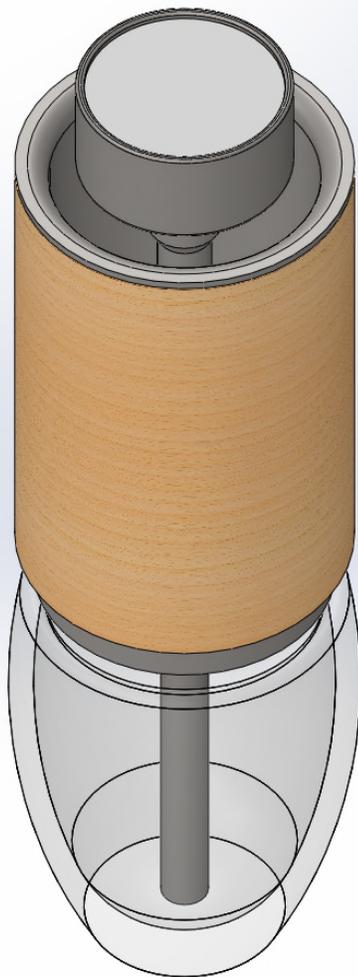
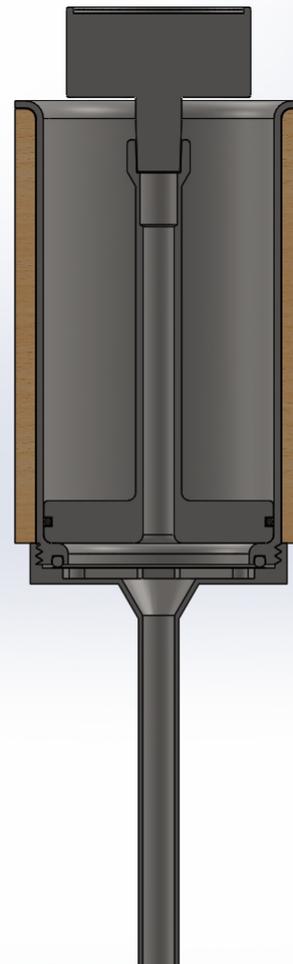


Single Serve Coffee Maker

A portable single serve coffee maker is described that uses an external source of hot water to brew coffee and dispense it directly into the vessel for consumption. The compact nature of the coffee maker allows for its use on travel or for camping and has a minimum of cleanup. The quality of the coffee is controllable by the pressure of extraction, temperature of incoming water, and grind and quality of the coffee used.



Coffee Maker In Use



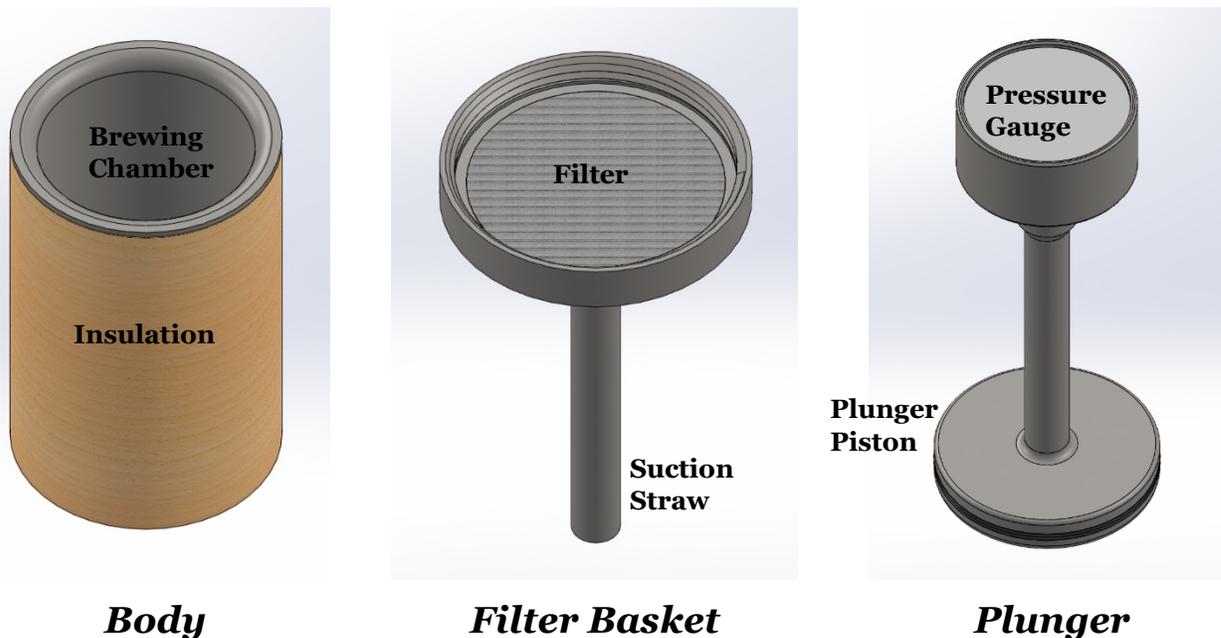
Cutaway

Basis of Design

There are many single serve coffee makers that serve this market, but this design seeks to solve some of the problems inherent in their design. It uses pressure extraction combined with turbulent mixing of the grounds to maximize the contact of the hot water with the grounds and optimize extraction in a short timeframe. It can be used in any situation where hot water and coffee grounds are available.

The coffee maker consists of three major components:

- The body which is a cylindrical vessel with mating threads for the filter basked assembly to hold the hot water during brewing. It may be double walled for insulation or have an insulative coating such as silicone or wood applied to minimize hot surfaces and ensure the water temperature is maintained relatively constant during brewing.
- A filter basket assembly that contains a holder for the filter, suction straw, and mating threads. The design shown here has a reusable metal filter in the holder, but a paper or cloth filter could also be used. The length of the straw is sized to reach into most single serve coffee vessels but could be extended if necessary.
- A plunger assembly that provides suction and pressure when operated. It contains an integrated pressure gauge to allow for control over the brewing process.





Unique Aspects of Design

The construction of the coffee maker allows for control over the brewing process by providing the ability to heat water to the desired temperature outside of the brewer and monitor pressure during extraction. Due to the insulated nature of the body and the thin wall construction of the metal body, temperature drop during initial introduction of hot water and during brewing will be relatively consistent independent of external factors. The integrated pressure gauge on the plunger assembly allows for consistent application of pressure during extraction.

The hot water only contacts metal with the exception of the silicone gasket in the filter basket. This minimizes the potential of chemicals leaching into the coffee, and the longevity of the coffee maker is anticipated to outlast any system that uses plastic in a high temperature environment.

Usage Details

The Brewing Process

The coffee maker is used in the following way:

1. Hot water is poured into the final consumption vessel at a temperature slightly higher than the desired brewing temperature. The temperature will be determined by the user based on preferences on extraction, coffee used, amount of coffee, brewing time, heat capacitance and temperature of the consumption vessel, etc.
2. The filter basket is installed on the body with a filter (reusable or disposable). Coffee grounds are poured directly into the body from the top.
3. The plunger assembly is inserted all the way into the body as far as possible until it contacts the coffee.
4. The suction straw of the filter basket is put into the bottom of the consumption vessel and the plunger assembly is used to suction the hot water into the coffee maker. Suction is performed to the point where air is suctioned and drawn into the main body, resulting in mixing in the brewing chamber. This turbulent mixing maximizes contact between the hot water and the grounds.
5. The hot water is held in the body of the brewer for a set amount of time to be determined by the user based on coffee used, grind, water temperature, etc. The coffee grounds settle to the bottom of the coffee maker against the filter in preparation for extraction.
6. After the brew time has elapsed, the plunger is used to pressurize the air pocket above the surface of the coffee and push the coffee through the filter and into the consumption vessel. The pressure gauge may be used to regulate the amount of pressure used in this process to control extraction.

Perceived Benefits

The design and brewing process allows for tailored control of the coffee making process in a compact format that can be used in a variety of situations and allow for replication of results. Due to the high mixing caused by introduction of air during suction and the potential for high pressure extraction, single servings of coffee can be made in a relatively short amount of time with minimal equipment.