

**United States Patent** [19]

**Kunikane et al.**

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- [54] **OPTICAL FIBER SWITCHING WITH SPHERICAL LENS AND METHOD OF MAKING SAME**
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- [73] **Assignee:** Fujitsu Limited, Kawasaki, Japan
- [21] **Appl. No.:** 439,025
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§ 102(e) Date: Nov. 9, 1989
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Apr. 15, 1988 [JP] Japan ..... 63-93829  
Jul. 27, 1988 [JP] Japan ..... 63-185536

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[57] **ABSTRACT**

A ferrule having an optical fiber connected thereto and a spherical lens are fixed in a cylindrical lens holder to form a fiber collimator. The thickness of a cylindrical wall of the lens holder is made smaller at a spherical lens receiving portion than the other portion and the cylindrical lens holder is fixed to a substrate by welding. A pair of such fiber collimators are provided in an opposing relationship to each other on the substrate, and an optical function element is disposed between the opposing fiber collimators to form an optical device. By provision of a light path changing over mechanism as such optical function element, an optical switch of a small size having a high performance can be provided.

- [51] **Int. Cl.<sup>5</sup>** ..... G02B 6/32; C03C 27/02
- [52] **U.S. Cl.** ..... 385/23; 65/4.2; 65/59.4; 385/35
- [58] **Field of Search** ..... 350/96.10, 96.15, 96.17, 350/96.18, 96.20, 96.21, 320, 252, 253; 65/59.4, 4.2, 37

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**9 Claims, 4 Drawing Sheets**

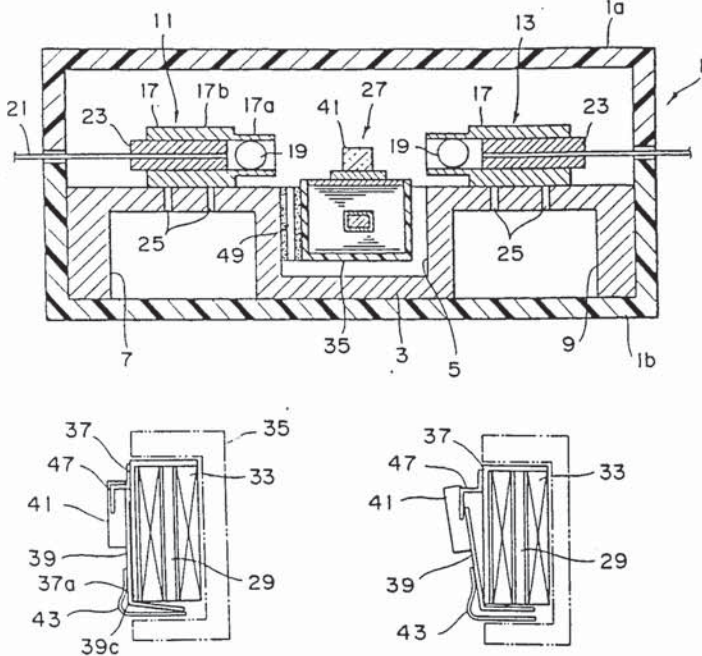


FIG. 1

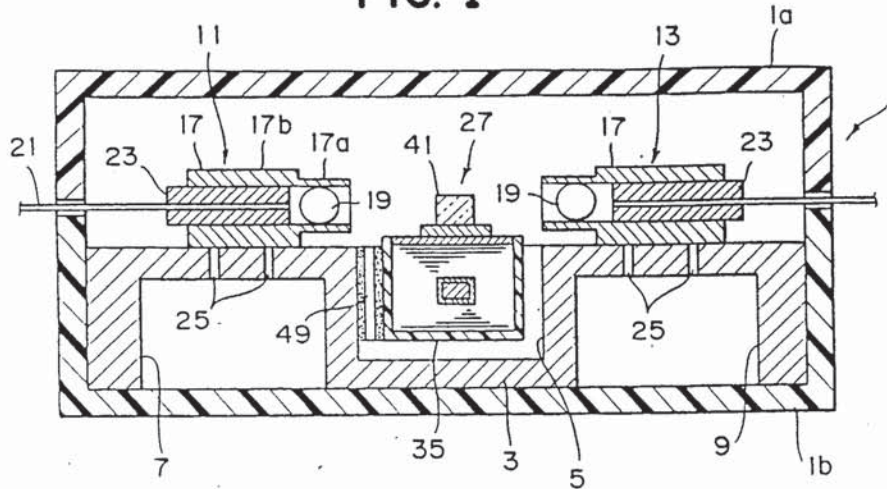


FIG. 2

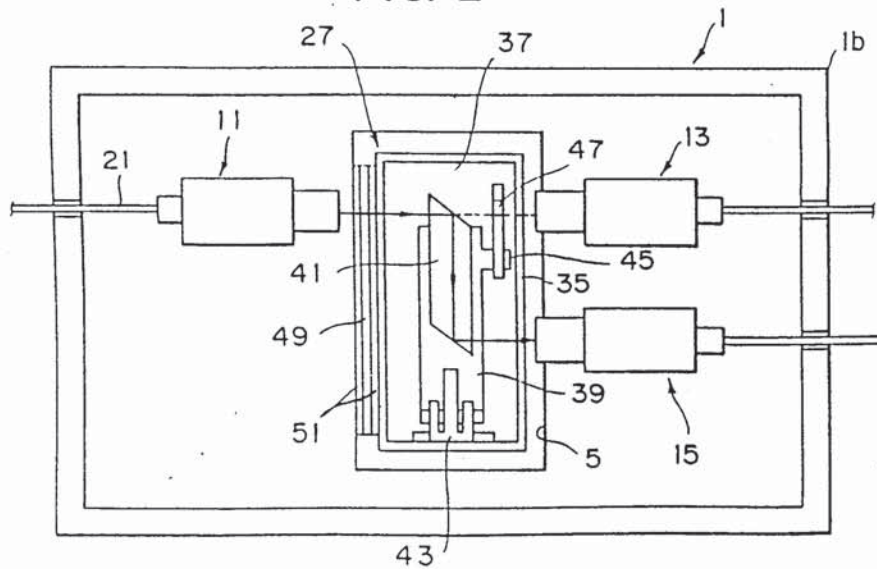


FIG. 3

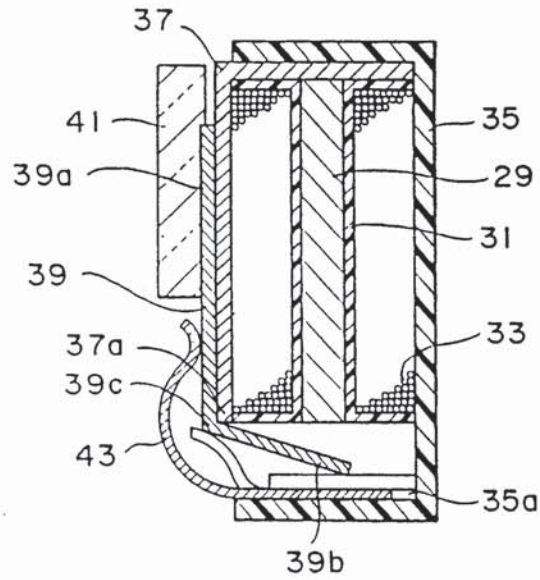


FIG. 4A

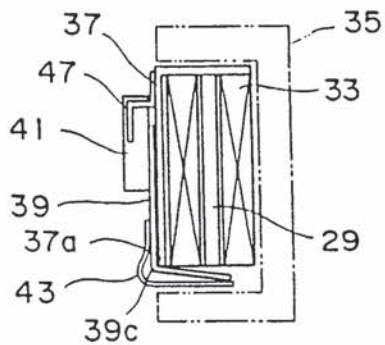


FIG. 4B

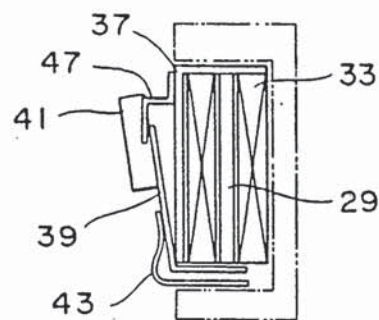


FIG. 5

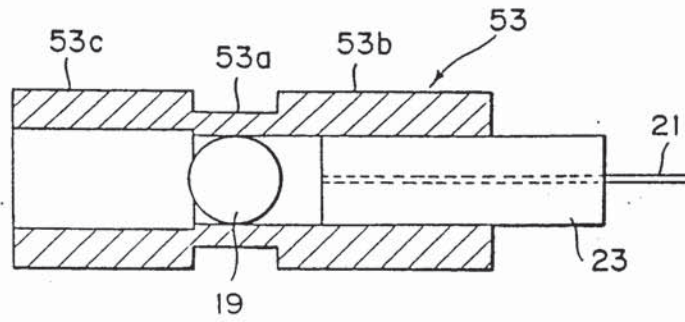


FIG. 6

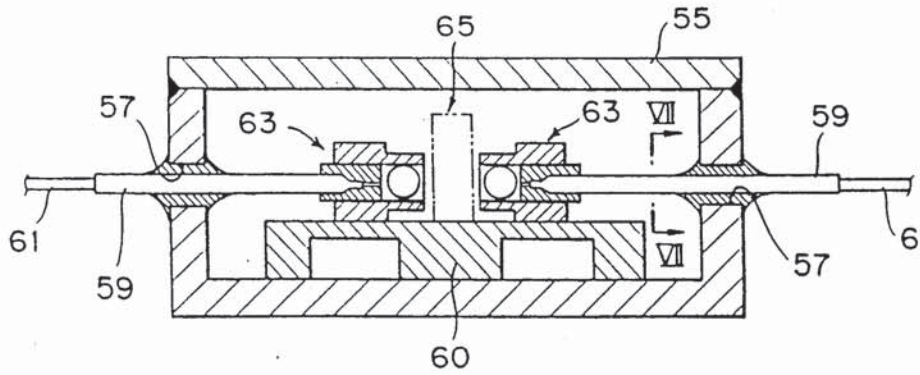


FIG. 7

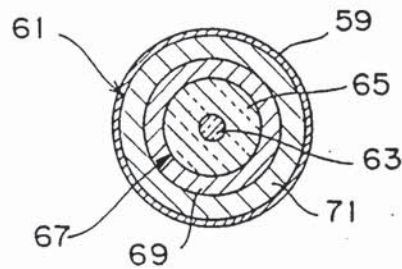




FIG. 8

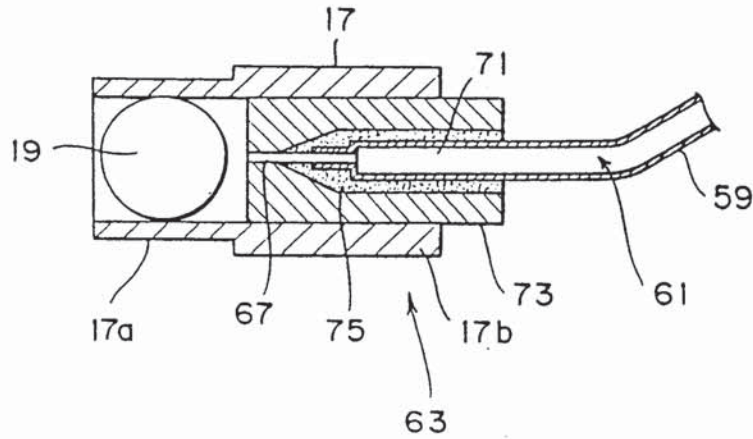
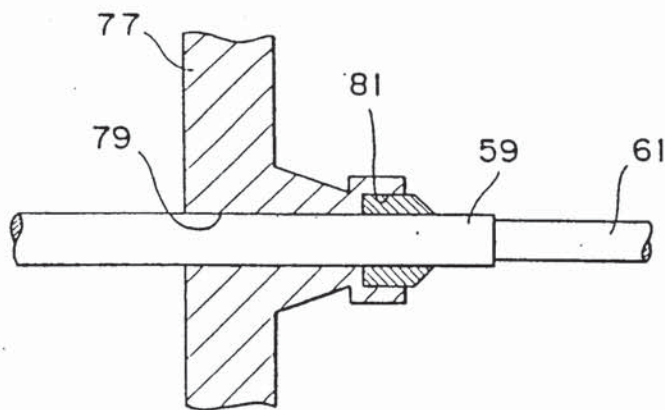


FIG. 9



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