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Kuntman et al.

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- (54) **TRANSPONDER HAVING DIRECTIONAL ANTENNAS**
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- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
- (21) Appl. No.: **09/369,958**
- (22) Filed: **Aug. 6, 1999**

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- Related U.S. Application Data**
- (60) Provisional application No. 60/125,994, filed on Mar. 24, 1999.
- (51) **Int. Cl.⁷** **G01S 13/74; G01S 13/93**
- (52) **U.S. Cl.** **342/32; 342/29; 342/30; 342/36; 342/37; 342/42; 342/51**
- (58) **Field of Search** **342/29-32, 36-40, 342/42-51, 156, 351, 417-424**

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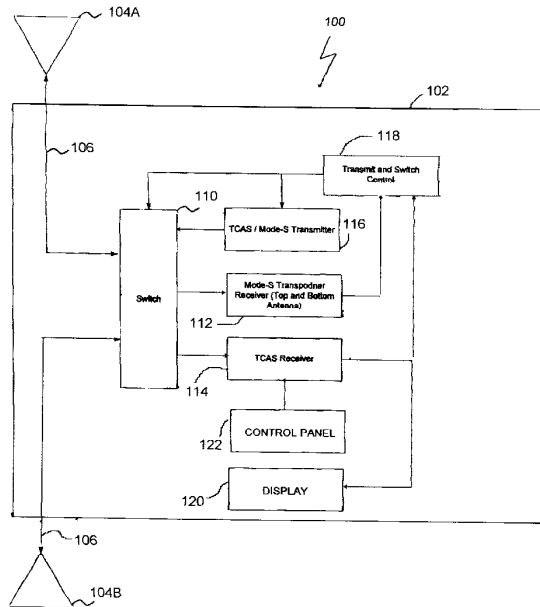
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Primary Examiner—Bernarr E. Gregory

(57) **ABSTRACT**

A method and apparatus for transmitting a directional reply signals in response to Air Traffic Control Radar Beacon System and Mode Select signals interrogation signals. Two directional antennas independently acquire an interrogation signal and are connected by means of a configurable switch to a transponder. The antennas may include multiple directional antenna elements.

31 Claims, 12 Drawing Sheets



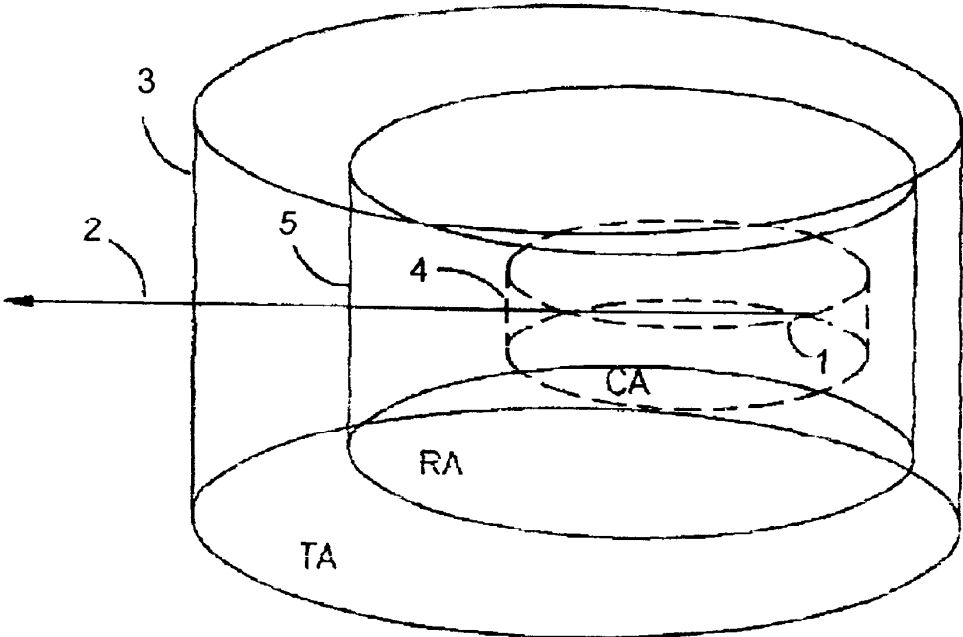


Figure 1
(PRIOR ART)

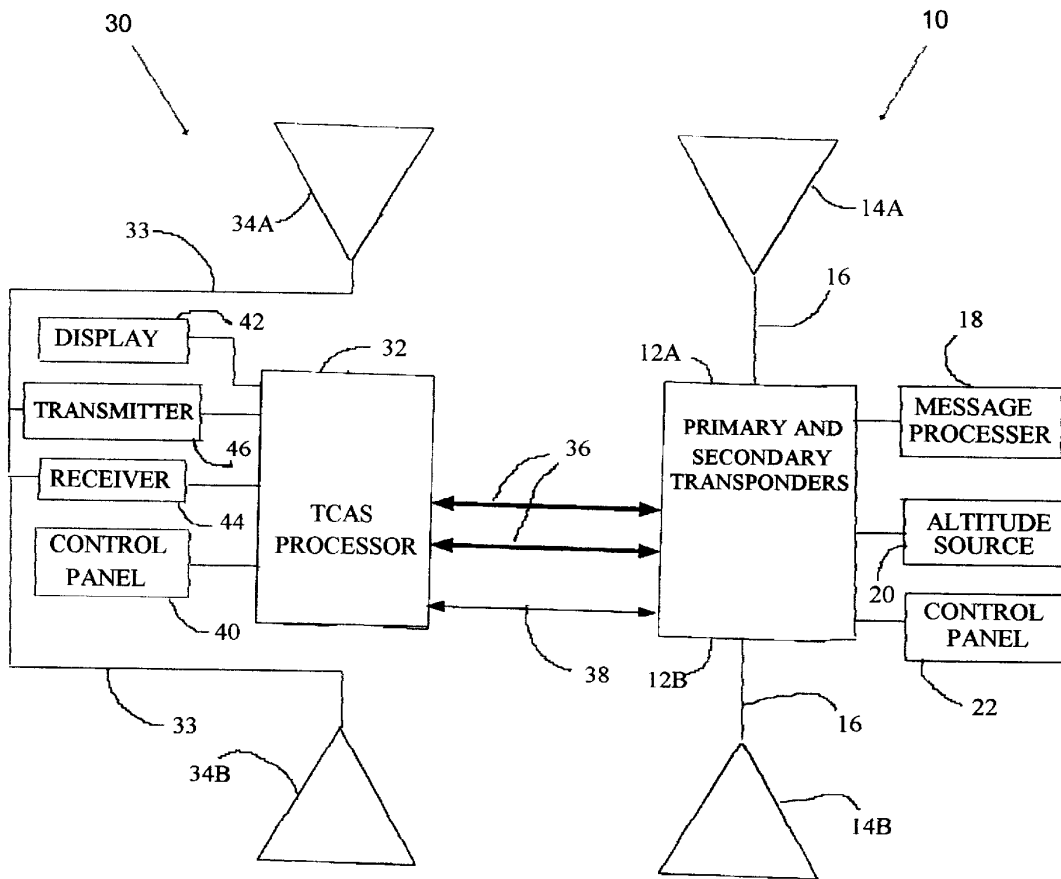


Figure 2
(PRIOR ART)

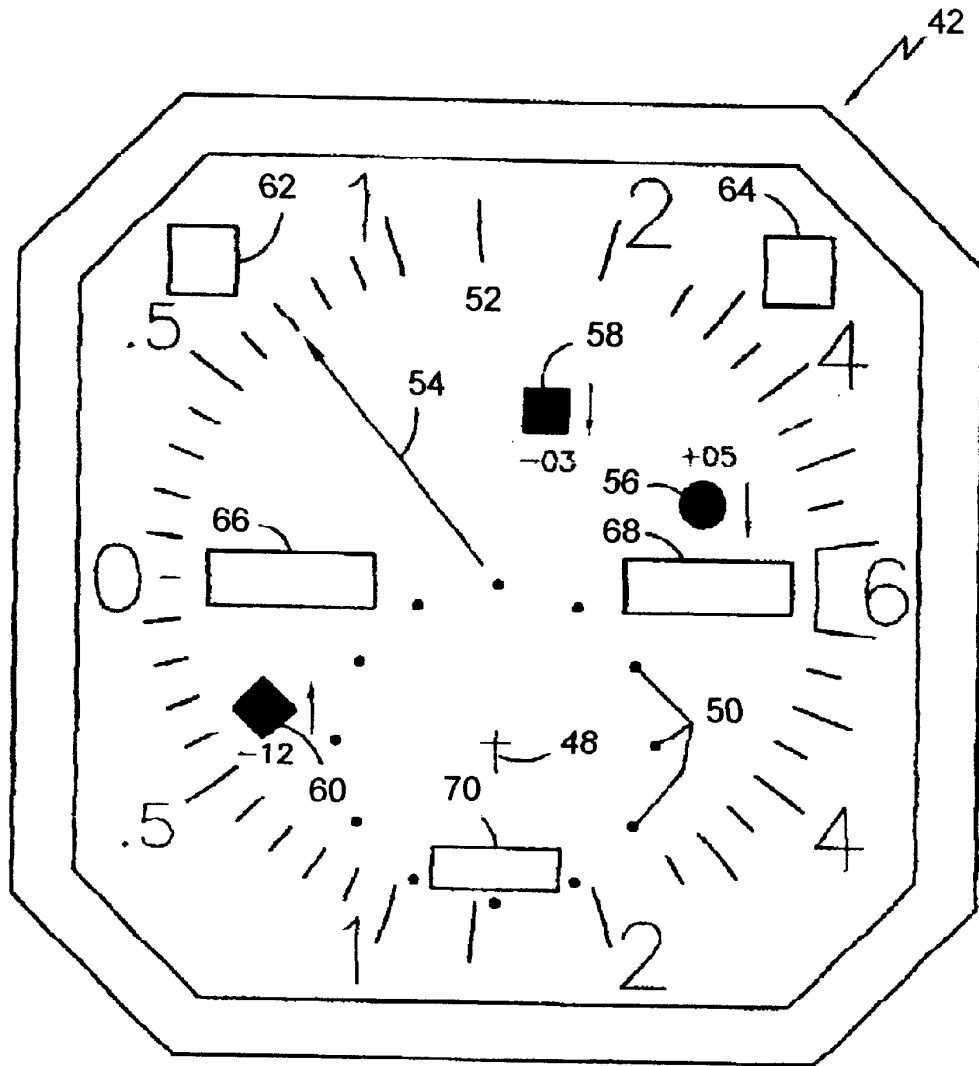


Figure 3
(PRIOR ART)

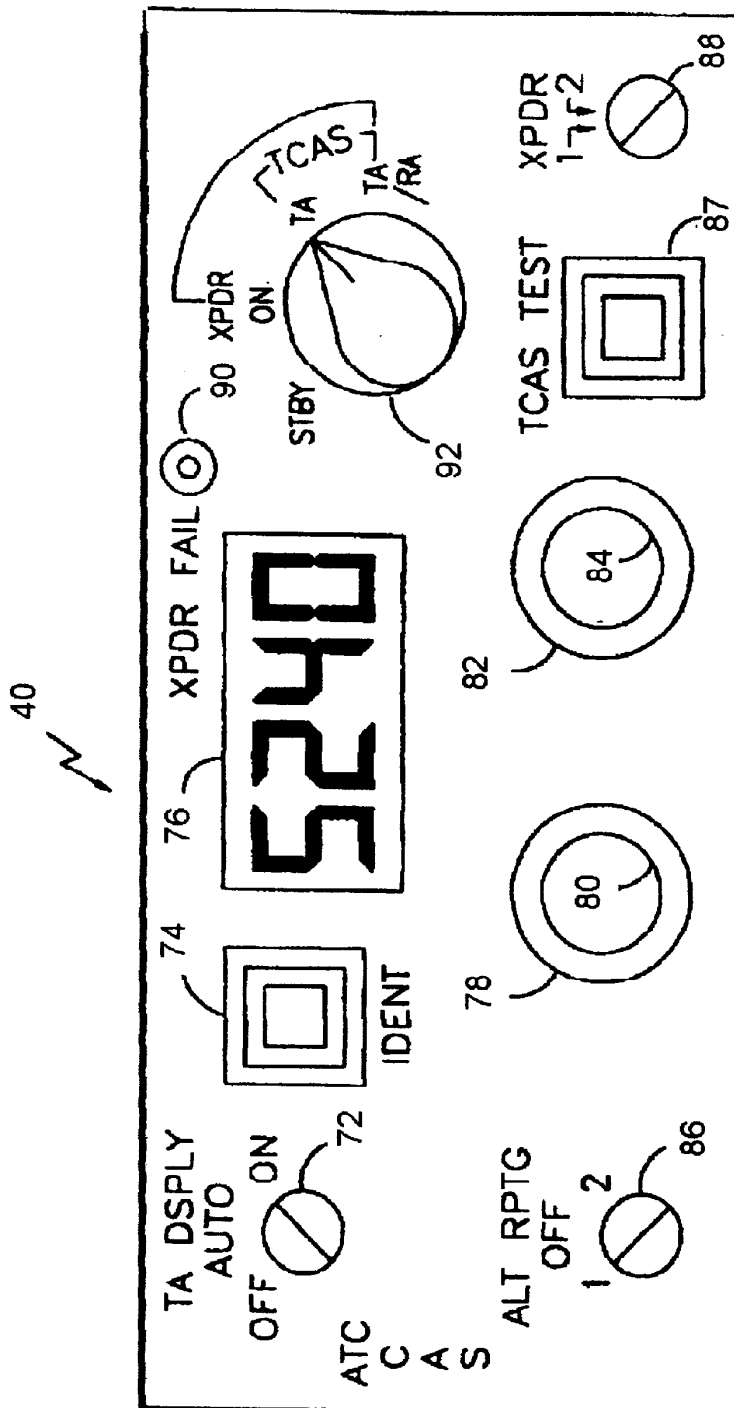


Figure 4
(PRIOR ART)

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