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United States Patent [19]

[11] **Patent Number:** **6,039,078**

Tamari

[45] **Date of Patent:** ***Mar. 21, 2000**

[54] **INLINE EXTRACORPOREAL RESERVOIR AND PRESSURE ISOLATOR**

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5,061,365 10/1991 Utterberg 210/90

[76] Inventor: **Yehuda Tamari**, 21 Singworth St.,
Oyster Bay, N.Y. 11771-3703

Primary Examiner—John Fox

[*] Notice: This patent is subject to a terminal disclaimer.

[57] **ABSTRACT**

[21] Appl. No.: **08/474,267**

The specification describes several uses for pressure sensitive valves during extracorporeal pumping in one embodiment, an improved pumping loop for a roller pump is used in an extracorporeal circuit with a pressure relief valve and pump tubing. The inlet and outlet of the tubing are connected respectively to the outlet and inlet of said valve via two 3 way connections, across the outlet of the pump. The pumping loop allows recirculation of pumped liquid between the inlet and outlet of the pump when the outlet pressure generated by said pump exceeds a set value thereby limiting the pump outlet pressure to the set pressure. The pressure relief valve can also be placed at the inlet of the pump to protect the circuit from excess negative pressure that the pump can generate. The pressure relief valve in combination with the pump loop provides an accurate means to dynamically set the occlusion of the tubing within the roller pump. Other applications for the pressure sensitive device include inline noninvasive pressure isolator, and pressure relief across other devices. Various designs are introduced.

[22] Filed: **Jun. 7, 1995**

Related U.S. Application Data

[63] Continuation-in-part of application No. 07/852,931, Mar. 13, 1994, Pat. No. 5,186,431, which is a continuation of application No. 07/683,093, Apr. 10, 1992, abandoned, which is a continuation of application No. 07/410,845, Sep. 2, 1989, abandoned.

[51] **Int. Cl.⁷** **F16L 55/04**

[52] **U.S. Cl.** **138/30; 604/4**

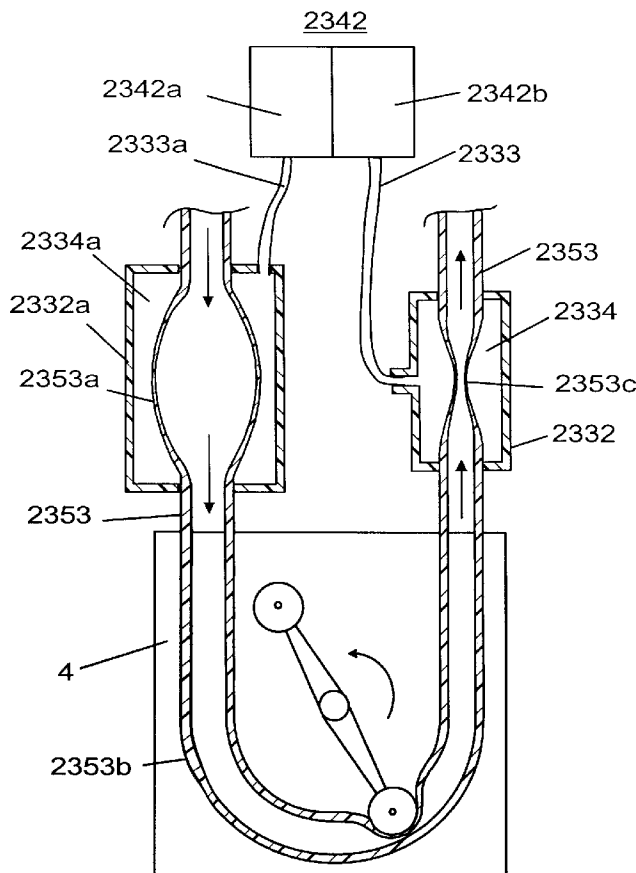
[58] **Field of Search** 251/4, 5; 604/4,
604/5; 138/30

[56] **References Cited**

U.S. PATENT DOCUMENTS

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7 Claims, 9 Drawing Sheets



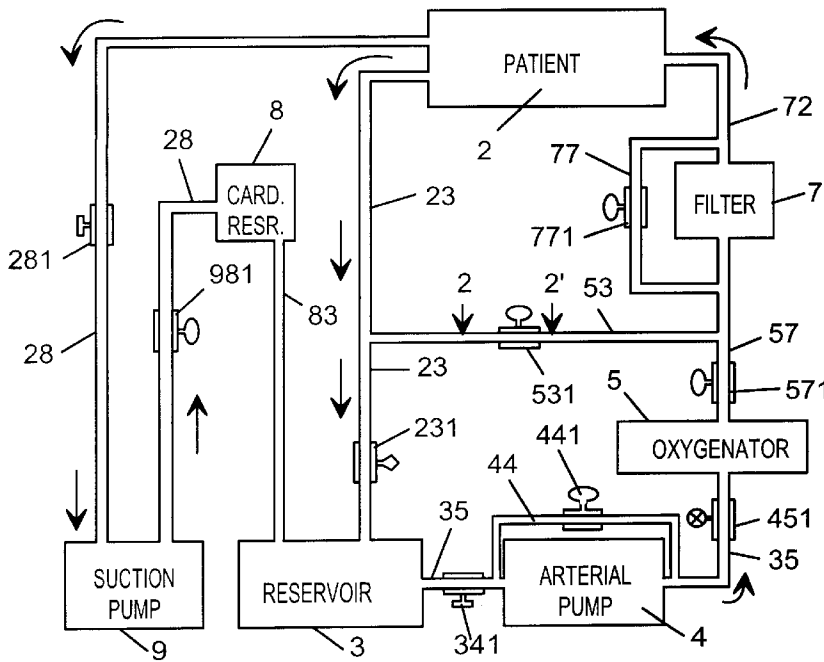


FIG. 1

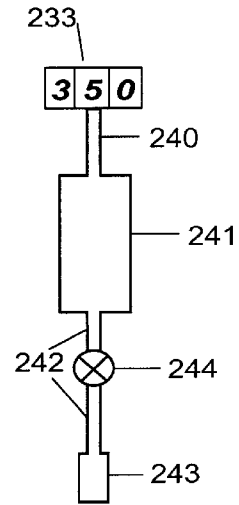


FIG. 2b

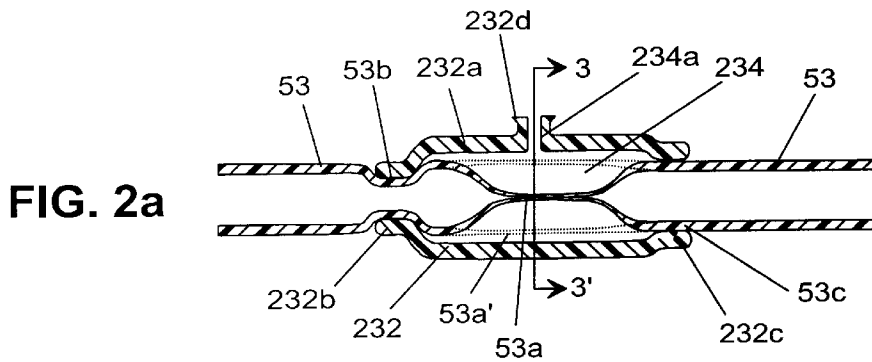


FIG. 2a

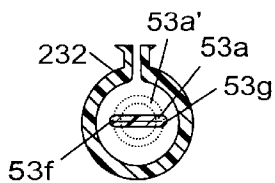


FIG. 3

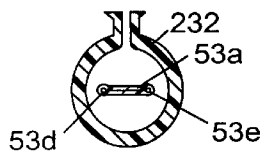


FIG. 4

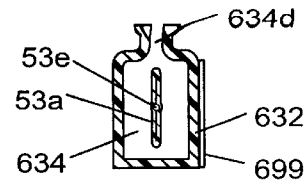


FIG. 6

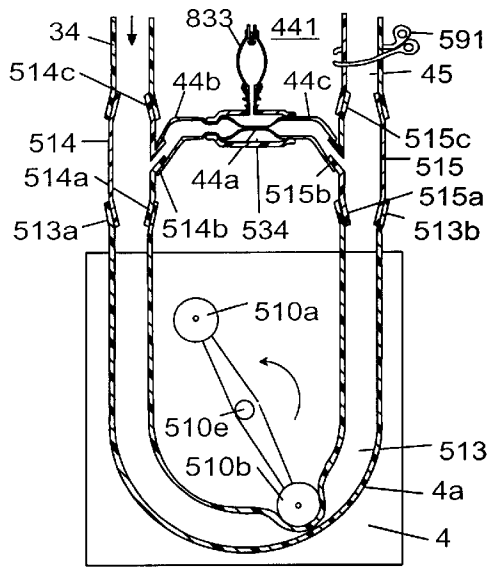


FIG 5a

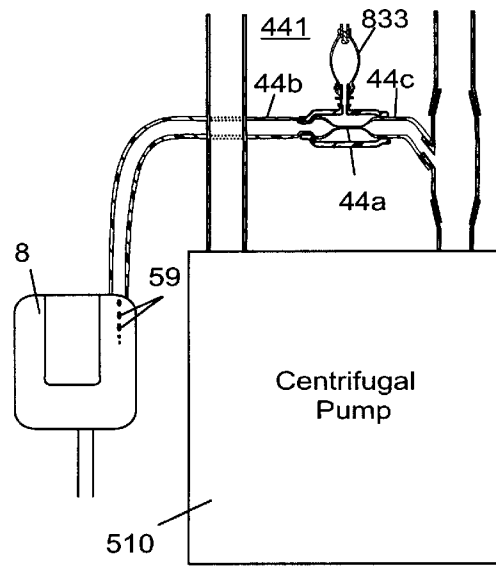


FIG 5d

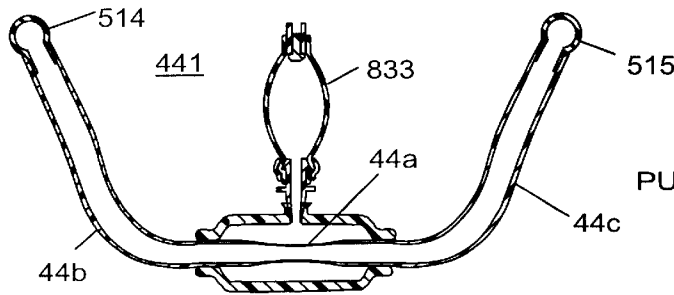


FIG 5b

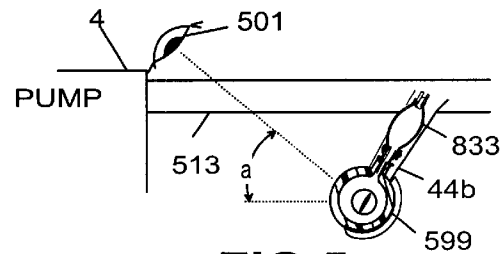


FIG 5c

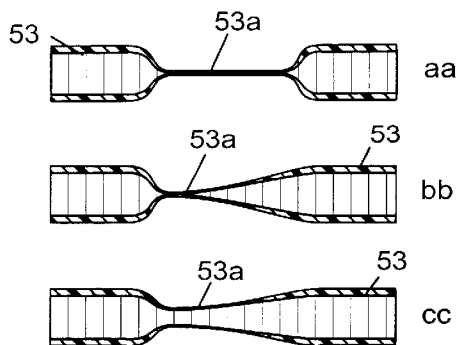


FIG 7a

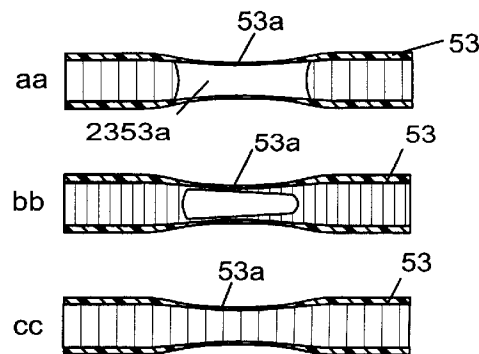


FIG 7b

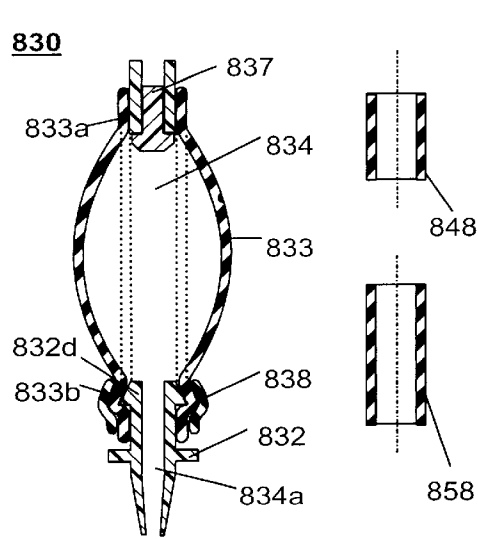


FIG. 8

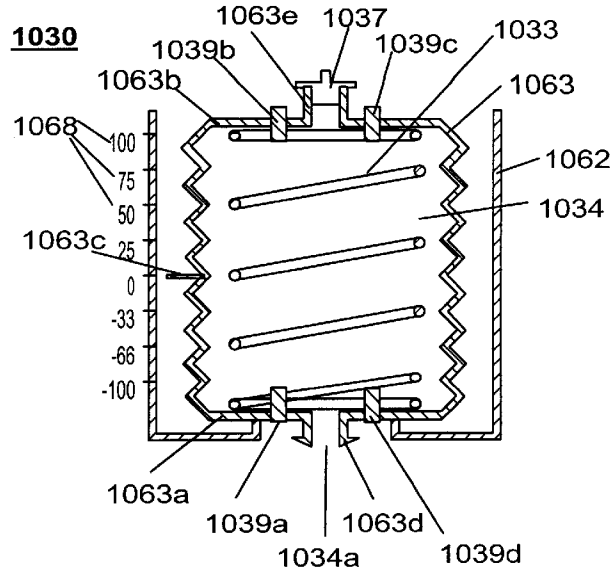


FIG. 10

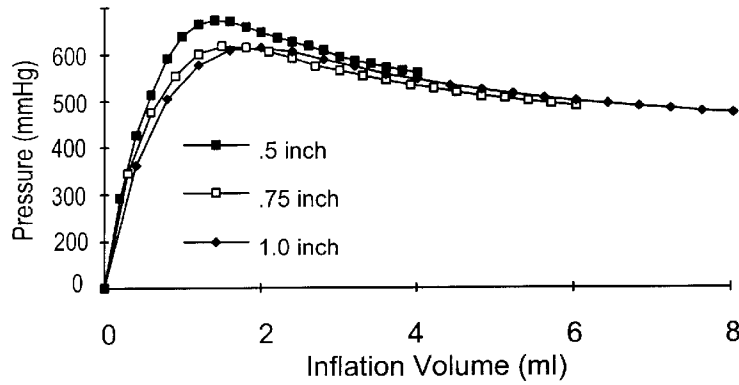


FIG. 9

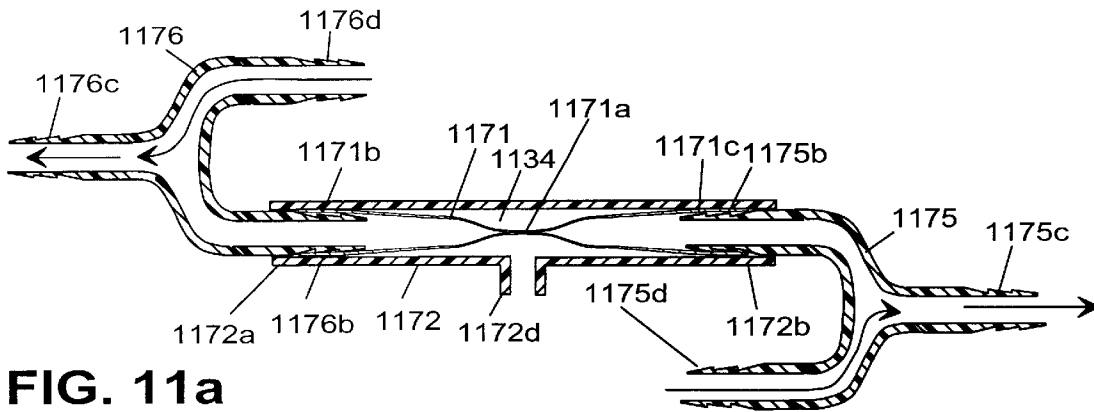


FIG. 11a

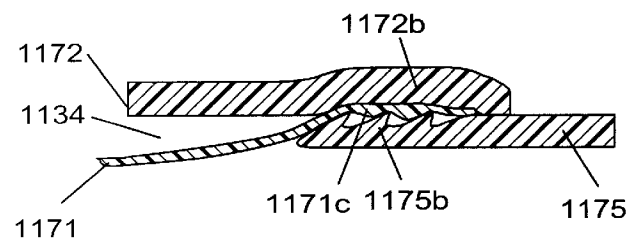


FIG. 11b

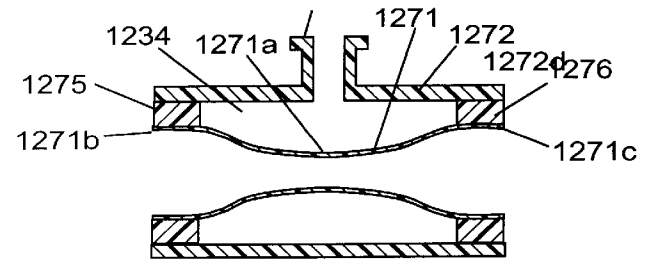


FIG. 12

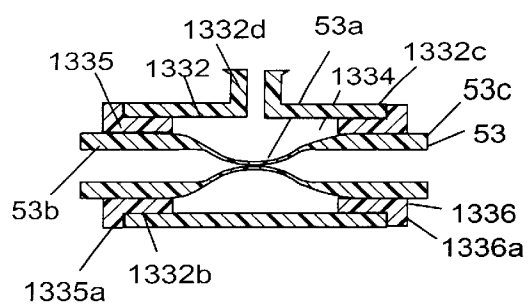


FIG. 13

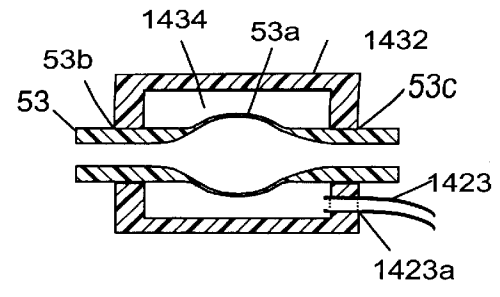


FIG. 14

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