# METHOD AND APPARATUS FOR RETAINING A SOFT SEAL IN AN INTEGRATED FLAPPER MOUNT, HARD SEAT, SPRING HOUSING SURFACE CONTROLLED SUBSURFACE SAFETY VALVE


## ABSTRACT

Presented is a subsurface safety valve in which the flapper mount, hard seat and spring housing have been integrated into a single assembly. To accommodate a "soft seat insert," a special retainer soft seat ring and soft seat seal are provided. The soft seat seal fits over a conical protruding surface (hard seat) that surrounds the main bore of the safety valve on the bottom side of the spring housing. The retainer ring fits over the soft seat seal and holds it in place against the conical surface. Notches along the perimeter of an upper flanged end of the soft seat seal prevent gases, such as nitrogen, from becoming trapped behind the seal and potentially damaging it during a rapid decompression event. A gap between the upper flanged end of the soft seat seal and the lower spring housing allow the seal to move up and down the conical protruding surface as the flapper opens and closes, reducing compression of the seal and the risk of a compression set due to repeated opening and closing of the flapper.


Figure : 1