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(54) Title: DIALYSATE FREE ARTIFICIAL KIDNEY DEVICE

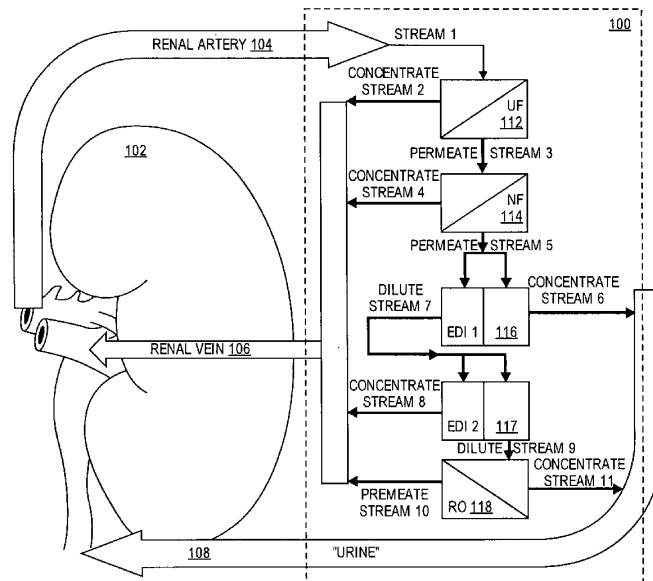


FIG. 1

(57) **Abstract:** A device and method are described for the treatment of blood, which device may be used in conjunction with or in place of a failed Kidney. The device includes an ultrafiltration unit to remove proteins, red and white blood cells and other high molecular weight components, a nanofiltration unit to remove glucose, at least one electrodeionization unit to transport ions from the blood stream, and a reverse osmosis unit to modulate the flow of water, to both the blood and urine streams. In one embodiment, a specialized electrodeionization unit is provided having multiple chambers defining multiple dilute fluid channels, each channel filled with an ion specific resin wafer, and electrodes at the extremity of the device and proximate each of the resin filled dilute channels. By selective application of voltages to these electrodes, the ion transport functionality of a given dilute channel can be turned on or off.

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