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United States Patent [19]

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Matero et al.

[45] Date of Patent: **Jun. 16, 1998**

[54] **ANTENNA SWITCHING CIRCUITS FOR RADIO TELEPHONES**

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[73] Assignee: **Nokia Mobile Phones Limited**, Salo, Finland

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WO 94/14247	6/1994	WIPO

[21] Appl. No.: **692,496**

[22] Filed: **Aug. 7, 1996**

[51] Int. Cl.⁶ **H04B 1/44**

[52] U.S. Cl. **455/78; 455/84; 333/101; 370/280**

[58] Field of Search 333/101, 103-104; 455/73, 78, 82, 83, 84, 575, 132, 272, 99, 129, 345; 370/276, 277, 278, 280, 282, 294

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Primary Examiner—Nguyen Vo
Attorney, Agent, or Firm—Perman & Green, LLP

[57] ABSTRACT

Disclosed are various embodiments of circuitry for coupling first and second transceivers of a dual band radio telephone to integral and external antennas. The circuitry uses impedance matching lengths of transmission lines and switches arranged to provide a minimum insertion loss. Also disclosed is an embodiment for use with a single band radio telephone, such as a digital TDMA radio telephone that either transmits or receives at any given time. Also disclosed is an antenna switching arrangement for a dual band phone that eliminates a requirement for duplexers.

17 Claims, 6 Drawing Sheets

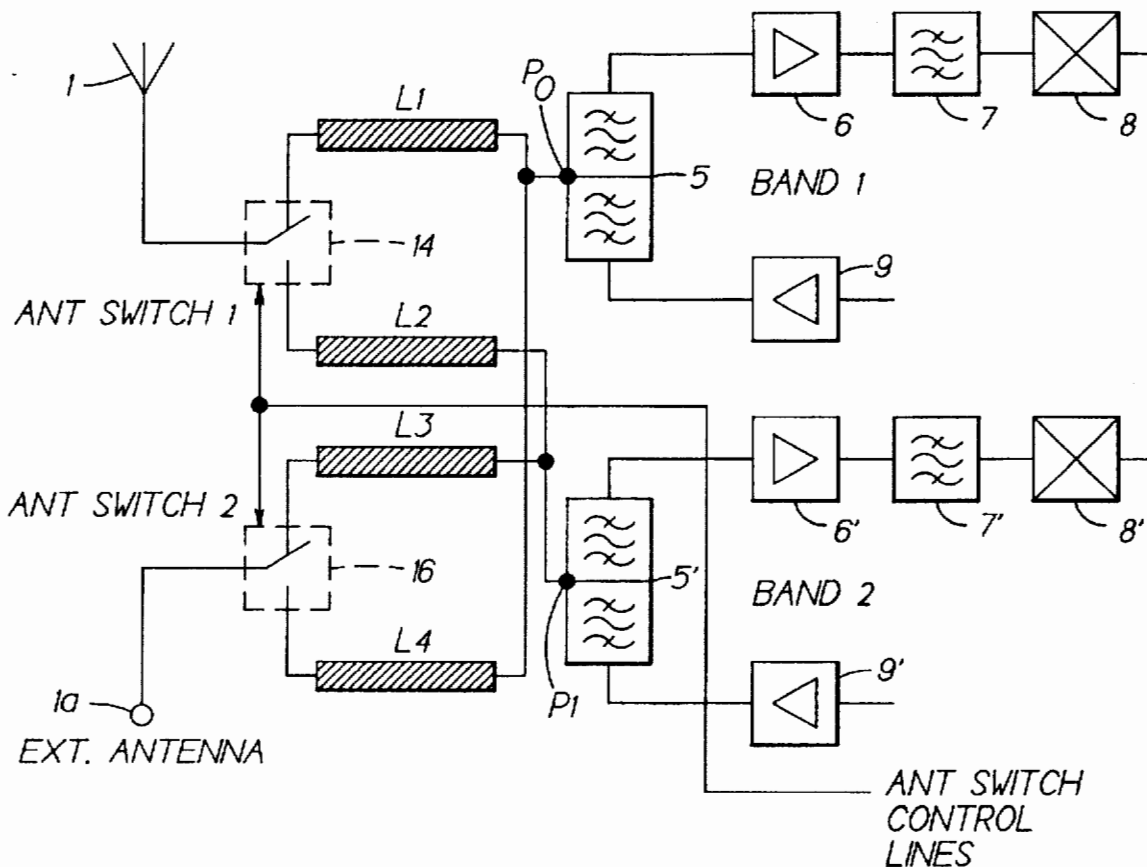


FIG. 1
PRIOR ART

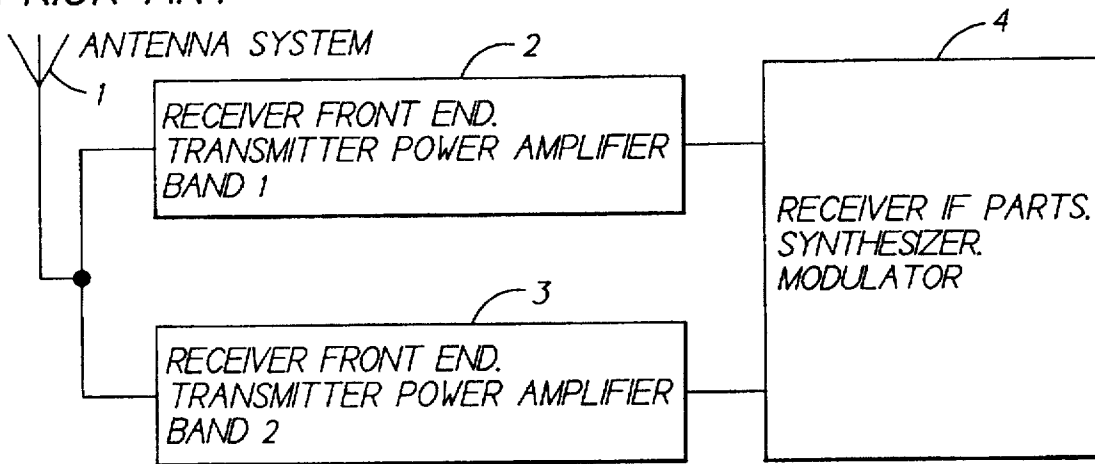


FIG. 2
PRIOR ART

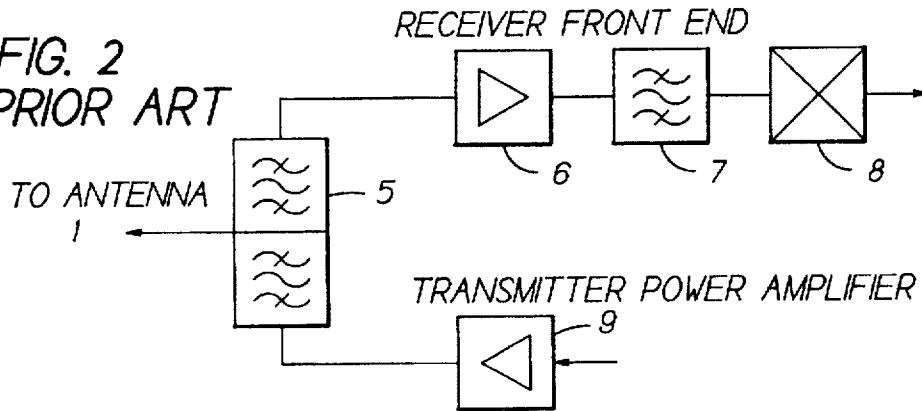
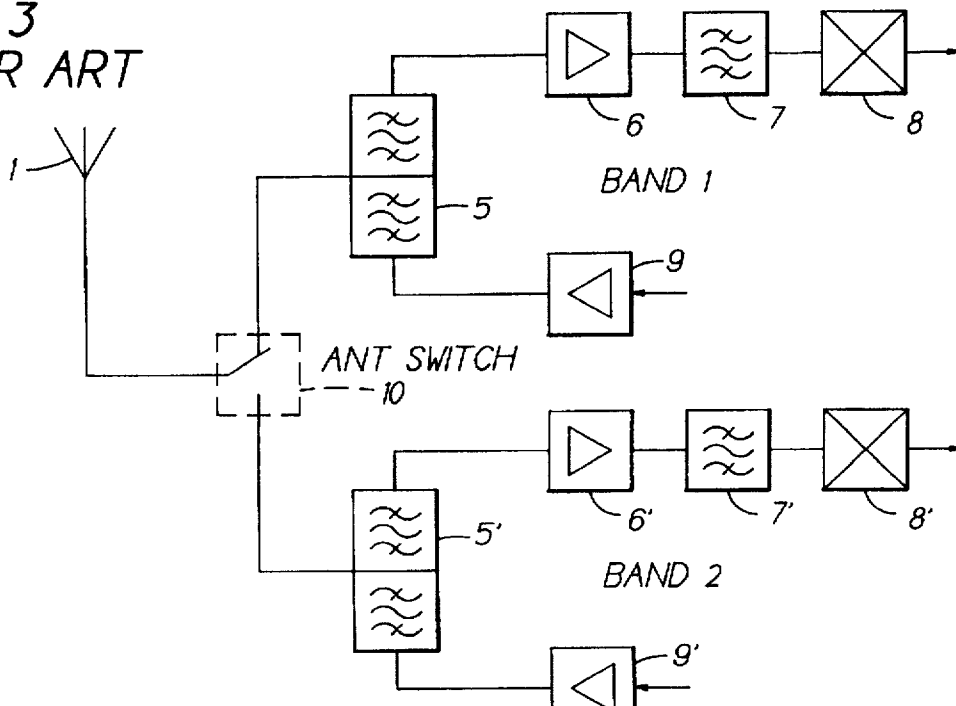


FIG. 3
PRIOR ART



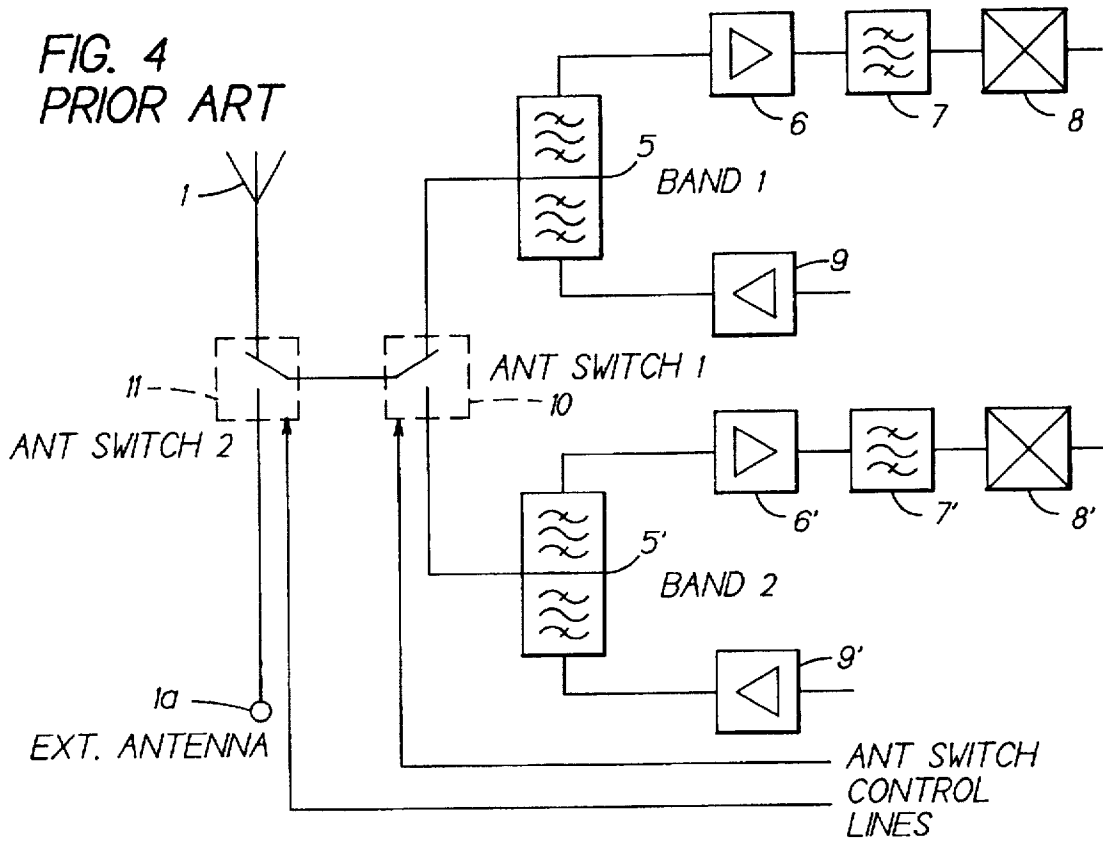
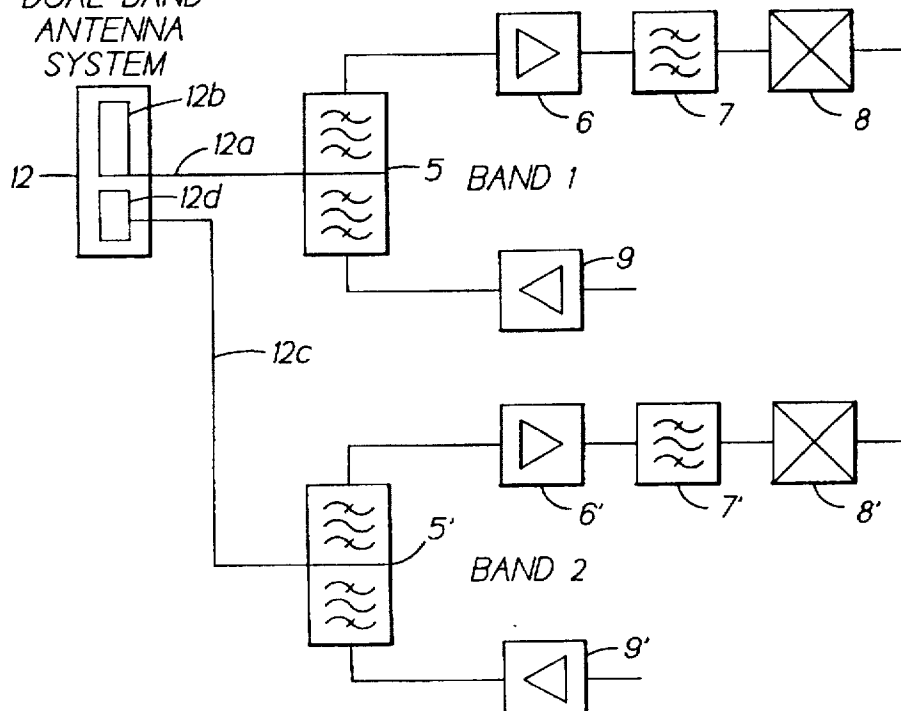


FIG. 5

DUAL BAND ANTENNA SYSTEM



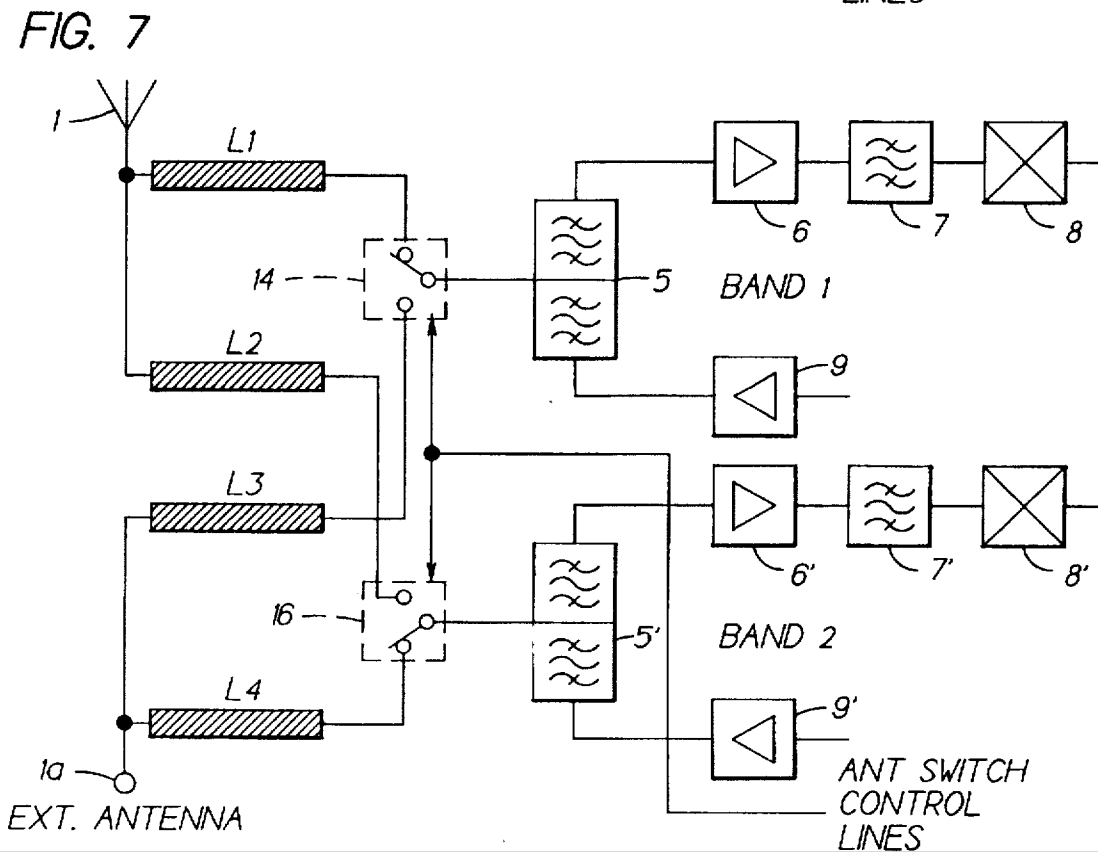
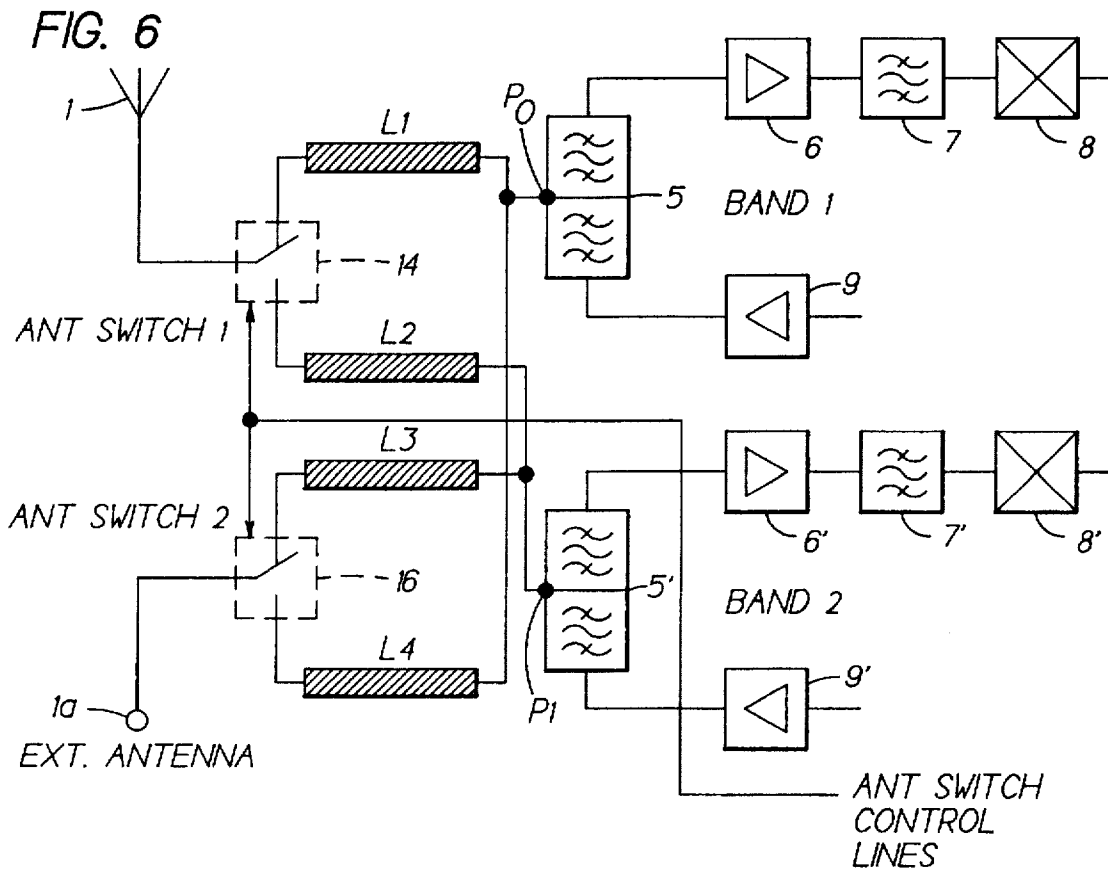


FIG. 8
PRIOR ART

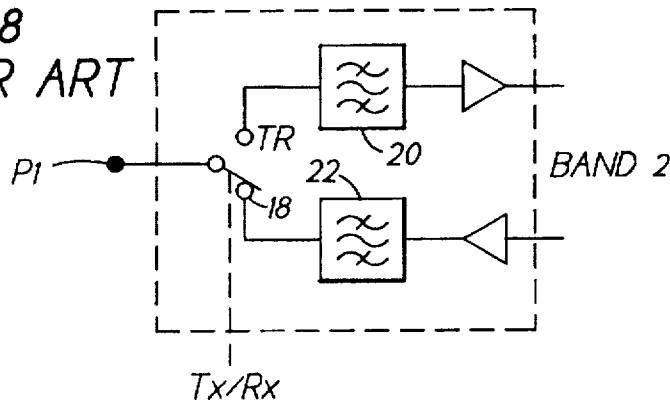


FIG. 9
PRIOR ART

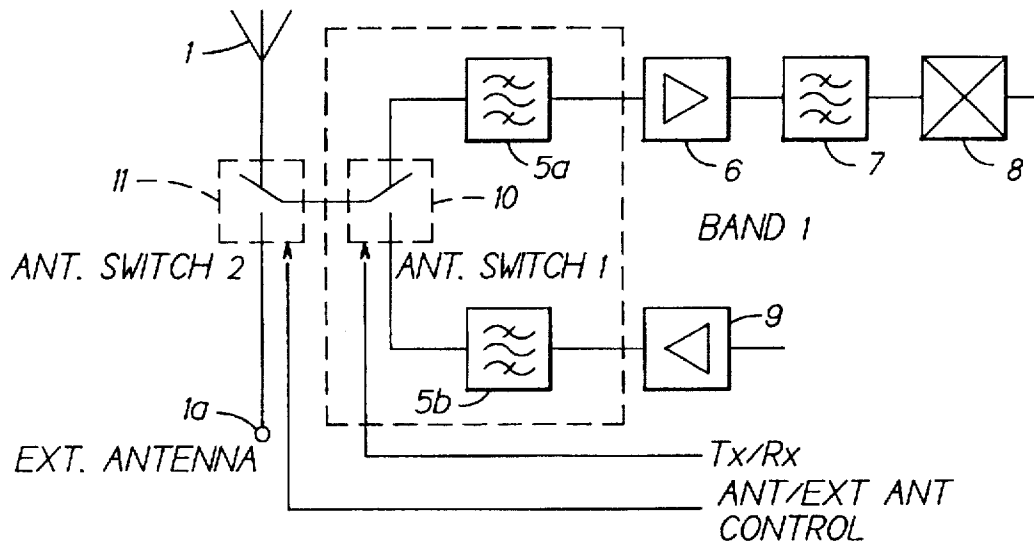
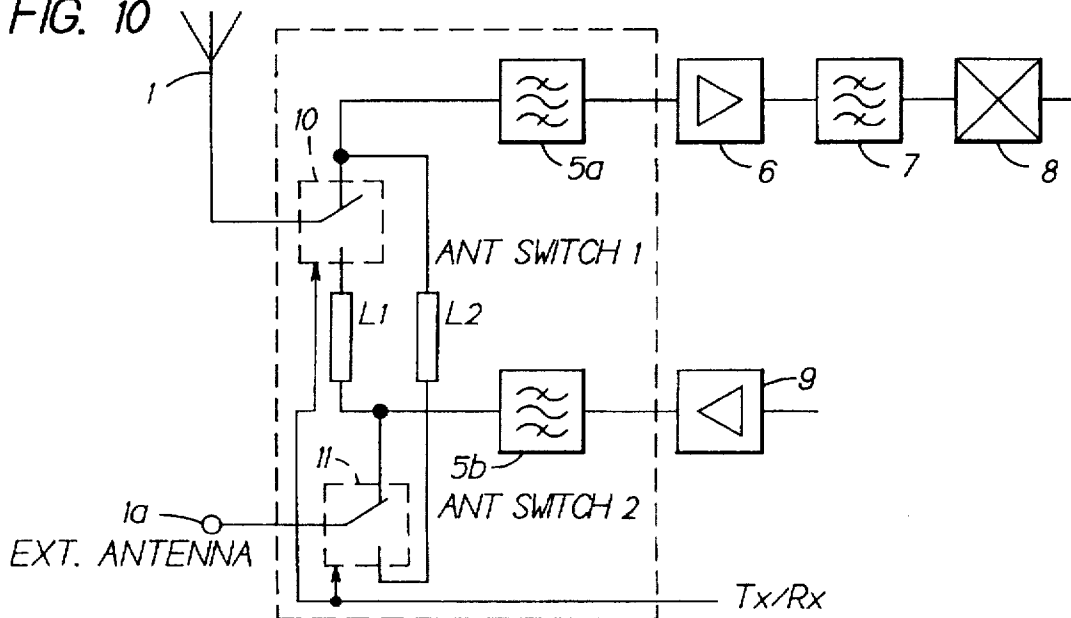


FIG. 10



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