



ABSTRACT OF THE DISCLOSURE

A nozzle retention shroud provided to shroud at least
5 a portion of the extended nozzle to further protect a
portion of the nozzle nearest the exit plane from downhole
obstructions. A combination of materials used to form the
nozzle may include a matrix of tungsten carbides with
suitable binder joined to an outer metal jacket nozzle
10 body. A third ceramic matrix material may be utilized to
line or partially line an interior passage formed by the
mini-extended nozzle and a reduced in diameter portion of
the nozzle design may include a built-in fracture plane in
the unlikely event the end of the nozzle hits an
15 obstruction. The extended portion of the nozzle will shear
off along this fracture plane thereby preventing a nozzle
washout that likely would result in a trip out of the hole
to repair the resultant damage to the rock bit.