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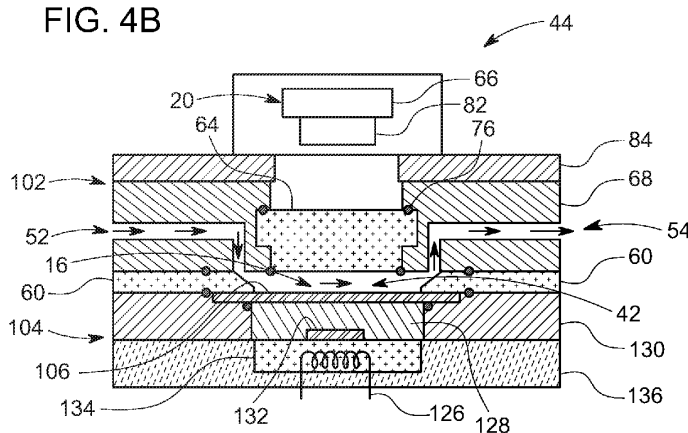
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(54) Title: METHOD AND APPARATUS FOR REAL-TIME DIRECT SURFACE FOULING AND SCALE MONITORING OF HEAT TRANSFER SURFACES

FIG. 4B



(57) Abstract: A heat transfer surface monitoring (HTSM) system and cell for direct detection and monitoring of fouling, scaling, corrosion, and pitting of heat transfer surfaces. The system has a heat transfer plate (HTP) that has a heat transfer monitoring surface (HTMS). The system also includes an edge-lit light guide and light source to illuminate the HTMS, a fluid flow channel module, a heating/cooling module, a surface imaging module to view the HTMS, and a system controller. The environment is controlled to mimic the environment within heat exchange equipment, which are indicative of the changes inside heat exchange equipment. Output of signals relating to the HTMS are used as a guide mitigate problems related to the monitored heat exchange equipment. The system can also use a heat exchanger cylindrical tube with slit light guides along the tube, and the surface imaging module views the inner surface of the heat exchanger cylindrical tube.

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