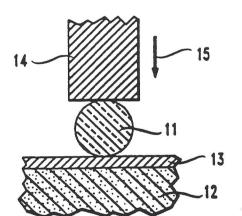
United States Patent [19]	[11] Patent Number: 5,178,319
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 [54] COMPRESSION BONDING METHODS [75] Inventor: Alexander Coucoulas, Basking Ridge. N.J. [73] Assignee: AT&T Bell Laboratories, Murray Hill, N.J. 	4.610.746 9/1986 Broer et al. 156/275.5 4.659,378 4/1987 Volz et al. 228/263.12 4,687.285 8/1987 Hily et al. 350/96.18 4,711.521 12/1987 Thillays 350/96.20 4,793,688 12/1988 Aiki et al. 350/252 4,897.71 1/1990 Blonder et al. 357/74
[21] Appl. No.: 679,506 [22] Filed: Apr. 2, 1991	Primary Examiner—Richard K. Seidel Assistant Examiner—Jeffrey T. Knapp Attorney, Agent, or Firm—R. B. Anderson
[51] Int. Cl. ⁵	[57] ABSTRACT Elements such as glass spheres (11) and optical fibers (30') are permanently bonded to aluminum surfaces (13) of substrates (12) by applying pressure along with energy to the interface of the element and the aluminum. For example, a glass sphere is bonded by pressing it against aluminum while heating the aluminum. As an
[58] Field of Search	
U.S. PATENT DOCUMENTS 3.360.849 1/1968 Forman et al	alternative to heating, acoustic energy can be applied to the sphere along with the pressure. Glass optical fibers can be bonded to aluminum surfaces in the same manner. 11 Claims, 1 Drawing Sheet



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