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(71) Applicant: AMGEN INC. [US/US]; One Amgen Center Drive, Thousand Oaks, CA 91320-1799 (US).

(72) Inventors: JIN, Huixing; c/o Amgen Inc., One Amgen Center Drive, Mail Stop 28-5-A, Thousand Oaks, CA 91320-1799 (US). JAZAYERI, Julian; c/o Amgen Inc., One Amgen Center Drive, Mail Stop 28-5-A, Thousand Oaks, CA 91320-1799 (US). VALENZUELA, Sergio Giovanni; c/o Amgen Inc., One Amgen Center Drive, Mail Stop 28-5-A, Thousand Oaks, CA 91320-1799 (US). SELVE, Ryan David; c/o Amgen Inc., One Amgen Center Drive, Mail Stop 28-5-A, Thousand Oaks, CA 91320-1799 (US). PARAMANANDAM, Sivakumar; c/o Amgen Inc., One Amgen Center Drive, Mail Stop 28-5-A, Thousand Oaks, CA 91320-1799 (US).

(74) Agent: FURMANEK, Michael P.; Marshall, Gerstein & Borun LLP, 233 S. Wacker Drive, 6300 Willis Tower, Chicago, IL 60606-6357 (US).

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(54) Title: SOUND-DETECTION BASED INJECTION TIME MEASUREMENT SYSTEM FOR DRUG DELIVERY DEVICES

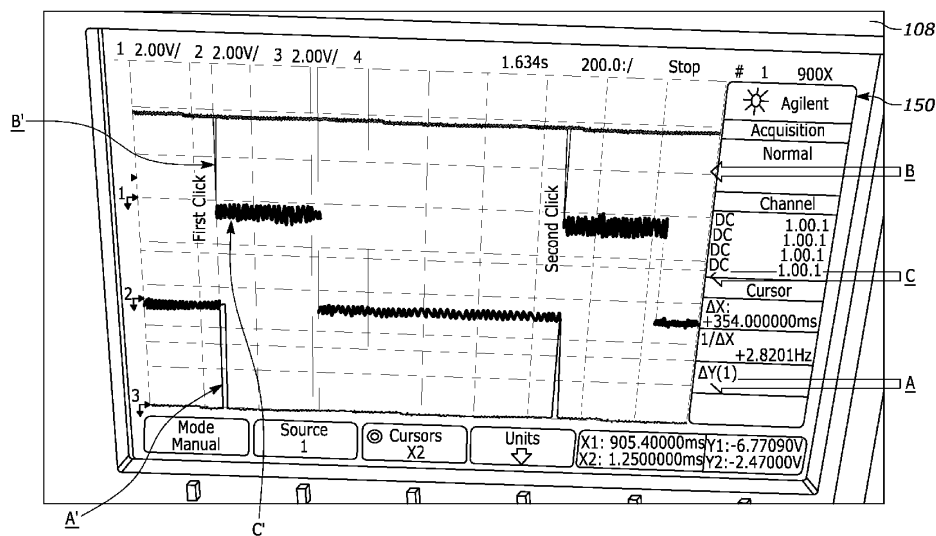


FIG. 3

(57) Abstract: A real-time drug injection time duration measurement system includes a sound transducer, a waveform shaping circuit operably coupled therewith, a pulse clamping circuit operably coupled with the waveform shaping circuit, and a timer operably coupled with the pulse clamping circuit. The sound transducer detects a first sound associated with drug delivery initiation and a second sound associated with drug delivery completion and is further converts the detected first and second sounds into a first electronic waveform and a second electronic waveform, respectively. The waveform shaping circuit converts the first and second waveforms into a first pulse and a second pulse, respectively. The pulse clamping circuit triggers upon receiving the first pulse and generate a regenerated pulse. The timer initiates upon receiving the regenerated pulse and stop upon receiving a subsequent regenerated pulse via the pulse clamping circuit.

[Continued on next page]

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