meters to be studied, while the others are qualities which
are compatible with the plasticity equations to be introduced
later. The secondary wafer material should reflect changes
only in those parameters under study. The above reasoning
led to the selection of annealed 303 stainless steel for the
primary material, and 2S aluminum, 6061 aluminum, and Armco
iron for the secondary materials.

The approach to be taken here is to first describe the
system of equations to be used, present the method of solu-
tion, and then show the resulting stress distributions for
each of the situations under study.

A. Formulation of Governing Equations. The system of
equations to be developed here are patterned from those given
by Hoffman and Sachs in Reference (k). It has been determined
experimentally in Reference (g), that for large plastic stra-
ins, such as occur in most metal-forming operations, the
material may be considered incompressible. The condition of
volume constancy may be written as

$$\epsilon_r + \epsilon_\theta + \epsilon_z = 0 \qquad (1)$$

where ϵ_r, ϵ_θ, and ϵ_z are the normal strains acting in the
radial, tangential, and axial directions, respectively.
Since the wafer is axially symmetric, the strains are defined
in terms of the displacements as

$$\epsilon_r = \frac{\partial u}{\partial r} \quad , \quad \epsilon_\theta = \frac{u}{r} \quad , \quad \epsilon_z = \frac{\partial \omega}{\partial z}$$