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(54) Improvements in and relating to a beer container.

(57) A dispenser for beer or the like comprising a container filled with a beverage having carbon dioxide in solution to between about 5/8 to 3/4 of its volume, the head space above the beverage being filled with a gas under pressure.

When liquid is dispensed from the container the loss of CO₂ dissolved in the liquid is less than that in dispensers known hitherto because the pressure in the head space remains relatively high and consequently less CO₂ comes out of solution with the liquid. Hence a dispenser having a substantial head space significantly increases the ability to dispense relatively large volumes without requiring any significant restoration time.

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IMPROVEMENTS IN AND RELATING TO A BEER CONTAINER.

This invention relates to the dispensing of carbonated beverages and in particular, beer.

It is desirable to provide a carbonated
5 beverage dispensing apparatus which may for example be kept in the home and used to dispense only a part of the volume of the container at any one time whilst retaining the remainder in good condition and under sufficient pressure to facilitate further dispensing.

10 If, as in a conventional soda syphon, a carbonated beverage occupies virtually all of the volume of the container and a significant amount of the beverage is dispensed, then the volume of the head space is increased, the gas pressure drops and dispensing
15 ceases. Further dispensing may be possible after a lapse of time as carbon-dioxide dissolved in the beverage comes out of solution due to the drop in pressure, restoring pressure in the head space. This, however, means that the quality of the remaining
20 beverage suffers and with the substantial amounts drawn off at any one time, for example in the case of beer or lager, the time delay could be unacceptable.

It is a general object of this invention to try to overcome this problem.

25 A beverage dispenser for use in the invention

comprises a container which may for example be of plastic material which is a good gas barrier such as polyethylene terephthlate (PET) made for example by injection blow moulding in one piece or by injection moulding in two pieces which are subsequently attached
5 together. The container which is provided with a dispensing valve or tap, is known per se.

Such a container in accordance with the invention is filled with a beverage with carbon dioxide
10 in solution (for example beer) to between about $5/8$ to $3/4$, preferably $5/7$, of its volume, the head space above the beverage being filled with gas under pressure.

It has been found that such a dispenser having a substantial head space significantly increases the
15 ability to dispense relatively large volumes without requiring a restoration time. It also reduces the vulnerability to temperature change since if the temperature rises and gas comes out of solution from the beverage, the relative pressure increase is much less
20 than would be the case if the container was full.

Furthermore with such an arrangement, as liquid is dispensed the loss of CO_2 dissolved in the liquid is much less because the pressure in the head space remains relatively high as compared with the case of a
25 conventional dispenser after a similar amount of

beverage has been dispensed, and consequently less CO₂ comes out of solution from the beverage.

If the temperature drops then further CO₂ may be dissolved in the beverage but if the head space is
5 filled with CO₂ this presents no problems. If however the head space is filled with Nitrogen (N₂), which is preferred, then a relatively small amount of N₂ is dissolved as this gas is less soluble than CO₂.

The use of N₂ helps to maintain the pressure in
10 the head space when beer or other carbonated beverage is dispensed as relatively little is dissolved in the beverage being dispensed. The Nitrogen "softens" the beer, but this can be compensated by increasing the amount of CO₂. ("Softening" is a reduction in the CO₂
15 tingle on the tongue).

As an example, of the invention, 5 litres of beer containing the maximum CO₂ permitted, is introduced into a 7 litre container at atmospheric pressure. Nitrogen is then charged into the head space of about
20 2 litres, at 14 psi above atmosphere so that 4 litres of nitrogen occupy the 2 litres of head space. With such an arrangement it has been found that with normal temperatures and atmospheric pressure the beer is under pressure at all stages during dispensing so that air is
25 not sucked into the container as beer is dispensed.

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In theory when the head space has been increased to 4 litres in volume due to dispensing of three litres of beer, the pressure is atmosphere (4 litres of Nitrogen being originally charged into 2 litres of head space volume). However at this lower pressure some CO₂ comes out of solution in the beer until an equilibrium is reached with a remaining sufficiently high CO₂ content of the beer to be acceptable and with a head space pressure which is above atmospheric. When the dispenser is used to dispense lager it is believed to be desirable to have a pressure of 8 psi in the head space as the last pint is dispensed. This may be achieved by having the original head space filled with gas under somewhat greater pressure.

At one end the container may have a screw neck and a matching cap with two apertures, each carrying an appropriate fitment. One aperture would be for the purpose of filling the container, and would advantageously be on the central axis of the container so that no orientation of the container was needed for filling. This could be sealed by a non-removable plug or cap, or by a screw cap or screw bung.

The second aperture may carry a dispensing tap capable of dealing with the pressures involved. It is

anticipated that a cradle would be provided so that the container would be used in the conventional barrel position with its major axis horizontal. The tap position would therefore be as low down as possible on the end face to dispense the maximum amount of beverage before tipping becomes necessary.

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CLAIMS:

1. A dispenser for beer or the like comprising a container filled with a beverage having carbon dioxide in solution, to between about $5/8$ to $3/4$ of its volume,
5 the head space above the beverage being filled with a gas under pressure.
2. A dispenser as claimed in Claim 1 in which the gas in the head space is CO_2 or N_2 .
3. A dispenser as claimed in Claim 1 or 2 in which
10 the container before dispensing is filled with a beverage to $5/7$ of its volume.
4. A dispenser as claimed in Claim 3 in which nitrogen is present in the head space at 14 psi above atmospheric.
- 15 5. A dispenser as claimed in any one of the preceding claims in which the container is made of polyethylene terephthlate.
- 6.. A dispenser as claimed in any one of the preceding claims in which the container has two
20 apertures, one for filling the container which is on the central axis of the container and which is normally closed by a removable closure, the second aperture carrying a dispensing tap or the like which is positioned adjacent the periphery of the end face and
25 which in use is located as low as possible.