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Markussen

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(54) **AUTOMATIC INJECTION DEVICE WITH A TOP RELEASE MECHANISM**

(71) Applicant: **Novo Nordisk A/S**, Bagsvaerd (DK)

(72) Inventor: **Tom Hede Markussen**, Bagsvaerd (DK)

(73) Assignee: **Novo Nordisk A/S**, Bagsvaerd (DK)

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This patent is subject to a terminal disclaimer.

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(58) **Field of Classification Search**

CPC A61M 5/315-31596; A61M 5/2033; A61M 5/326; A61M 2005/206; A61M 2005/208

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,104,380 A * 4/1992 Holman A61M 5/20 604/117

5,308,340 A 5/1994 Harris
(Continued)

FOREIGN PATENT DOCUMENTS

DE 20317377 U1 4/2005
EP 0293958 A1 12/1988

(Continued)

OTHER PUBLICATIONS

Danish Patent Application No. PA 2004 01576, filed Oct. 14, 2004.

Primary Examiner — Laura A Bouchelle

(74) *Attorney, Agent, or Firm* — Wesley Nicolas

(57)

ABSTRACT

The present invention relates to a handheld mechanical injection device by which set doses of a liquid medicament can be injected from a medical reservoir. The medicament is expelled through an injection needle by release of a power reservoir in the device, the power reservoir being fully or partially released by actuation of a user operable release member being positioned at or near an upper end of the injection device, the upper end being that end of the injection device which is opposite the injection needle.

15 Claims, 13 Drawing Sheets

