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(54) Title: HOLLOW FIBER IMMERSSED MEMBRANE MODULE AND CASSETTE WITH HIGH PACKING DENSITY AND VERTICAL PERMEATE PORT CONNECTIONS

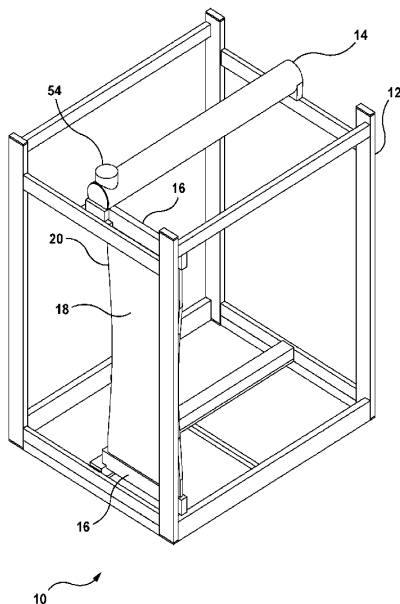


FIGURE 1 (Prior Art)

(57) Abstract: An immersed membrane cassette has a high tank intensity achieved by one or more of: reduced module to module gap; using structural hollow tubing in at least parts of a frame in place of separate permeate and/or air pipes; and, using vertical permeate port connections. The cassette has a tank intensity over $650 \text{ m}^2/\text{m}^2$. The cassette may be combined with a fine screen. This specification also describes an immersed membrane module having a permeate port and/or connector on the top of a header. The permeate connection between the module and a permeate collection tube may be vertical, i.e. perpendicular to the length of the header. A piston seal may be used between the permeate port of the header and the permeate collection tube. The permeate collection tube may be a horizontal structural member on the periphery of a frame that holds the module.

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