Steam and Spray Mechanism for a Faucet

Anonymous
Title:
Steam and Spray Mechanism for a Faucet

Abstract:
Disclosed is a mechanism for creating a steam and spray output from a faucet wand. The mechanism channels fluid through a single waterway and shapes or shifts the flow of water to create a steam output or a spray output.

Invention:
Current kitchen faucet wands typically offer discrete water presentation modes such as spray and stream. Each of these are achieved by directing water via a valve to either a series of nozzles for spray or an aerator for stream. This valving mechanism requires a multitude of components including multiple seals. Thus complexity in execution, manufacturing, and multiple seal interfaces.

A multi-function wand with a single conduit for use with a pull-down kitchen faucet is herein described. Multi-functionality is achieved by impinging a jet of water against the inner surface of a cylindrical housing through a user-selectable angle of deflection. The jet of water issues forth from a single orifice at atmospheric pressure, and the resulting spray pattern can range from a tight column at zero deflection angle (with no impingement) to a fan-shaped spray, the spread of which is directly dependent on the angle of deflection. Furthermore, the fan-shaped spray can be flat or curved depending on the radius of curvature of the surface against which the jet impinges: a flat surface results in a flat spray, while a curved surface results in a curved spray. Other factors affecting the shape of the spray pattern include the diameter of the orifice, the distance from the orifice to the point of impingement, and the distance from the point of impingement to the downstream edge of the impingement surface.

The benefits of this concept are as follows:
Multiple spray configurations are achievable using a single conduit.

1. The shape of the spray can be variable per the user's need: a tight column provides a "pinpoint" spray for localized cleaning, while a wider spray can be used for more generalized cleaning, rinsing, or flooding.
2. Assembly complexity is minimal since only there is only one moving part, whether the jet is moveable and the impingement surface is fixed, or the jet is fixed and the impingement surface is moveable.
3. The deflection angle can be changed by mounting the moveable component on a pivot which can be redirected via an external wheel or user-driven linkage.

A boost mode could be integrated by varying the restriction upstream of the outlet orifice, still as a single conduit.
The below wand concept does not use a valve to shift water from one delivery mode to another. Rather it closes off or opens various outlets to allow water to exit the wand. In one mode the spray pattern outlets are closed and the outlet to the aerator is open to provide an aerated stream mode. Likewise in another mode the spray pattern outlets are opened and the outlet to the aerator is opened to provide a stream mode.

Two concentric pistons move axially in a fully wetted chamber. One piston would block the aerator outlet. The second concentric piston would block the spray nozzle outlets. While this configuration is for concentric pistons, the pistons could be non-concentric, aligned next to each other. An actuation mechanism would control the piston movements.
The below concept simplifies the ability to have a stream or spray mode in a kitchen wand. Rather than a valve with multiple seals, this concept uses a piston that varies the flow cross section to alter the water exit velocity and volume. In the attached configuration the stream mode is achieved by creating a large exit flow area. In the spray mode the flow area is decreased to the point of allowing flow only through the exterior nozzles.