



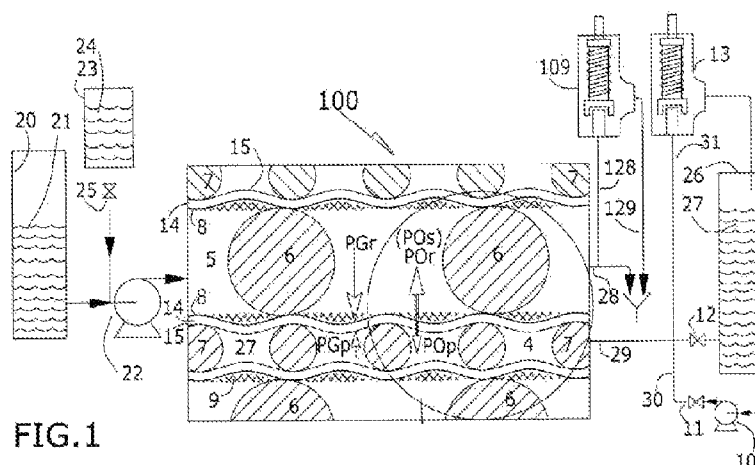
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| <p>(71) Applicant: MEMBRANE RECOVERY LTD. [IL/IL];
 16 Ofrit St., POB 7153, 40500 Even Yehuda (IL).</p> | |
| <p>(72) Inventors: LIBERMAN, Boris; C/o Membrane Recovery Ltd., 16 Ofrit St., POB 7153, 40500 Even Yehuda (IL).
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(54) Title: FORWARD OSMOTIC AND WATER HAMMER METHOD OF MEMBRANE CLEANING



(57) Abstract: Apparatus and method for semi-permeable membrane cleaning in particular, applying series of pulsed water stroke, made simultaneously with osmosis backward flow causing superposed membrane directional shaking and fouling detachment. Pulsed water stroke provided by water stroke generator as several momentum sharp changes in gauge pressure and induce velocity pulse of residual brine flow. The pulsed water strokes ideally induce resonance in the membrane. Osmosis backward wash may be provided either by injection for predetermined injection time, additional solution selected in such way that net driving pressure becomes opposite to normal osmotic operation thereby providing a backward flow of permeate towards to the side opposite to normal operation mode, so as to lift said foulant, or by throttling permeate exiting from the permeate enclosure, until the net driving pressure value become equal to zero, during application of precise synchronized and opposing brine and permeate pressure strokes thereby providing a plurality of quick RO-FO-RO process changes. These procedures allow a membrane to be kept continuously clean and operate at higher recovery.