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(54) Beverage dispenser

(57) Beverage dispenser with a long outlet spout (9) which in use extends to the bottom of a glass into which the beverage is to be dispensed. A valve (4) is provided at the bottom of the spout (9). Preferably the valve (4) is in the form of a plunger (4) having a generally conical shape with concavely curved sidewalls to smooth the flow of beverage.

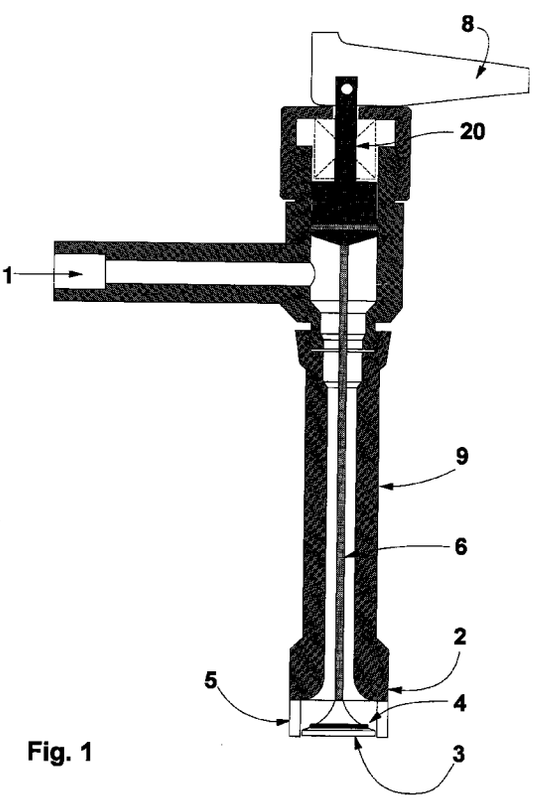

Fig. 1

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Description

Beer and other beverages are conventionally dispensed through a beverage tap which comprises an inlet to a housing, an outlet spout from the housing, and a valve within the fluid path in the housing for controlling the flow of beer through the tap.

A problem with conventional beverage taps is the time taken to dispense beverage into a glass. Typically it takes between 15 and 20 seconds to dispense a pint of beverage into a glass. It is important that beverages can be dispensed as quickly as possible to keep up with customer demand.

Reducing the time taken to dispense beverage is particularly difficult for high carbonation beverages such as lager. Typically, taps for dispensing high carbonation beverages comprise a short delivery spout from which the beverage drops into the glass, falling either directly onto the glass or onto beverage already dispensed in the glass. Due to the high carbonation level in the beverage, gas is liberated from the beverage as it hits the glass or surface of beverage already in the glass, and this liberation of gas causes excessive foam formation. Where this occurs, it is necessary to wait until the foam has dispersed before the remainder of the beverage can be dispensed. As the amount of gas liberated depends on the force with which the beverage falls onto the glass or beverage in the glass, the speed at which the beverage can be dispensed is limited to reduce the force and prevent excess foam formation.

It is also known to use a dispensing tap having a long spout including a sparkler which provides a restriction to the flow of beer which causes agitation of the beer as it is dispensed. The spout extends to the bottom of a glass and dispenses the beverage at the bottom of the glass. With the long spout, the beverage falls down the length of the spout and onto the bottom of the glass. During the passage of the beverage through the spout, air in the spout is entrained with the beverage. As the beverage hits the bottom of the glass, this agitates the beer and leads to the formation of gas bubbles. Accordingly, this system is not suitable for dispensing high carbonation beverages as the entraining of air and the agitation caused by the impact with the bottom of the glass causes excessive liberation of gas and overfoaming. Such long spout dispensing systems are therefore used for low carbonation beverages such as ales and stout.

According to a first aspect of the present invention, a beverage dispenser includes a beverage inlet, a beverage outlet spout, and a valve located substantially adjacent the outlet of the spout.

With this arrangement, when beverage is dispensed from the dispensing system, there is an initial pressure of beverage throughout the dispensing system to the valve at the end of the dispensing spout. Therefore, when the valve is opened, the beverage flows through the spout, without entraining any air as it passes through the spout.

It is preferred that the end of the spout is positioned below the surface of beverage in the vessel into which the beverage is dispensed. In this way, due to the location of the valve, there is nothing to cause the liberation of gas as the beverage passes through the dispensing system, and the beverage does not fall onto either the glass or beverage in the glass as it is dispensed. In this way there is minimal liberation of gas and consequent foam generation as the beverage is dispensed, and therefore the beverage can be dispensed at a higher rate than with conventional systems. Preferably the end of the spout is positioned near the bottom of the glass. This gives a high pressure at the end of the spout due to the maximum amount of beverage above the outlet.

It is preferred that the valve comprises a plunger which is movable between a closed position in which it seats against the open end of the spout, and an open position spaced apart from the open end of the spout. In this case the plunger may be connected to a control rod which extends through the spout to an actuator. The actuator may be in the form of a solenoid or other electrical control, but is preferably a hand operated actuator such as a lever which is moved to push or pull the control rod by a camming action.

To ensure a good seal when the valve is closed, an O-ring is preferably provided either on the outer surface of the plunger, or on the inner surface of the opening of the spout.

Preferably, the spout includes longitudinal legs which project around the outside of the plunger and extend to a position below the lower surface of the plunger in the lower position. In this way, the projections limit the lateral movement of the plunger, ensuring it remains generally co-axial with the spout. Furthermore, when dispensing a beverage into a glass, the bottom of the glass can be pushed up against the projections, and when the valve is opened, the plunger remains above the bottom of the glass. This ensures that the glass does not prevent or affect the opening of the valve.

Another advantage of the provision of the valve at the outlet end of the spout is that it is more hygienic than conventional systems as it remains closed when not in use.

According to a second aspect of the present invention, a beverage dispenser includes a beverage outlet spout including a nozzle provided at the outlet end of the spout, the nozzle including a dispersing means to laterally disperse the flow of the beverage, and having an opening larger than the internal cross-sectional area of the spout to reduce the velocity of the beverage flowing through the outlet.

With this arrangement, as the beverage is dispensed through the spout, the velocity of the beverage is reduced, so that less gas is liberated from the beverage as it fills a vessel into which it is dispensed. Furthermore, as the beverage is dispensed laterally rather than being projected straight down onto the vessel or onto

the surface of beverage already dispensed, the impact of the beverage and consequent liberation of gas from the beverage is reduced. In particular, by positioning the nozzle near the bottom of the vessel into which the beverage is to be dispensed, the beverage flowing through the spout is gradually diverted sideways, generally parallel to the bottom of the vessel, and in this way the beverage does not fall against the bottom of the vessel or against beverage previously dispensed, and therefore there is minimal liberation of gas from the beverage. This allows the beverage to be dispensed more quickly than with conventional systems.

The nozzle preferably includes a generally conical portion provided generally coaxial with the outlet spout. It is preferred that the generally conical portion has concave side walls to smooth the diversion of the beverage. Preferably the opening of the spout includes an interior surface corresponding generally with the conical portion giving a diverging annular path for the beverage.

The nozzle may include curved spokes extended generally radially. This causes some additional divergence of the beverage flow.

Advantageously, the first and second aspects of the present invention are combined. In this case the valve at the outlet of the spout acts to hold the beverage in the spout under pressure before dispensing to reduce initial liberation of gas as the beverage is dispensed, and to reduce entrainment of air as the beverage is dispensed, and the nozzle disperses the beverage sideways, and reduces the velocity to reduce gas liberation and foam formation throughout the dispensing.

In this case, where the valve is in the form of a plunger, this has a generally conical outer surface to divert the beverage as described above.

The dispenser according to the present invention is not limited to dispensing high carbonation beverages.

Particular examples of the present invention will be described in accordance with the accompanying drawings, in which:

Figure 1 shows a cross-section through a dispenser in the open position according to the present invention;

Figure 2 shows an end view of the dispenser of Figure 1;

Figure 3 shows a cross-section through the end of the dispenser of Figure 1 when closed;

Figure 4 shows a handle arrangement for operating the valve; and

Figures 5 and 6 show alternative shapes of outlet nozzle.

As shown in Figure 1, the dispenser includes an inlet portion 1 through which beer or other beverage enters the dispenser. The beverage passes down a spout 9 towards an outlet 2. The spout 9 is of a length such that it can extend to the bottom of a glass which is to be filled from the dispenser, typically 150mm. The spout may have an internal diameter of about 10mm.

At the bottom of the spout 9 is provided a plunger 3. The plunger 3 is connected by a longitudinally extending rod 6 to a tap 8 on the top of the dispenser. By operating the tap, the rod 6 is pushed or pulled causing the plunger 3 to move between the open position as shown in Figure 1 in which the plunger 3 is remote from the end of the spout 9, to the closed position as shown in Figure 3 in which the plunger 3 seals the end of the spout 9. In this way, turning of the tap 8 in the conventional manner opens and closes a valve to allow and prevent the dispensing of beverage respectively. The plunger 3 travels by about between 5mm between its open and closed position.

The operation of the tap 8 can be seen in greater detail from Figure 4. As shown best in Figure 4a, a rod 20 which is connected to the rod 6, is pivotally connected to the handle 8. The pivotal connection is at a height B (for example 10mm) above the top of the housing and a distance A (for example 5mm) from the side of the tap 8, where B is greater than A, so that movement of the tap 8 as indicated by the arrow to the position shown in Figure 4b causes the rod 20 to move downwards, thereby opening the valve in the spout.

The plunger 3 has a generally conical shape, with concavely shaped side walls. The end of the spout 9 has an inner surface with a corresponding shape. An O-ring 4 is provided on the plunger 3. The corresponding shapes of the nozzle 3 and the end of the spout 9, together with the O-ring 4 ensure a good seal when the plunger 3 is closed. The profile of the plunger 3 and end of the spout 9 ensure that as the valve is opened, beverage flowing down the spout 9 is gradually diverted from a generally vertical flow to a horizontal flow. As the beverage is diverted, it is spread out, thereby reducing its velocity as it leaves the spout 9. By slowing the beverage, and introducing this sideways into the glass, rather than projecting it at high velocity directly onto the bottom of the glass or onto the surface of beverage already dispensed, there is less agitation of the beverage, and therefore less liberation of gas as it is dispensed. This means that the beverage can be dispensed at a high rate without excessive foam formation.

As best seen from Figure 2, four legs 5 project longitudinally from the end of the spout 9. The legs 5 project slightly further than the lowermost position of the plunger 3. Therefore when the bottom of a glass to be filled is pressed up against the dispenser, the bottom of the legs 5 contact the bottom of the glass, and prevent the plunger 3 from contacting the bottom of the glass and thereby affecting the opening of the spout 9. Additionally the legs 5 contact the outside of the plunger 3, and thereby constrain the lateral movement of the plunger 3. This ensures that the preferred path for the beverage between the end of the spout 9 and the plunger 3 remains smooth. As seen clearly in Figure 2, the cross-section of the legs 5 gives a smooth flow path

for the beverage past the legs 5, and therefore these do not agitate the beverage and do not cause liberation of gas as the beverage is dispensed.

In another aspect of the present invention, the control of dispensing of the beverage is by a valve in the dispenser at a position other than the end of the spout 9, for example near the top of the spout 9 as in known dispensers. In this case, a flow smoothing device is provided at the end of the spout 9. As with the main aspect of the present invention, the flow smoother includes a generally cone shaped portion provided co-axially with the spout 9 which directs the beverage flowing down the spout 9 generally sideways, and reduces the velocity of the beverage as it is dispensed, thereby reducing the liberation of gas from the beverage.

As shown in Figure 6, the nozzle may include generally radially extending fins which are curved. In this case, beverage passing down the spout 9 is diverted sideways by the generally conical shaped smoother 3", reducing the velocity of the beverage. The curved fins further divert the beverage which gradually swirls into the glass.

Claims

1. A beverage dispenser comprising a beverage inlet (1), a beverage outlet spout (9), and a valve (4) located substantially adjacent the outlet (2) of the spout (9).

2. A beverage dispenser according to claim 1, wherein, in use, the end of the spout (9) is positioned below the surface of beverage in the vessel into which the beverage is dispensed.

3. A beverage dispenser according to claim 2, wherein, in use, the end of the spout (9) is positioned near the bottom of the glass.

4. A beverage dispenser according to any one of the preceding claims, wherein the valve comprises a plunger (3) which is movable between a closed position in which it seats against the outlet (2) of the spout (9), and an open position in which the plunger (3) is spaced apart from the outlet (2) of the spout (9).

5. A beverage dispenser according to claim 4 wherein the plunger (3) is connected to a control rod (6) which extends through the spout (9) to an actuator (8).

6. A beverage dispenser according to claim 5, wherein the actuator (8) is a hand operated actuator such as a lever (8) which is moved to push or pull the control rod (6) by a camming action.

7. A beverage dispenser according to any one of the preceding claims, wherein the spout (9) includes longitudinal legs (5) which project around the outside of the plunger (3) and extend to a position below the lower surface of the plunger (3) in the open position.

8. A beverage dispenser comprising a beverage outlet spout (9) including a nozzle (2) provided at the outlet end of the spout, the nozzle (2) including a dispersing means (3') to laterally disperse the flow of the beverage, and having an opening larger than the internal cross-sectional area of the spout to reduce the velocity of the beverage flowing through the outlet (2).

9. A beverage dispenser according to any one of the preceding claims, wherein the nozzle (2) includes a generally conical portion (3',3") provided generally coaxial with the outlet (2).

10. A beverage dispenser according to claim 9, wherein the generally conical portion (3',3") has concave side walls to smooth the diversion of the beverage.

11. A beverage container according to claim 9 or 10, wherein the opening of the spout (9) includes an interior surface corresponding generally with the conical portion giving a diverging annular path for the beverage.

12. A beverage container according to any one of the preceding claims, wherein the nozzle includes curved spokes extended generally radially.

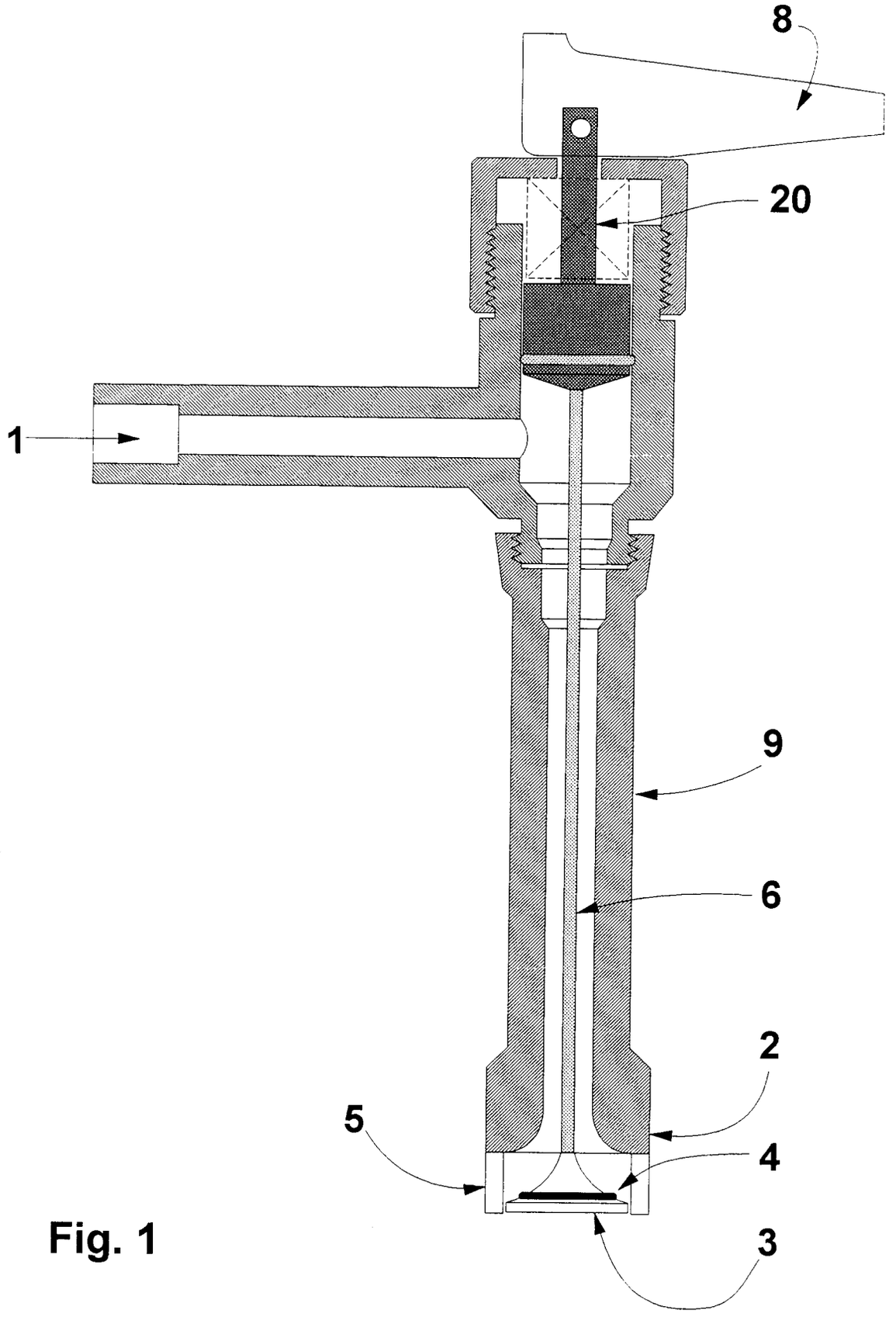


Fig. 1

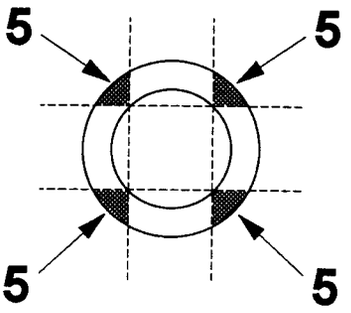


Fig. 2

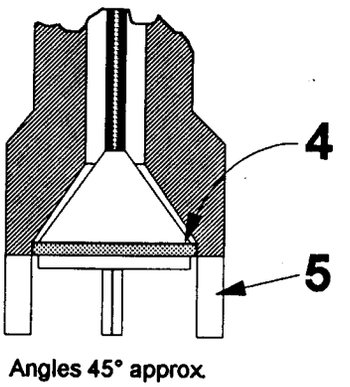


Fig. 3

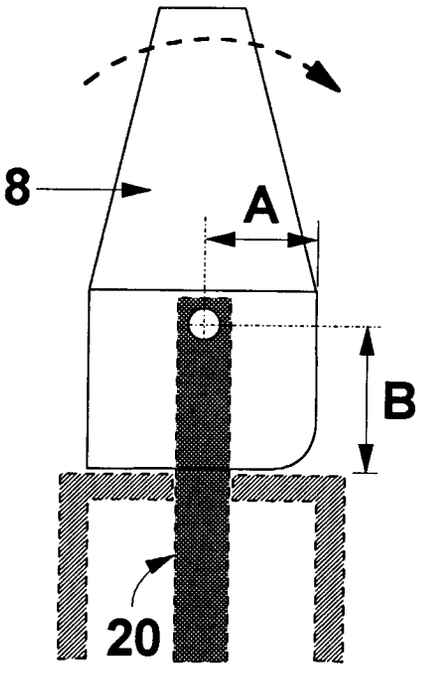


Fig. 4a

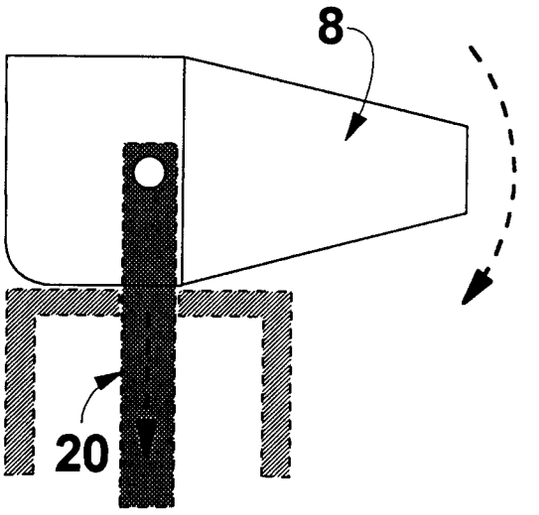


Fig. 4b

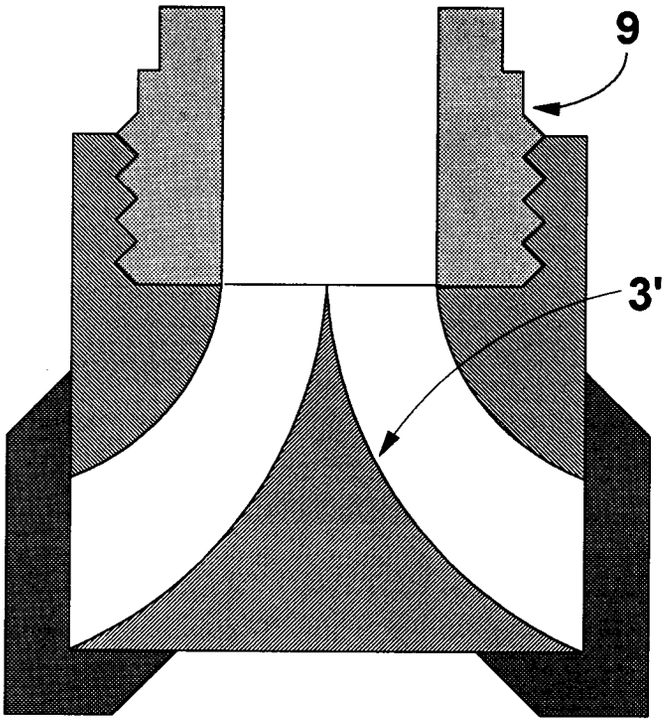


Fig. 5

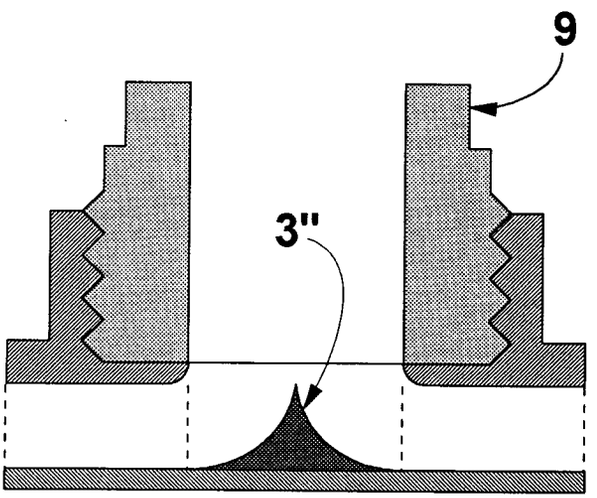


Fig. 6a

Fig. 6b

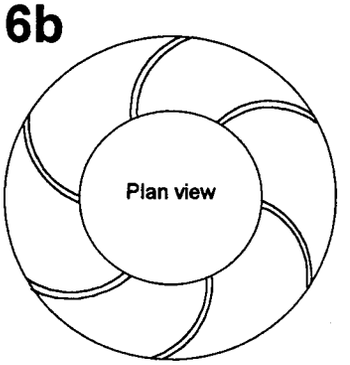
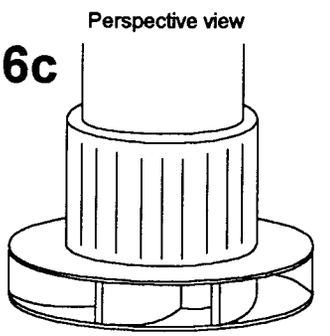


Fig. 6c



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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 1338

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X A	US 5 603 363 A (P. NELSON) * column 4, line 47 - column 5, line 32 * * figures 2,3 * ---	1-5,9,11 8	B67D1/14
X	US 2 450 315 A (L. VETRANO) * the whole document * ---	1-6	
A	US 4 648 421 A (N. CHANT) -----		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B67D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	11 July 1997	Smolders, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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