

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 0 855 165 A2**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
29.07.1998 Bulletin 1998/31

(51) Int Cl.<sup>6</sup>: **A47L 15/42**

(21) Application number: **98830010.9**

(22) Date of filing: **15.01.1998**

(84) Designated Contracting States:  
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE**

Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **22.01.1997 IT MI970111**

(71) Applicant: **SMEG S.p.A.**  
**I-42016 Guastalla (IT)**

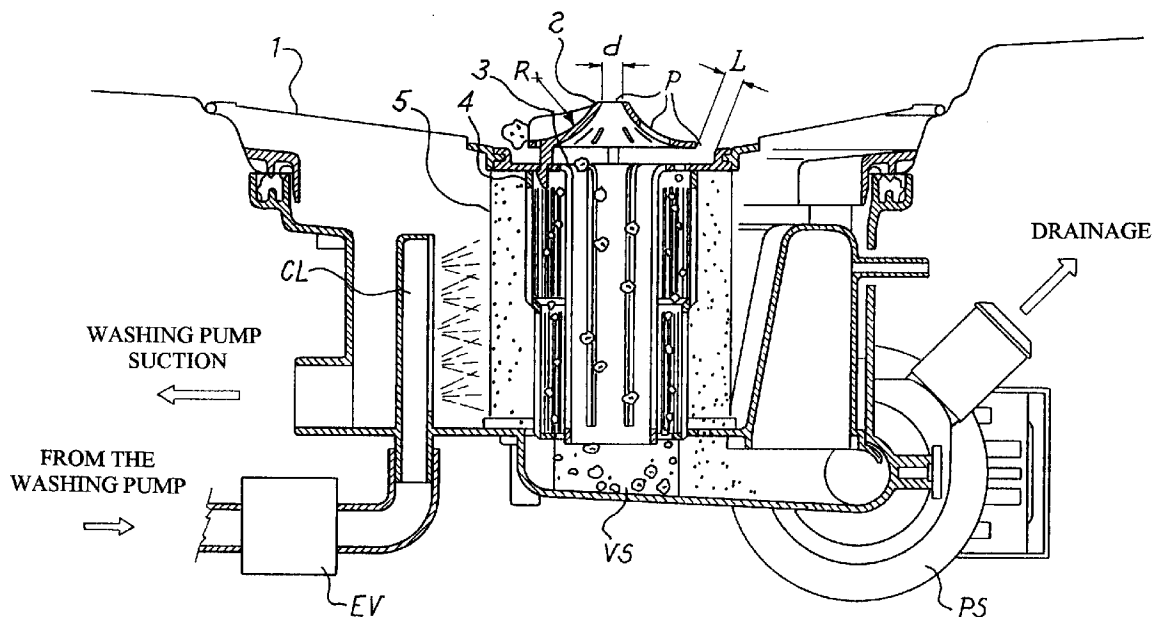
(72) Inventor: **Bertazzoni, Roberto**  
**42016 Guastalla (IT)**

(74) Representative: **Adorno, Silvano et al**  
**c/o SOCIETA' ITALIANA BREVETTI S.p.A.**  
**Via Carducci, 8**  
**20123 Milano (IT)**

**(54) Improved filtering device for dishwashers**

(57) An improved filtering device to be used in a dishwashers includes a covering member (2) fixed at the top of a first filtering member (3) introduced into a second filtering member (4), the latter being in turn introduced into a third filtering member (5) with a close-mesh net, i.e. a microfilter. The device is located on the tank

bottom in the center of the concave shape of a plane filter (1) with a large-mesh net. The presence of the covering member (2) provided with particular passage ports (P) and the ratios between the various progressively smaller passage ports provide a higher filtering effectiveness with reduced risks of clogging.

***Fig.1*****EP 0 855 165 A2**

## Description

The present invention relates to dishwashing machines for domestic use, and in particular to an improved filtering device to be used in said machines.

It is known that in dishwashers for domestic use there is a filtering group on the tank bottom which provides the retention both of the larger residues removed from the dishes and of the smaller particles which could be re-deposited on the dishes, thus reducing the washing effectiveness.

To this purpose, the filtering group generally includes a plane filter with a comparatively large-mesh net (1-2 mm.) located on the tank bottom and having a concave shape. Therefore this filter conveys a portion of the water towards a lower central area, where there is arranged an assembly of two or three vertical concentric filters with progressively smaller passage ports.

It is clear that in order to achieve a good washing effectiveness the filtering group must be able to retain the dirt particles without clogging. For this reason it is essential to make filters with a correct balance between the filtering and non-clogging requirements. Prior art filtering devices have the drawback of not achieving this balance of requirements, whereby they do not allow to achieve a desirably high washing effectiveness.

Therefore the object of the present invention is to provide a filtering device suitable to overcome the above-mentioned drawback.

This object is achieved by means of a device having the characteristics disclosed in claim 1.

The main advantage of the filtering device according to the present invention is to provide a high filtration without clogging problems, so as to validly contribute to a good washing effectiveness of the dishwasher.

Another advantage of the present device is that it is made up of few simple pieces, which positively affects its cost and ease of assembly and disassembly.

These and other advantages and characteristics of the filtering device according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof, with reference to the annexed drawings wherein:

Fig.1 is a schematic vertical sectional view of the tank bottom area of a dishwasher provided with the present device;

Fig.2 is a perspective exploded view showing the members which make up the present device;

Figs.3a and 3b are schematic top and elevational views, respectively, of a covering member of the present device;

Fig.3c is a vertical sectional view along line A-A of fig.3a;

Figs.4a and 4b are schematic top and elevational views, respectively, of a first filtering member of the present device;

Fig.4c is a vertical sectional view along line B-B of

fig.4a;

Figs.5a and 5b are schematic top and elevational views, respectively, of a second filtering member of the present device; and

Fig.5c is a vertical sectional view along line C-C of fig.5a.

With reference to figs.1 and 2, there is seen that on the tank bottom of a dishwasher there is arranged a plane filter 1 with a large-mesh net (1-2 mm), having a concave shape and centrally provided in the lowermost area with a seat for the filtering device according to the present invention. Said device is substantially made up of a covering member 2 fixed at the top of a first filtering member 3 introduced into a second filtering member 4, the latter being in turn introduced into a third filtering member 5 with a close-mesh net (0,25-0,40 mm), a so-called microfilter.

The working of the present filtering device is not different from that of known filters as far as the general operation is concerned. In fact, the water sprayed onto the dishes brings therewith food residues while falling down on the tank bottom, the larger residues being retained at the surface of the filtering group by the plane filter 1. In this way they are clearly visible to the user which can remove them manually before the following washing cycle. Most of the water (about 80%) goes through the plane filter 1 and is directly sucked in by the washing pump, whereas the remaining portion enters the central filtering device through a plurality of passage ports P, as it will be better explained further on. Since during the washing cycle the water contained in the dishwasher is recycled by the washing pump about 10-12 times per minute, it may be assumed with a good approximation that during the whole cycle all the particles in the water will finally go through the filtering device.

The particles retained by the various members of the filtering device will then fall down by gravity into an underlying drainage space VS, from which they are sucked out by a drainage pump PS. Moreover, in order to keep clean the third outer filtering member 5, or microfilter, there is provided a washing duct CL having a plurality of nozzles which tangentially spray the microfilter 5. Water coming from the washing pump is periodically fed into the duct CL, e.g. at the beginning of each rinsing step, by opening an electrovalve EV. In this way the whole surface of microfilter 5, which is rotatably mounted in its seat, is washed by a counter-current from the nozzles of duct CL.

Referring also to figs.3a-5c, the features of the members of the present filtering device are now illustrated in detail.

The covering member 2 (figs.3a-3c) has a substantially frustoconical circular shape with a concave lateral surface 6 having a curvature radius "R" (fig.1) between 15 and 25 mm, preferably 20 mm. In said concave surface 6 there are formed a plurality of radial slots 7, in particular twelve slots in the illustrated embodiment,

symmetrically arranged and having a width between 1,2 and 1,6 mm, preferably 1,4 mm. At the top of cover 2 there is formed a circular axial bore 8 having a diameter "d" (fig. 1) between 5 and 7 mm, preferably 7 mm. The concave surface 6 is divided into four equal portions by four vertical orthogonal fins 9 extending from the edge of the axial hole 8 to the periphery 10 of cover 2.

The fixing of the covering member 2 on the first filtering member 3 is performed through a pair of opposite teeth 11 integrally formed, together with a pair of reference pins 12, on the lower face of cover 2. Teeth 11 and pins 12 engage corresponding holes 13 formed in the first filtering member 3 (fig1 and fig.4a), so as to keep cover 2 centered and spaced with respect to the first filter 3. The diameter of cover 2 is smaller than that of the top inner periphery 14 of the first filter 3, so that between said periphery 14 and the edge 10 of cover 2 there is a circular ring-shaped space having a width "L" (fig. 1) between 4,5 and 6,5 mm, preferably 5,4 mm.

Said circular ring-shaped space, slots 7 and the axial hole 8 of cover 2 together are the above-mentioned passage ports P which allow the water to enter the filtering device according to the present invention.

The first filtering member 3 (figs.4a-4c) has a circular cylindrical body 15 ending at the top with a disk 16 in which the above-mentioned holes 13 are formed. In the cylindrical body 15 there are formed a plurality of vertical slots 17, in particular six slots in the illustrated embodiment, arranged symmetrically and having a width between 2,5 and 3,5 mm, preferably 3 mm. These slots 17 extend from disk 16 almost until the lower end of the cylindrical body 15. Furthermore, below disk 16 there are formed two opposite vertical lugs 18 shaped so as to engage in corresponding seats 19 formed in the second filtering member 4 (fig.5a). In this way, the first filter 3 is restrained against axial rotation with respect to the second filter 4 in which it is introduced.

The second filtering member 4 (figs.5a-5c) also has a circular cylindrical body 20, whose diameter is reduced at about mid-height. In the cylindrical body 20 there are formed a plurality of vertical slots 21, in particular forty-eight slots in the illustrated embodiment, arranged symmetrically and having a width between 0,8 and 1,2 mm, preferably 1,2 mm. These slots 21 extend from the lower end of the cylindrical body 20 almost until the top, with a discontinuity at the change in diameter. The structural integrity of body 20 is assured by a lower base in which there are formed a central seat 22, for introducing the first filter 3, as well as a plurality of holes 23, sixteen holes in the illustrated embodiment, symmetrically, arranged for draining the filtered particles.

The second filter 4 is in turn introduced into microfilter 5 (figs. 1, 2) which simply consists of a cylindrical net, with 0,25 mm mesh, provided with top and bottom reinforced edges. The global assembly of the various members of the present filtering device is achieved by coupling the top edge of microfilter 5 with the outer periphery of disk 16 of the first filter 3, which projects with

respect to the second filter 4.

It is clear that the above-described and illustrated embodiment of the device according to the invention is just an example susceptible of various modifications. In particular, the number and arrangement of slots 7, 17, 21 may be varied somewhat and the same is true for holes 13 and 23. Similarly, the shape, size and coupling mechanisms of the members making up the device may be changed according to specific requirements, as far as the ratios between the various passage ports described above are maintained. For example, the snap-in coupling of teeth 11 into holes 13 could be replaced by an equivalent bayonet coupling performed by properly shaped teeth and holes.

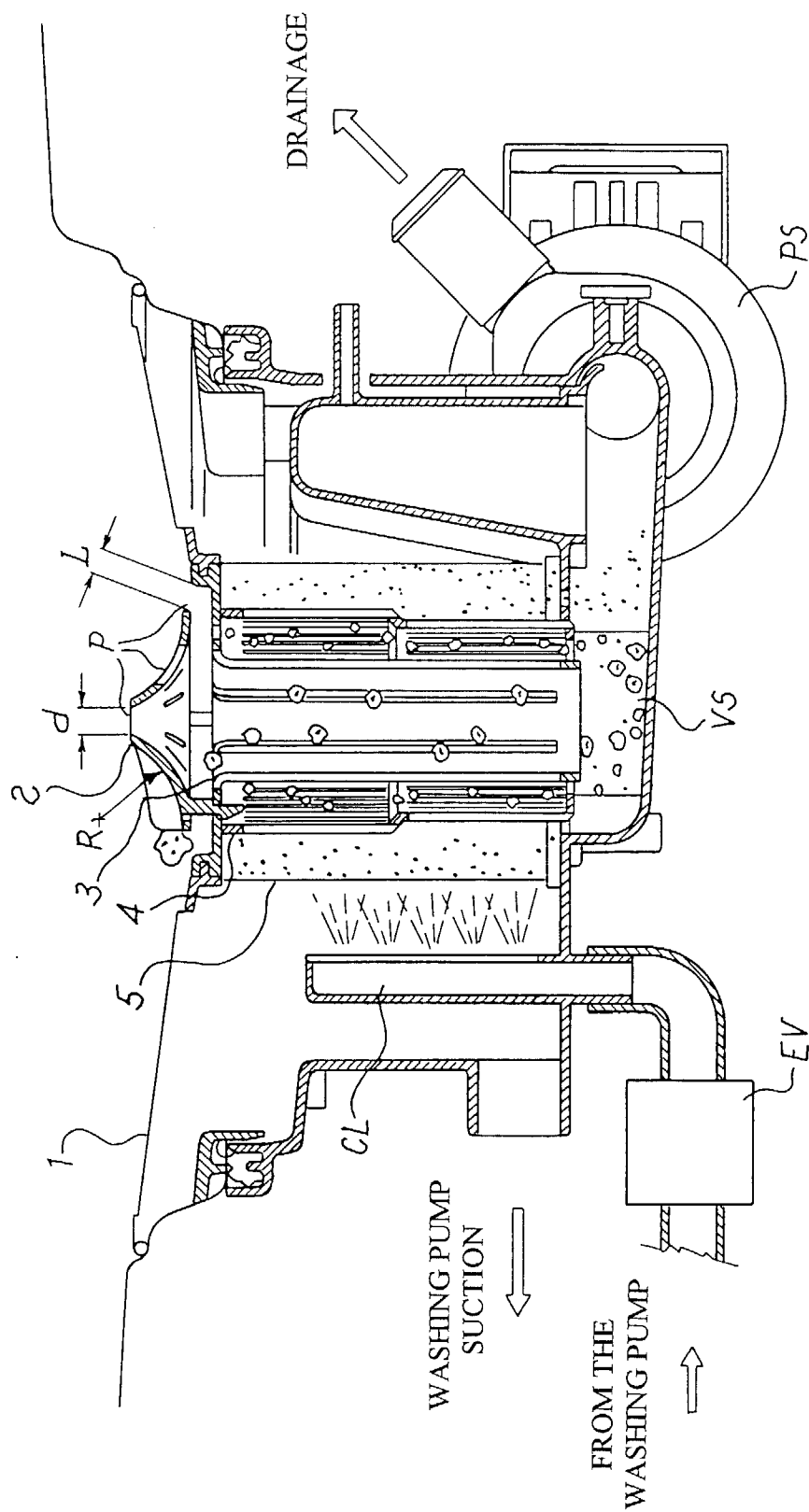
## Claims

1. An improved filtering device for dishwashers including a covering member (2) fixed at the top of a first filtering member (3) introduced into a second filtering member (4), the latter being in turn introduced into a third filtering member (5) with a close-mesh net, the device being located on the tank bottom of the dishwasher in the center of the concave shape of a plane filter (1) with a large-mesh net, characterized in that said covering member (2) has a substantially frustoconical circular shape with a lateral concave surface (6) wherein there are formed a plurality of symmetrically arranged radial slots (7), a circular axial hole (8) being formed at the top of the covering member (2), the diameter of the covering member (2) being smaller than that of the top inner periphery (14) of said first filtering member (3) so that between said periphery (14) and the edge (10) of the covering member (2) there is a circular ring-shaped space for the passage of water having a width (L) between 4,5 and 6,5 mm.
2. A filtering device according to claim 1, characterized in that the first filtering member (3) has a circular cylindrical body (15) ending at the top with a disk (16) wherein a plurality of holes (13) are formed, a plurality of symmetrically arranged vertical slots (17) being formed in said cylindrical body (15) which have a width between 2,5 and 3,5 mm, said slots (17) extending from said disk (16) almost until the lower end of the cylindrical body (15).
3. A filtering device according to claim 2, characterized in that the slots (17) are six and are 3 mm wide.
4. A filtering device according to one or more of the preceding claims, characterized in that the second filtering member (4) has a circular cylindrical body (20) wherein a plurality of symmetrically arranged vertical slots (21) are formed which have a width between 0,8 and 1,2 mm, said slots (21) extending

from the lower end of said cylindrical body (20) almost until the top thereof the cylindrical body (20) being also provided with a lower base wherein there are formed a central seat (22), for the introduction of the first filter (3), as well as a plurality of symmetrically arranged holes (23).

5. A filtering device according to claim 4, characterized in that the slots (21) are forty-eight and are 1,2 mm wide. 5  
10
  
6. A filtering device according to one or more of claims 2 to 5, characterized in that the third filtering member (5) consists of a cylindrical net, with 0,25 mm mesh, provided with top and bottom reinforced edges, said top edge being provided with means for coupling with the outer periphery of the disk (16) of the first filtering member (3). 15
  
7. A filtering device according to one or more of the preceding claims, characterized in that the slots (7) of the covering member (2) are twelve and have a width between 1,2 and 1,6 mm, preferably 1,4 mm. 20
  
8. A filtering device according to one or more of the preceding claims, characterized in that the axial hole (8) of the covering member (2) has a diameter (d) between 5 and 7 mm, preferably 7 mm. 25
  
9. A filtering device according to one or more of the preceding claims, characterized in that the width (L) of the circular ring-shaped space between the covering member (2) and the first filtering member (3) is equal to 5,4 mm. 30  
35
  
10. A filtering device according to one or more of the preceding claims, characterized in that the concave surface (6) of the covering member (2) has a radius of curvature (R) between 15 and 25 mm, preferably 20 mm. 40
  
11. A filtering device according to one or more of the preceding claims, characterized in that the concave surface (6) of the covering member (2) is divided into four equal portions by four vertical orthogonal fins (9) extending from the edge of the axial hole (8) to the peripheral edge (10). 45
  
12. A filtering device according to one or more of claims 2 to 11, characterized in that the covering member (2) is fixed onto the first filtering member (3) through a pair of opposite teeth (11) integrally formed on the lower face of the covering member (2) and suitable to engage holes (13) formed in the first filtering member (3). 50  
55

Fig.1



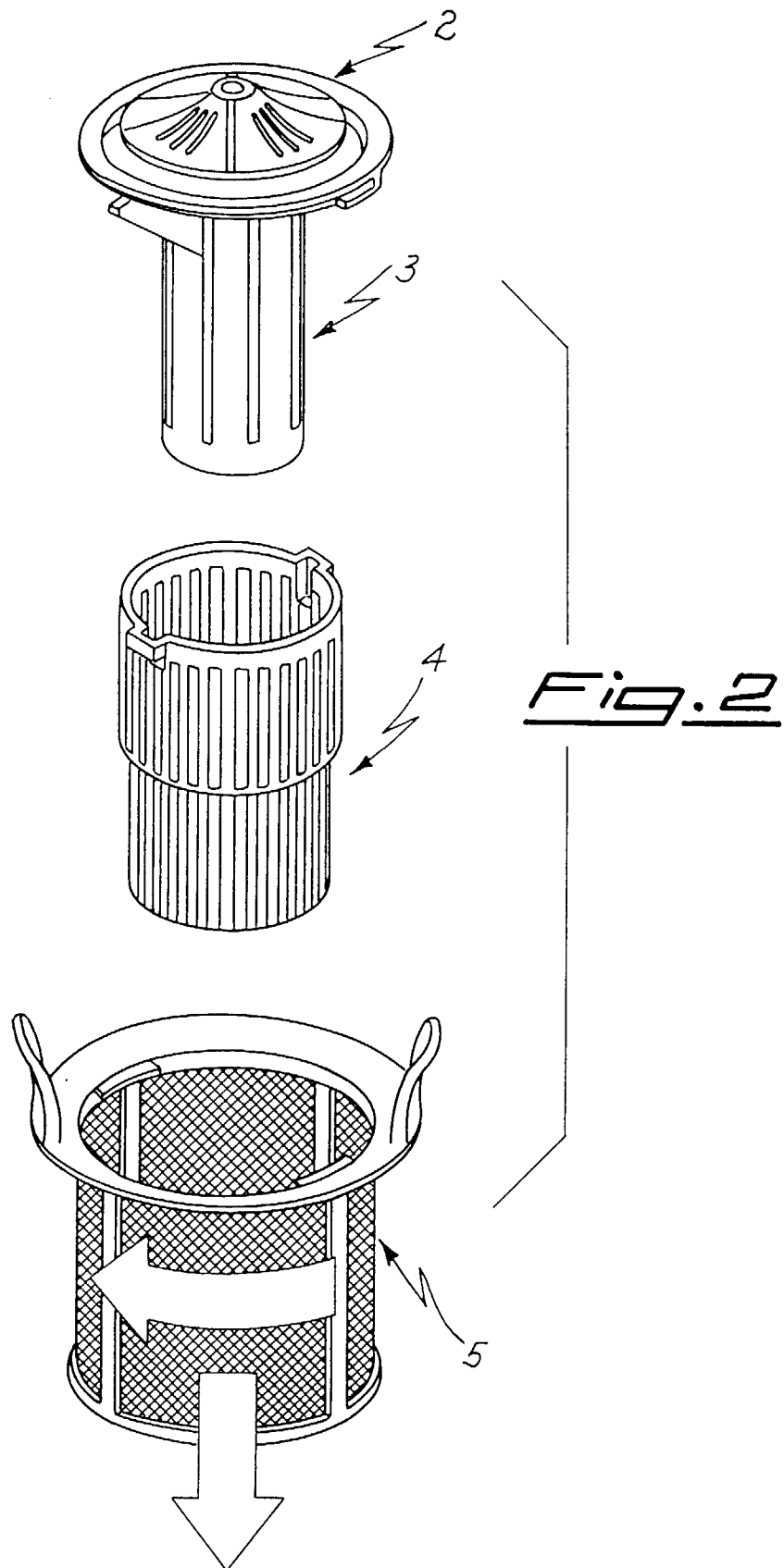


Fig. 3a

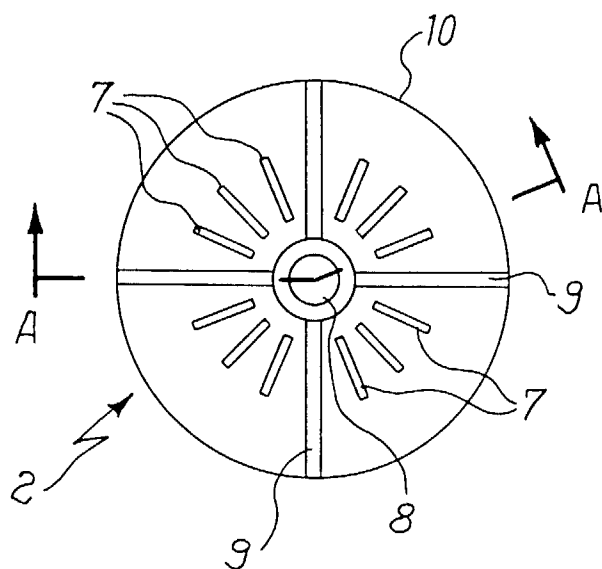


Fig. 3b

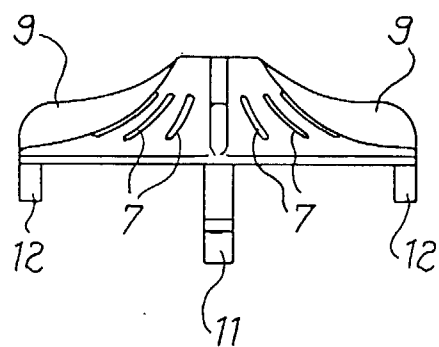


Fig. 3c

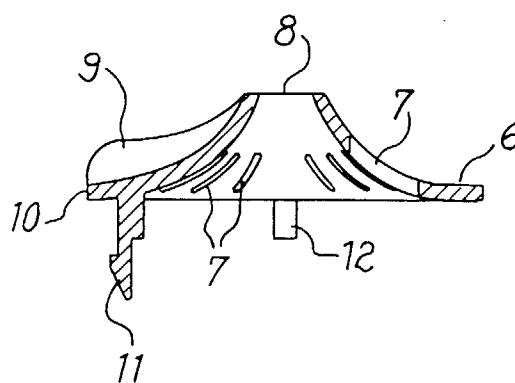


Fig. 4a

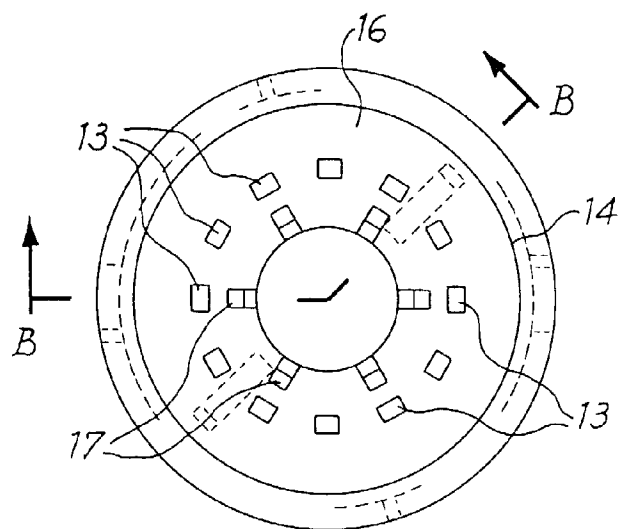


Fig. 4b

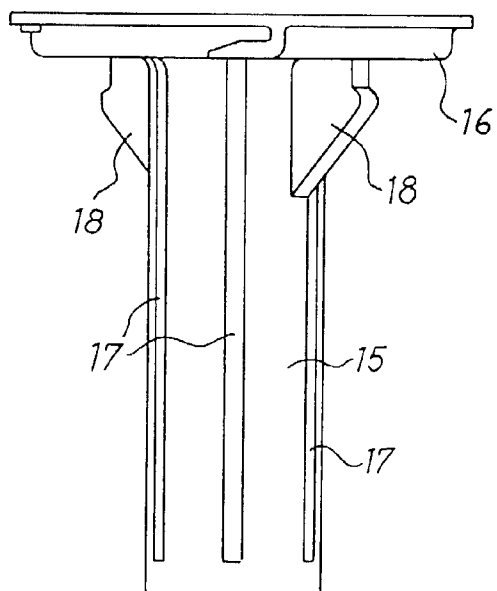


Fig. 4c

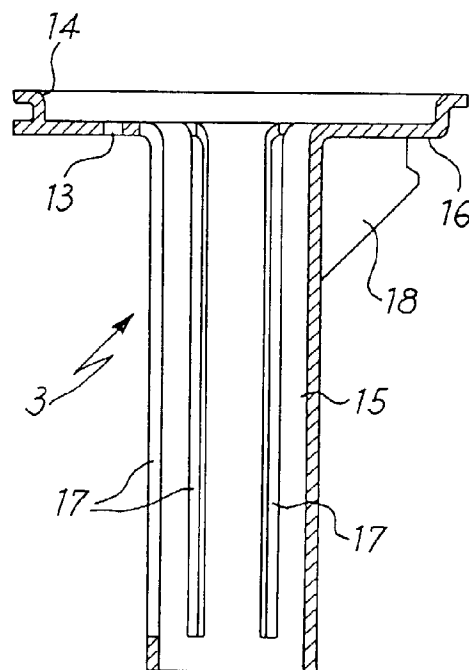




Fig. 5a

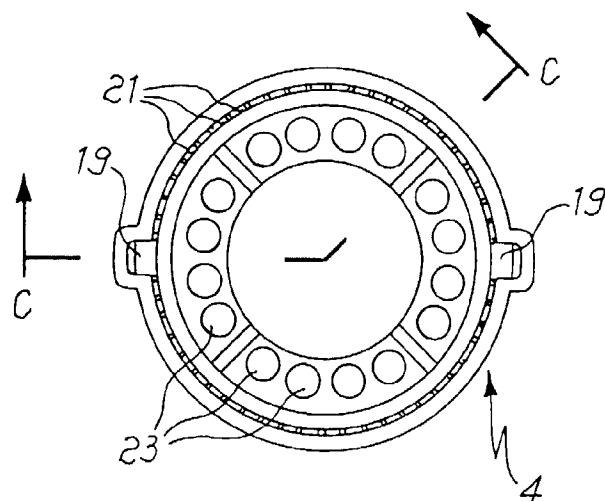


Fig. 5b

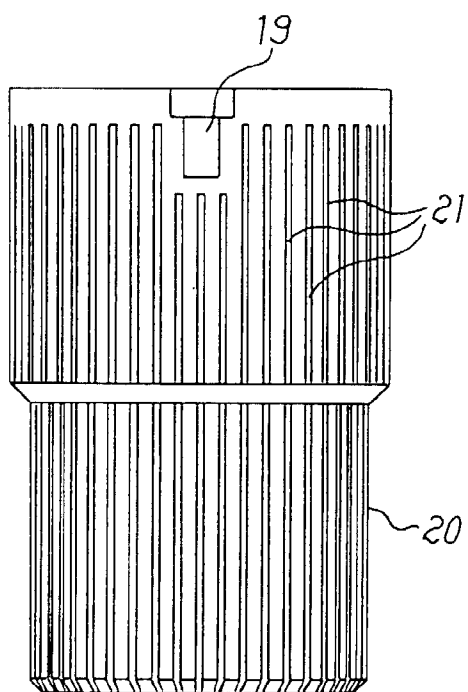


Fig. 5c

