United States Patent [19]

Hartung et al.

[11] **3,919,462**

[45] **Nov. 11, 1975**

[54] **METHOD AND APPARATUS FOR SCRAMBLING AND UNSCRAMBLING COMMUNICATION SIGNALS**

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[73] Assignee: **System Development Corporation**, Santa Monica, Calif.

[22] Filed: **Aug. 15, 1973**

[21] Appl. No.: **388,439**

[52] **U.S. Cl.** **178/5.1**; 178/DIG. 13; 178/22; 325/34

[51] **Int. Cl.**[2] **H04N 1/44**

[58] **Field of Search** ..... 178/5.1, DIG. 13, 22; 325/34

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Attorney, Agent, or Firm—Fulwider, Patton, Rieber Lee & Utecht

[57] **ABSTRACT**

Method and apparatus for scrambling and unscrambling television video and audio signals in a subscription television system in which program selections of subscribers are known at a central transmitting site, and control signals encoded into vertical blanking intervals of the video signals are addressed to receivers authorized to receive unscrambled transmissions, to selectively control unscrambling at those receivers. In an unscrambler at each subscriber's receiver, the control signals are decoded, and, if addressed to the particular subscriber's receiver, operate to enable or disable the unscrambler, or to frequently vary its mode of operation, thereby greatly increasing the security of the system and deterring viewing of scrambled transmissions. Video scrambling and unscrambling are effected by inversion of selected horizontal lines of a transmitted television picture, and possible modes of scrambling and unscrambling include inversion of alternate groups of equal numbers of lines, inversion or non-inversion selected on a line-by-line basis, with an appropriate control signal being transmitted with each line, and inversion or non-inversion in a preselected sequence, as determined by synchronized logic at the receivers and the transmitting site.

52 Claims, 16 Drawing Figures

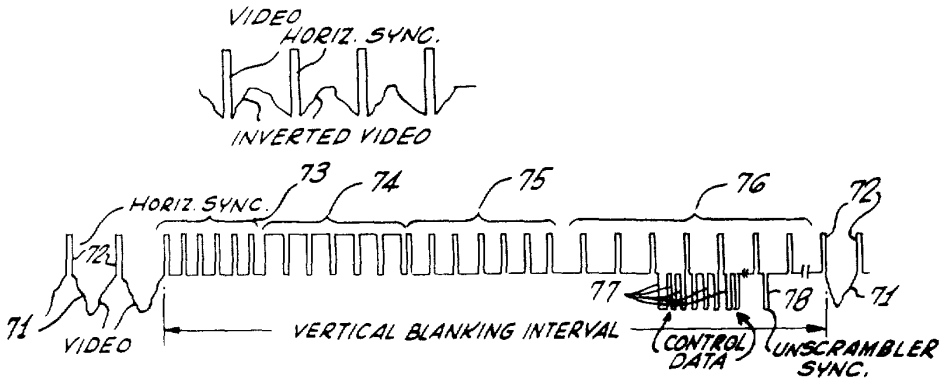

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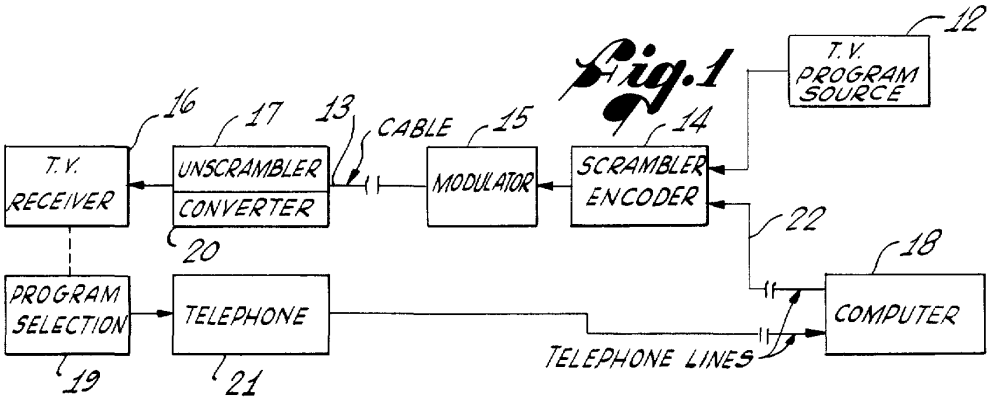
Fig. 1



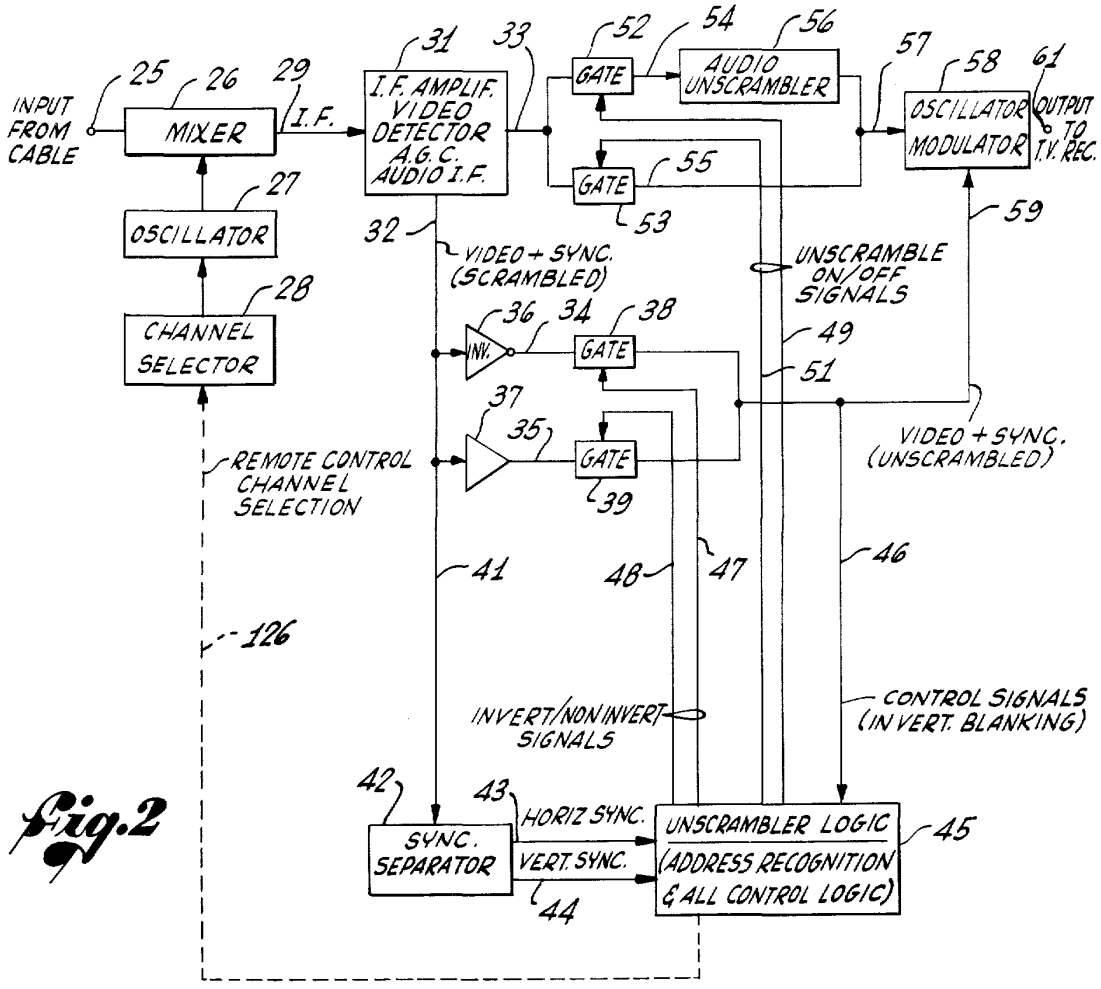


Fig. 2

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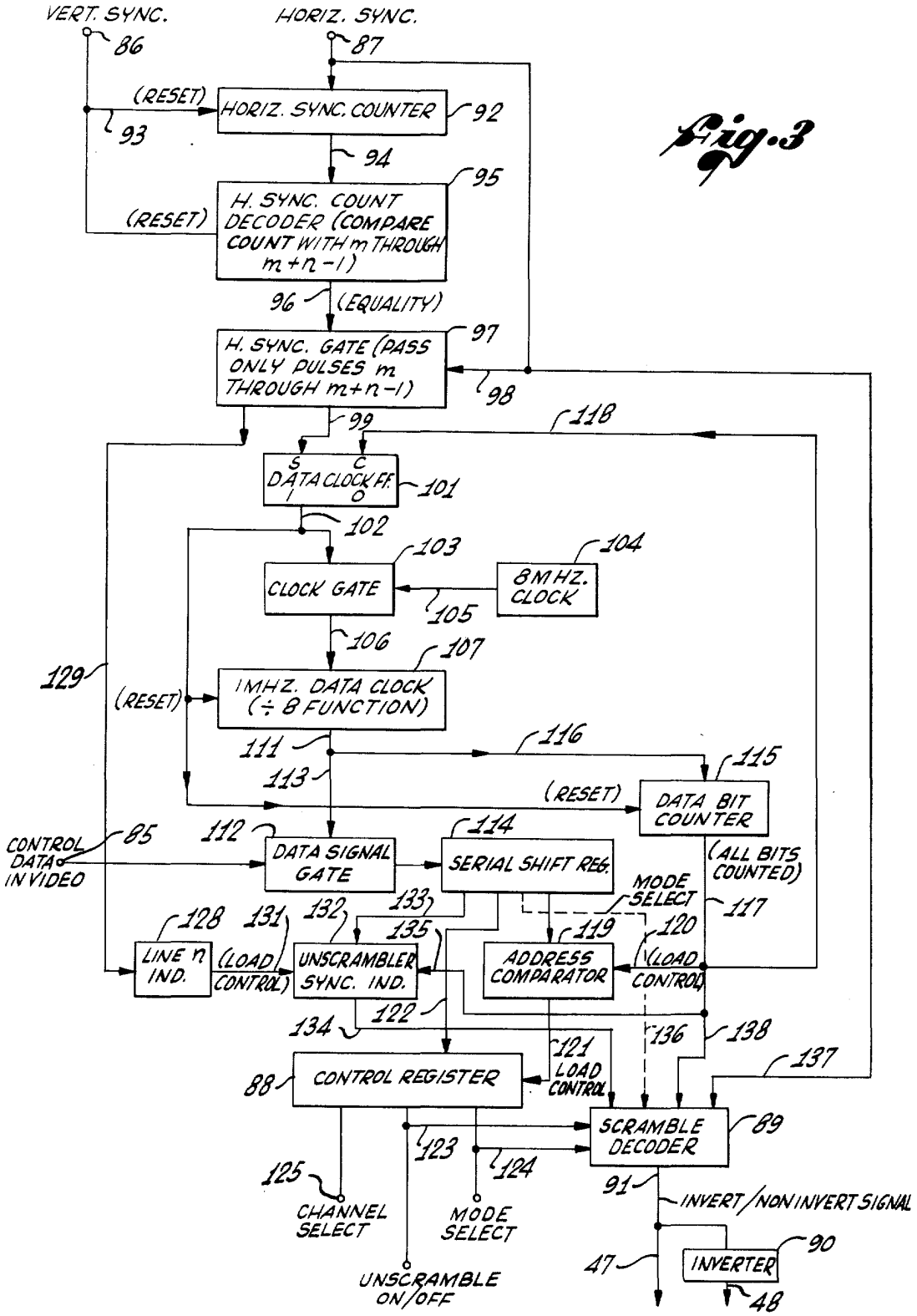

Fig. 3

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Fig. 4a

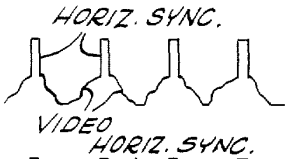


Fig. 4b

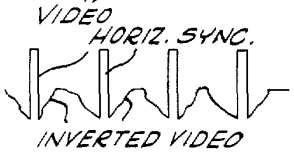


Fig. 5a

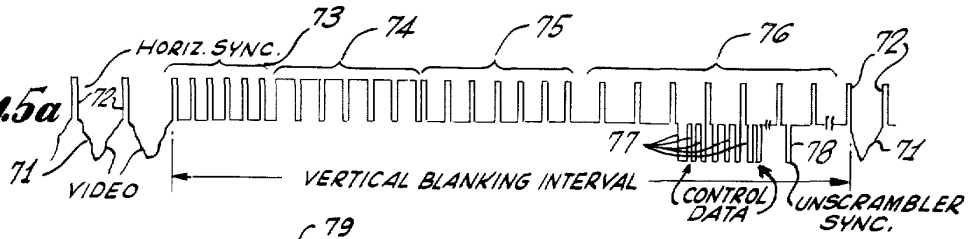


Fig. 5b

Fig. 6a

Fig. 6b

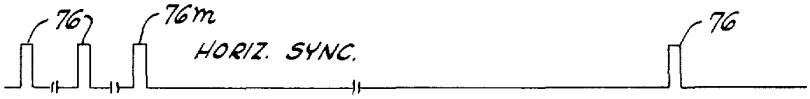


Fig. 6c

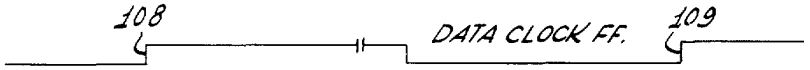


Fig. 6d

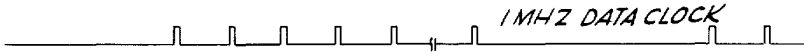


Fig. 6e

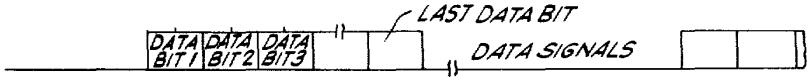
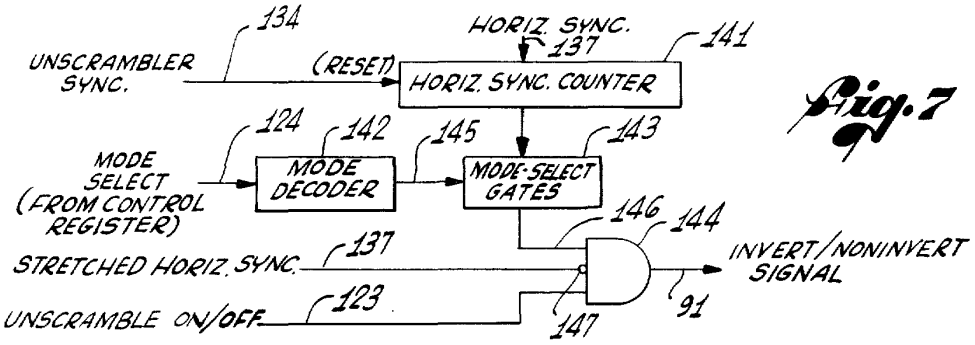


Fig. 7



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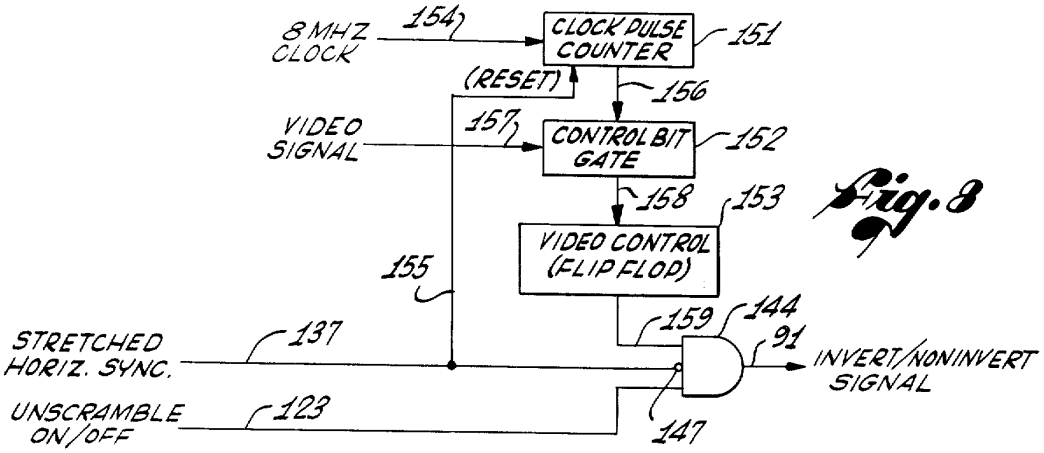

Fig. 8

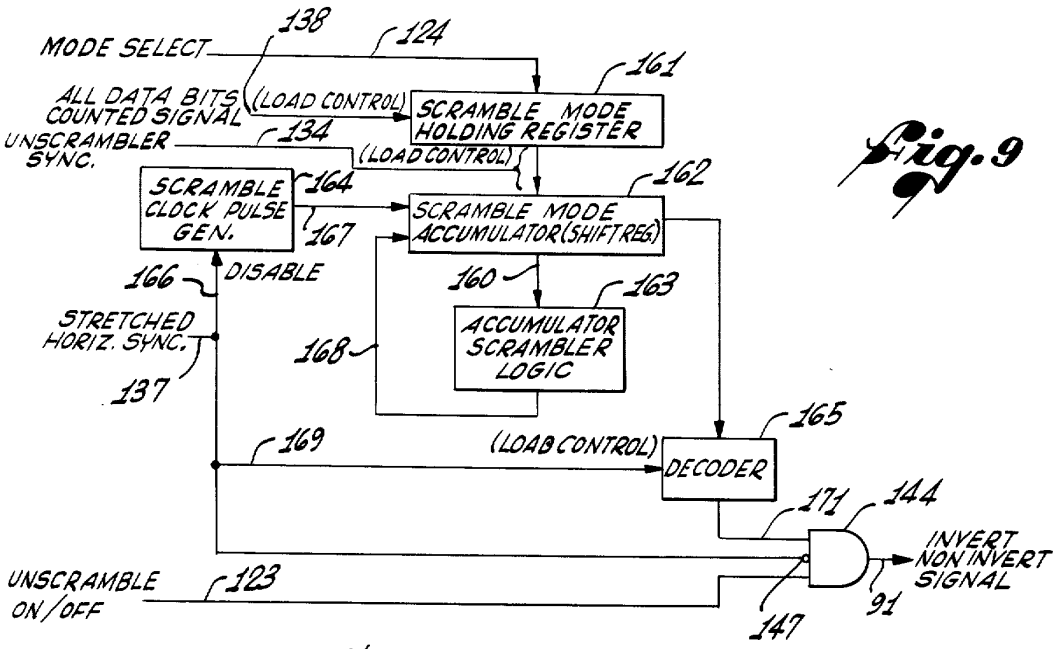

Fig. 9

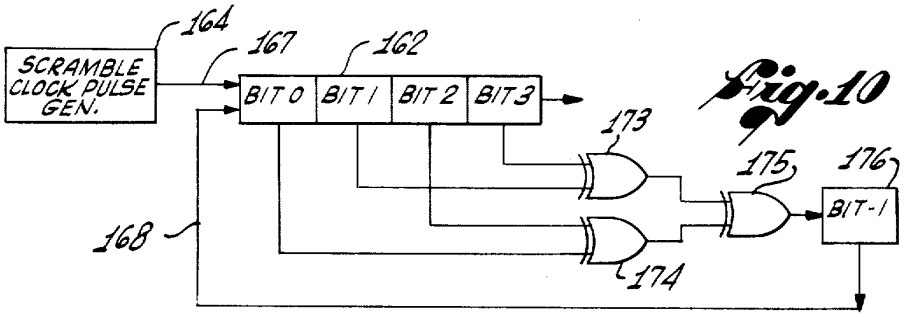

Fig. 10

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