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[54] AUTOMATED SAMPLE EXTRACTOR OR FEEDER/INOCULATOR FOR BIOREACTORS AND SIMILAR EQUIPMENT

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[52] **U.S. Cl.** **422/103**; 73/863.81; 73/863.82; 73/863.85; 73/863.86; 137/240; 137/241; 251/144; 251/335.3; 422/99; 422/114

[58] **Field of Search** 422/99, 100, 103, 114; 73/863.81-863.83, 863.85-863.86; 137/240, 241; 251/144, 335.3

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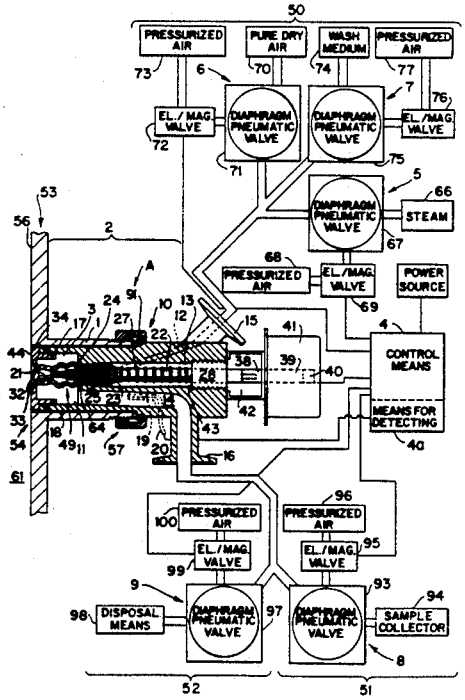
[57] **ABSTRACT**

An apparatus can withdraw a sample from a vessel or conduit or provide a sample to this vessel or conduit. This apparatus includes a main body with an inlet passage and drain passage. The main body has a longitudinal axis with the axes of the drain passage and inlet passage being inclined relative thereto. A flexible bellows is positioned within an internal cavity of the main body. A sealing tip of the bellows is movable by a valve operating rod to close an orifice to a sample cavity within the body. A sample can be taken from the vessel or conduit, through this sample cavity and out the drain passage to a sampling device when the apparatus is used as a sampler. On the other hand, a sample can be fed through the inlet passage, sample cavity and orifice to the vessel or conduit when the apparatus is used as a feeder/inoculator. Steam, pure dry air and/or a wash medium can be provided through the inlet passage to cleanse the apparatus. Crevices and exposure to moving parts are avoided in the apparatus to prevent contamination of the sample. This apparatus can be retrofitted to existing containers or vessels and can be automatically controlled and monitored.

21 Claims, 6 Drawing Sheets