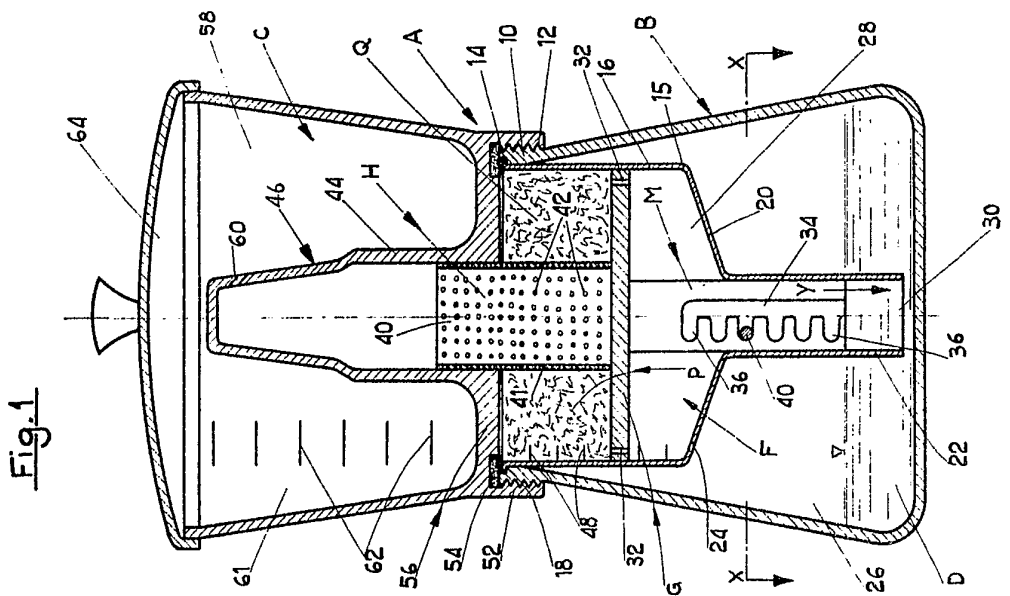


Fig. 1