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Title:
Mechanism for Changing the Mode of a Shower

Abstract:
Disclosed is a mechanism for changing the spray mode of a shower. The mechanism includes a rocker and linkage system to translate a force applied directly to the shower face into a rotational force to rotate a selector thereby allowing the user to select different spray modes from the shower.

Invention:
The problem proposed was to be able to change modes on a showerhead/handshower by pressing the entire spray face as a mode selector. Otherwise concealed to the user, the mode selection appears to be 'magic' as there is not a defined dial or push button as is commonly found in showering devices. This mechanism enables the user to press on the face of the device in order to change modes with an audible and haptic feedback system.

The design utilizes a compound 4 bar linkage to multiply the action from the user. The user inputs roughly 6-7 degrees of travel to the spray face and this multiplies to 40 degrees on the mode selector. Similarly, the mode selector utilizes (3) seals for a (3) function shower whereas most multifunction devices have one or two seals. The 3 seals allows for 360 degrees of travel within the system by reducing the amount of angular deflection by (3) once for the 3 seals and (3) for the number of modes. 360/3 results in a conventional amount of travel to be 120 degrees but by utilizing 3 seals the 120 degree force is reduced to 40.

As represented in the images below, the user engages the system by pressing on the spray face. The spray face pivots about the centerline of the engine and interfaces with a rocker. The rocker turns the spray face's pivoting motion into linear motion through a slider member. The slider member acts against spring force and compounds the force/angles through a planar four bar linkage system. The 4 bar linkage transvers the energy to a component which contains the mode seals, thus changing modes of the showerhead. When sufficient angular displacement has been reached, a detent snaps into position preventing the seal component from rotating further. When the user releases the spray face, the spring forces the slider backward, pulling the 4 bar linkage back to the home position until a second detent is engaged after the 4 bar linkage travels 4 degrees. One detent is stationary with respect to the mode changer whereas the other detent moves with the mode changer when changing modes and is allowed to retract when the system is released.
POR Mechanism:

- Sizing designed around Enliven cup seals/springs
- 4 bar linkage (Planar)
- Linkage driven by rocker
- 6.5° of spray face rotation results in 40° in mode change rotation
- Audible/tactile detent at end of travel
- Audible/tactile detent when reset
Touch Point Steps

I. User presses on spray face
II. Linkage causes mechanism to rotate counterclockwise
III. When end of travel is reached, an audible/tactile ‘click’ is reached
   I. This click holds the mechanism in a given mode
IV. User releases the spray face
V. Main spring causes linkage to rotate mechanism clockwise
VI. Driving plate slips past the mode changer clockwise
VII. Driving plate clicks into the next ‘home’ position

Touch Point: Mode Change Mechanism

Resting Position
Begin to pivot spray face
End of pivot travel
Touch Point: Mode Lock Mechanism

- Resting Position
- Begin to pivot spray face
- End of pivot travel
- Mode change complete
- User releases spray face; mechanism retracts
- Mechanism resets