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(54) **Gas separation and recovery in beer-filling machine**

(57) A gas recovery system for use in conjunction with a beer filling machine comprises a separation vessel, a gas drier, a gas reservoir, a compressor and a pressure vessel. Waste gas and beer from a beer filling machine is introduced to the separation vessel wherein the gas is separated from the beer; the gas thence being dried and transmitted via the reservoir and compressor to the pressure vessel whereby it may be recycled back to the beer filling machine.

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## SPECIFICATION

### Gas recovery system

5 This invention relates to equipment for the filling of containers with beer wherein the beer is filled into the container against the counter-pressure of a gas therein.

Machines for washing and filling containers with beer are well known and one such machine is described for example in our European Patent Application EP-A-19405. The machine described therein enables recovery of residual beer in the filling system subsequent to filling the container with beer; such beer recovery being effected by discharge of beer under pressure of carbon dioxide to a beer-save, or ullage, tank.

With the increasing costs of gases used in machines of the above type it has become desirable to recover as much waste gas as possible and it is an object of the present invention to provide a gas recovery system for use in conjunction with a filling machine for beer containers.

In accordance with the invention there is provided a gas recovery system for use with a beer filling machine comprising a separation vessel for receiving waste gas and residual beer from the machine, said vessel having a gas inlet for a regulated gas supply thereto, an outlet for the discharge of beer therefrom and a gas outlet leading to a gas reservoir, and a compressor located down-stream of the gas reservoir operable to pump gas therefrom to a gas pressure vessel; said pressure vessel having a gas inlet for a regulated gas supply thereto and an outlet for the discharge of gas therefrom to the beer filling machine.

Other features of the invention will become apparent from the following description given herein solely by way of example. Waste gas, which will usually be carbon dioxide and which is relatively expensive, will be used in the beer filling machine to drive residual beer from the filling system through a conduit through a non-return valve to a cylindrical separation vessel. The gas/beer mixture is introduced through a perforated annular ring in the top of the vessel so that the gas may separate from the beer as the beer falls to the bottom of the vessel. The vessel is conveniently fitted with a pressure gauge and, for safety, an anti-vacuum device.

A gas inlet is provided adjacent the top of the vessel for receiving a regulated gas supply of the same gas as the waste gas. An outlet is provided in the base of the vessel whereby beer may be removed therefrom by a pump at periodic intervals for transmittal to a suitable pasturising device whereby the beer may be recovered for later use. A gas outlet is provided adjacent the top of the vessel which leads via a suitable conduit through a pressure relief valve and stop valve to a drier for the gas. From the drier the gas is led to a gas reservoir which is maintained at a lower pressure than the gas above the beer in the separation vessel; such gas reservoir also being fitted with a pressure gauge and an anti-vacuum device. A discharge conduit leads from the gas reservoir via a compressor, a stop valve and

a non-return valve to a gas pressure vessel capable of withstanding a working pressure of approximately 250 p.s.i. This pressure vessel is also conveniently fitted with a pressure gauge and an anti-vacuum device. An inlet to the pressure vessel permits the introduction of a regulated gas supply of the same gas as that which is being recovered whilst an outlet from the pressure vessel enables a conduit to be connected therefrom back to the beer filling machine.

The system thus provides a gas recovery arrangement whereby the relatively expensive carbon dioxide gas which is usually used for beer filling may be recycled and used again in the beer filling machine.

## CLAIMS

1. A gas recovery system for use with a beer filling machine comprising a separation vessel for receiving waste gas and residual beer from the machine, said vessel having a gas inlet for a regulated gas supply thereto, an outlet for the discharge of beer therefrom and a gas outlet leading to a gas reservoir, and a compressor located down-stream of the gas reservoir operable to pump gas therefrom to a gas pressure vessel; said pressure vessel having a gas inlet for a regulated gas supply thereto and an outlet for the discharge of gas therefrom to the beer filling machine.