

Semi Automatic Venting Closure for Plastic Beer Barrels (Keg Closure with Venting Mechanism) – *Practice as research*

This commissioned (Petainer Holdings – Czech Republic) design research explores the potential for the development and manufacture of a semi automatic venting closure for the plastic beer barrel (non-returnable) industry, making for the 'safe' venting of these barrels when they become empty, 'opening up' the potential to access Eastern European markets. This is a highly original innovation which until this body of work had not been possible.

It applies rigorous, iterative design innovation and implementation methodologies, in which the investigator is a leading authority, to develop, prototype, evaluate and test design and manufacturing options, determining the most functionally effective and commercially viable solution. In particular this involved the use of comprehensive design development utilising three dimensional computer aided design and analysis, rapid prototyping and soft tool injection moulding techniques to determine the most appropriate design solutions and to test and validate the core innovation which is the validity of manufacturing an internal aperture on the main closure component into which an elastomeric valve can be fitted coupled with an externally mounted, one use only, valve opening feature.

This product opens up the potential for a fundamental paradigm shift in the way the beer industry can transport and dispense its product and as such has made it possible for the market to take advantage of beer being shipped in single use, recyclable, plastic beer barrels, with concomitant impacts on the both the environment, the economy and health and safety (reduced shipping weight - new sales - safe venting).

The product is under patent application (patent GB1221141.3), research findings have resulted in a product launch at the Brau Fair in Nuremberg, November 2012. Sales are expected to exceed 4 million a year in the Russian market alone.

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Existing Petainer Plastic Beer Kegs

Output Description

This work is a £80,000-00 design research commission from Petainer Holdings Sweden.

Petainer manufacture injection blow moulded plastic bottles out of Sweden and the Czech Republic. In addition they produce their own range of injection blow moulded (non returnable) plastic beer barrels which sell throughout most of Europe.

Sales of larger beer into Russia and other former Eastern Bloc countries represents a considerable market, but sales into these countries in returnable steel or aluminium barrels has proven problematic, in that their scrap value is too high and these barrels are seldom returned. As such there is a significant opportunity for Petainer's non returnable (but recyclable) plastic barrels to supply larger beer into these markets.

The barrier in using these plastic barrels however has been that these countries do not usually have automatic venting technology in their pubs and bars. A barrel is pressurised to about 4 to 6 bar, when empty the barrel could still be at 1.5 to 2 bar; a sudden release of this pressure (normally managed safely through an automatic venting system) can be highly dangerous, even potentially lethal.

The design research challenge was to produce a closure (a couple between the barrel and the pressurising/dispensing system) for these plastic barrels that would allow for semi-automatic venting of the barrels, prevent re use and yet not hinder recycling and therefore produce a system for Petainer to safely capitalise on these markets.

The innovation is based on creating an aperture from the inside of the closure (requiring very careful use of injection moulding techniques) to the outside of the closure into which a rubber bung is fitted from the inside but being exposed to the outside of the closure (item 1 figure 1). This bung sits up against a plastic button which is retained on the outside of the closure (item 3 figure 1).

The bung is slightly conical so when pressurised a gas tight seal is created.

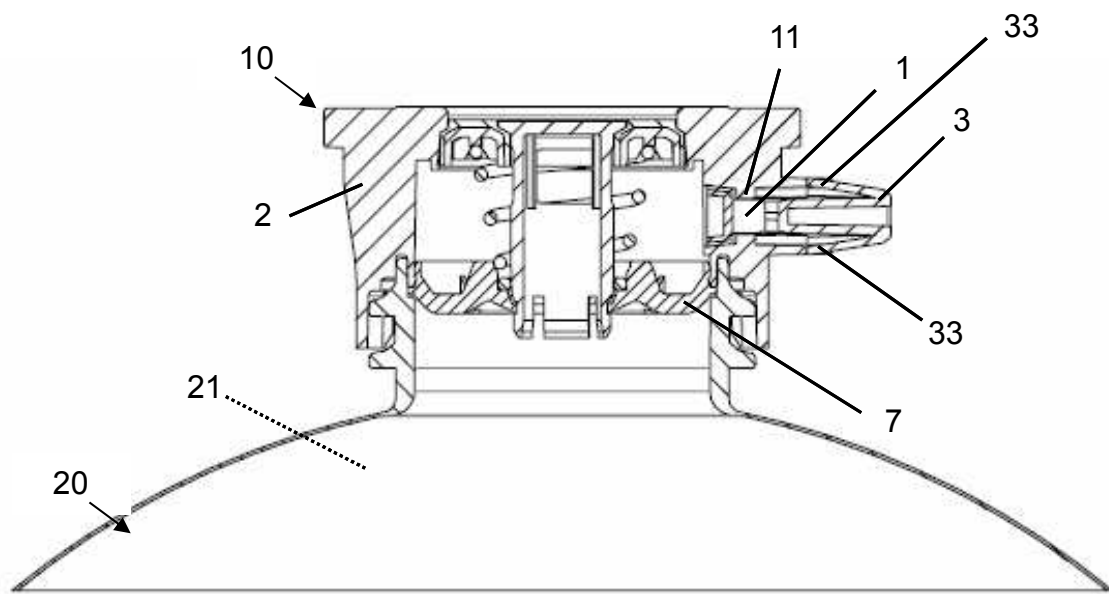
After the beer is dispensed the two plastic flanges (or latches, items 33 figures 1 and 2) on the button are depressed permitting the pressing of the button on the rubber bung. These two plastic flanges prevent the button being accidentally depressed. The bung is then permanently displaced dropping into the empty beer container (item 3 figure 2).

The barrel now safely vents the residual pressure in a safe manner.

The plastic button has two secondary latches which when the button is depressed, retain the button within the closure preventing re use.

The closure can now be safely removed enabling the polyester (PET) barrel to be recycled.

Note this venting system is for Petainer - Czech Republic and is different to the cask system produced for Petainer - Sweden as part of Fords output 'Rapid Prototyping and Additive Manufacturing in New Product Development'.



SECTION A-A

Figure 1

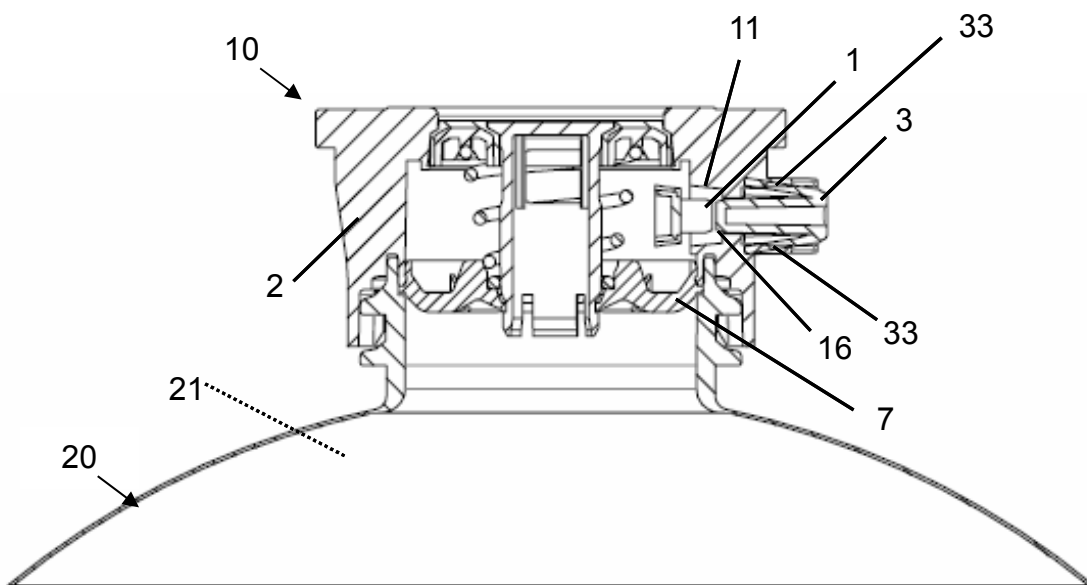
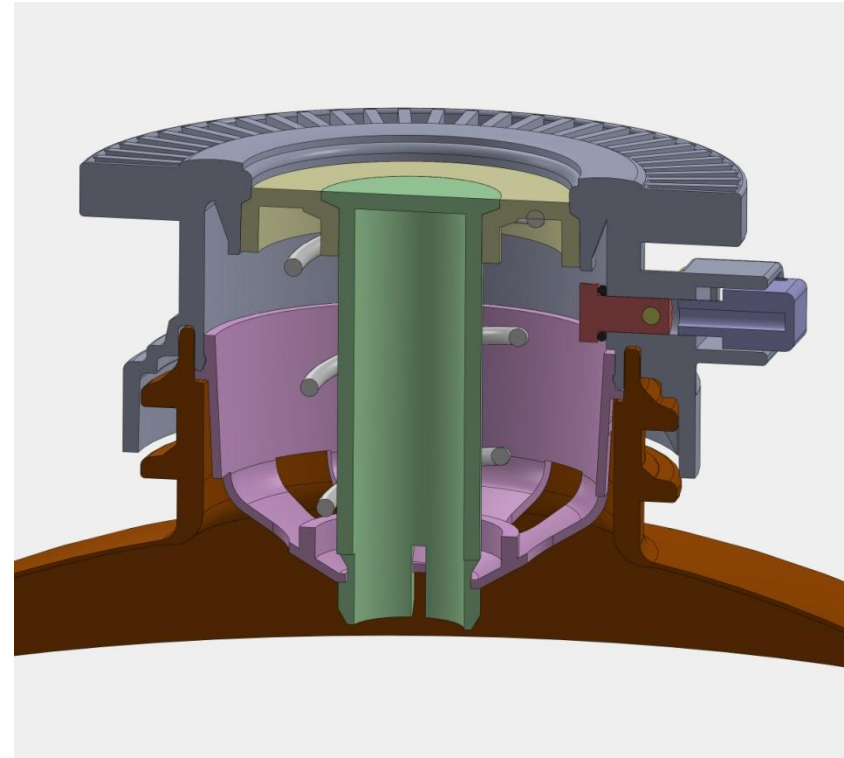
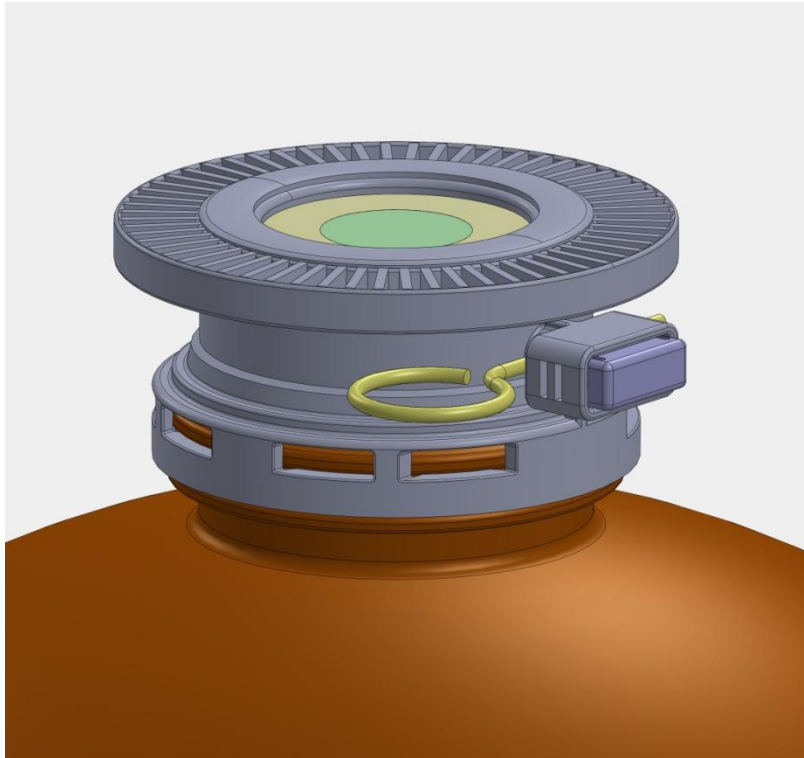


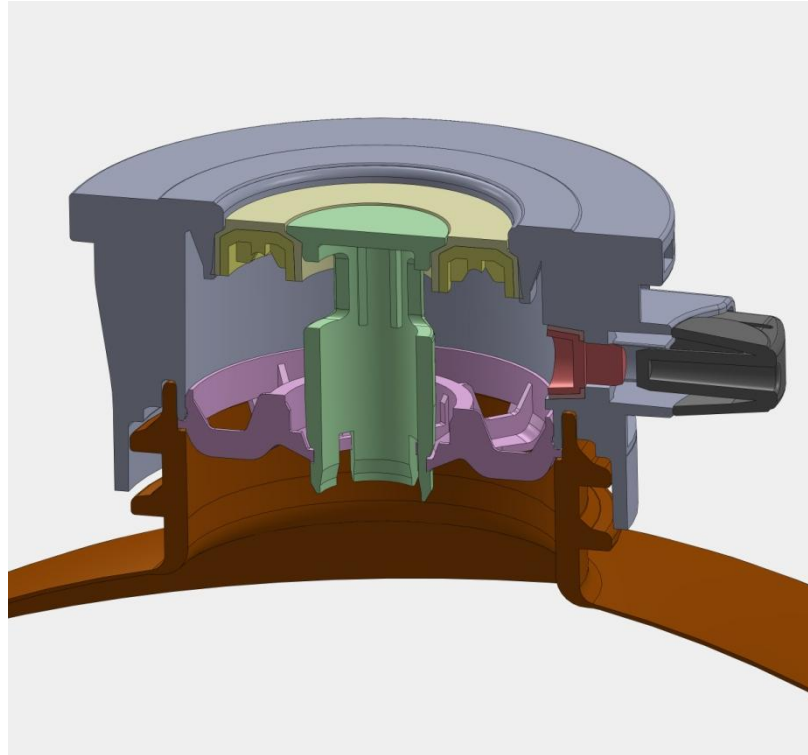
Figure 2

Semi Automatic Venting Closure for Plastic Beer Barrels (Keg Closure with Venting Mechanism)



Early CAD Concepts

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Refined Concept

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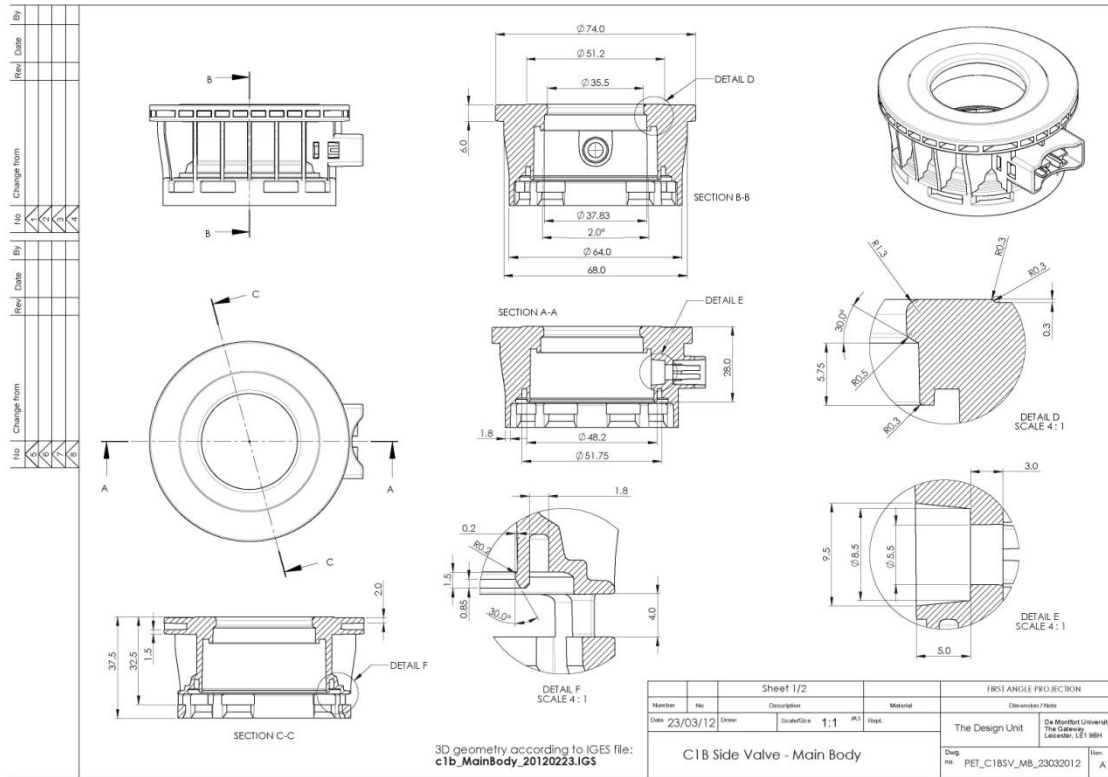


SLS (Selective Laser Sintering) Mock - Up



Soft Tooled Prototype

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Technical Definition

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Product Launch at Brau Fair Nuremberg, November 2012