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**United States Patent** [19]  
**Redmayne**

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[54] **CAPACITIVE TOUCH SENSOR**  
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[51] **Int. Cl.<sup>6</sup>** ..... **G08C 21/00**  
[52] **U.S. Cl.** ..... **178/19; 345/174; 341/33**  
[58] **Field of Search** ..... **178/18, 19, 20; 345/173, 174; 364/709.1, 709.11; 341/5, 33**

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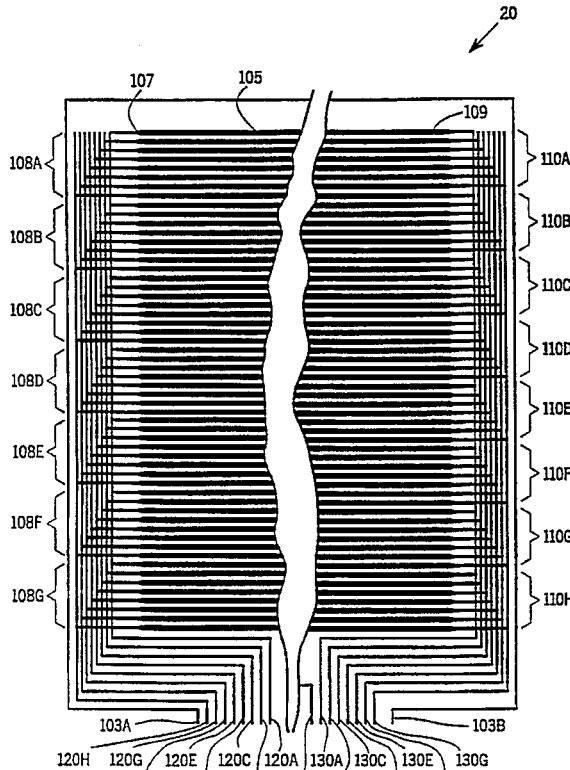
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[57] **ABSTRACT**

The present invention relates to a capacitive touch sensor including a plurality of horizontal sensor bars arranged in a single direction. The touch sensor preferably receives differential sensor signals from the sensor array to reduce proximity effects and noise associated with conventional capacitive touch sensors. The touch sensor also utilizes an isolation circuit or floating interface to reduce the effects of external interference and increase the accuracy of touch sensing and localization. The bars are preferably comprised of indium tin oxide oriented in the machine direction of roll for superior linearity. The touch sensor may be utilized with display screens having thick dielectrics and also eliminates the need for a rear guard layer.

**22 Claims, 13 Drawing Sheets**



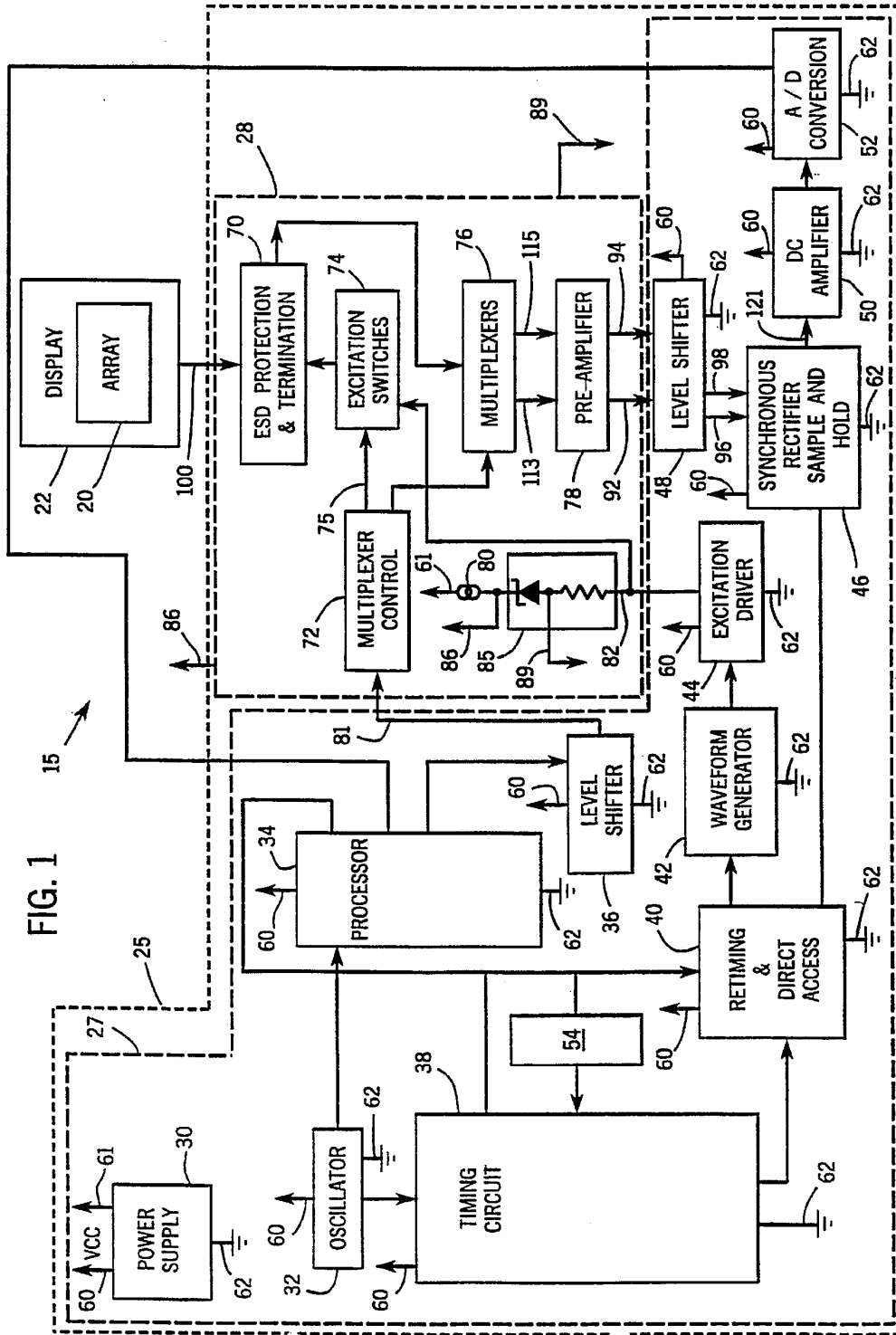


FIG. 1

FIG. 2

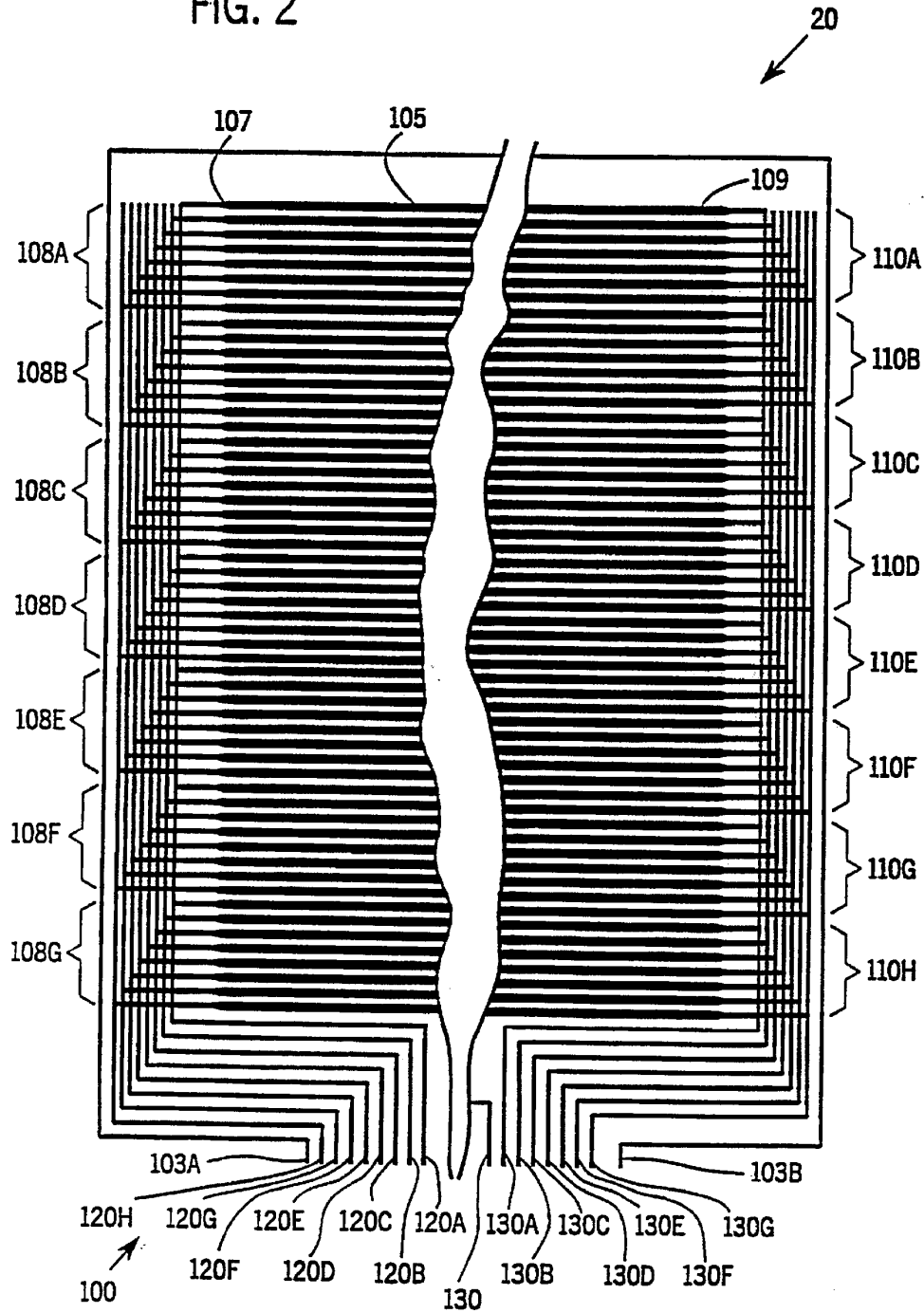
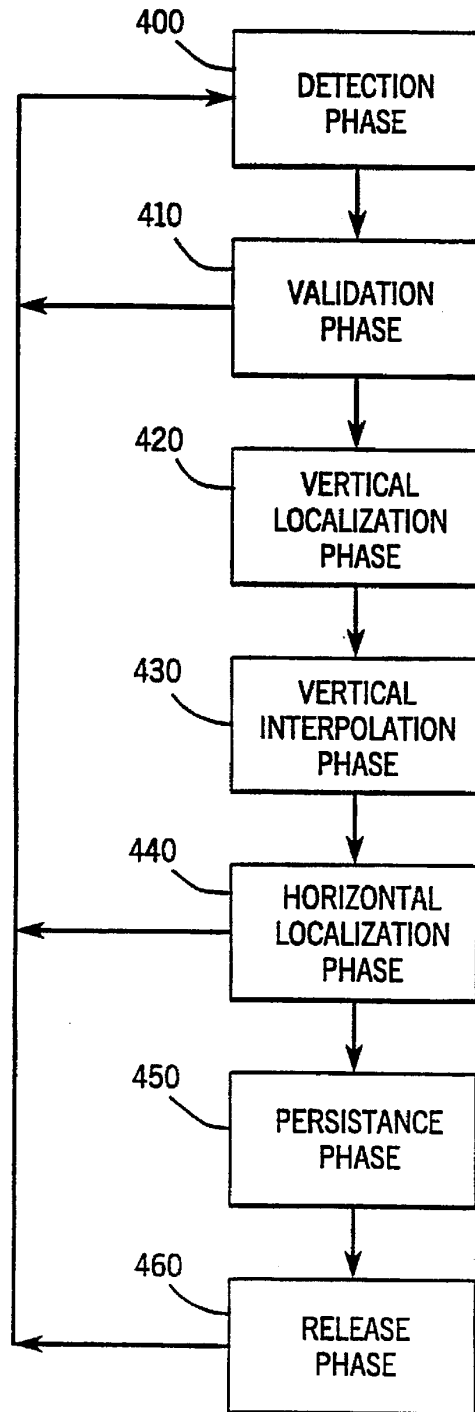


FIG. 3



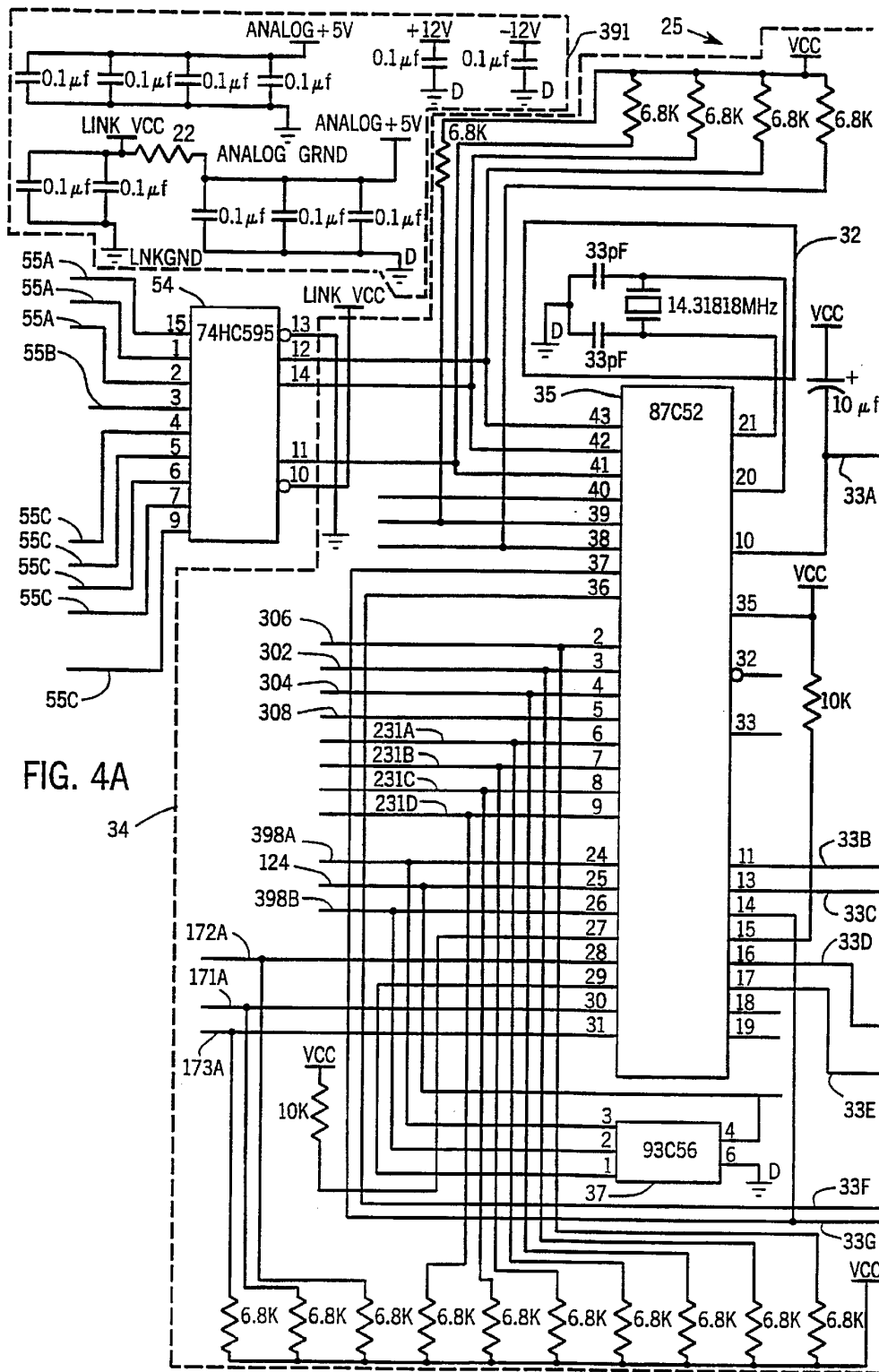


FIG. 4A

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