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Uber, III et al.

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[54] **INJECTION SYSTEM AND PUMPING SYSTEM FOR USE THEREIN**

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[51] **Int. Cl.⁶** **A61M 1/00**

[52] **U.S. Cl.** **604/30; 604/140**

[58] **Field of Search** 604/65-67, 30-34, 604/49, 118, 151; 128/DIG. 12, 13

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[57] ABSTRACT

The present invention provides a number of pumping systems and injection systems particularly useful for injecting a liquid medium into a patient. In general, the pumping systems comprise a removable pumping unit. The removable pumping unit includes means for pressurizing the liquid medium via the rotational displacement of the liquid medium. The present invention also provides a pumping system comprising a pumping unit for pressurizing the liquid medium and a feedback-controlled drive means in connection with the pumping unit for providing a controlled powered drive to the pumping unit. The pumping system further comprises a flow meter for measuring the flow rate of the pressurized liquid medium exiting the pumping system and control means in communicative connection with the drive means for providing a control signal to control the powered drive provided to the pumping unit. The control means is suitable to receive a feedback signal from the flow meter corresponding to the flow rate of the pressurized liquid medium exiting the pumping unit. The control signal provided to the drive means is a function of the feedback signal.

28 Claims, 5 Drawing Sheets

