



US006235004B1

(12) **United States Patent**
Steenfeldt-Jensen et al.

(10) **Patent No.:** **US 6,235,004 B1**
(45) **Date of Patent:** **May 22, 2001**

(54) **INJECTION SYRINGE**

(75) Inventors: **Søren Steinfeldt-Jensen**, Hornbæk;
Steffen Hansen, Hillerød, both of (DK)

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

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/429,677**

(22) Filed: **Oct. 28, 1999**

Related U.S. Application Data

(63) Continuation of application No. 09/238,849, filed on Jan. 28, 1999, now Pat. No. 6,004,297.

(60) Provisional application No. 60/073,820, filed on Feb. 5, 1998.

(30) Foreign Application Priority Data

Jan. 30, 1998 (DK) 1998 00130

(51) **Int. Cl.⁷** **A61M 5/00**

(52) **U.S. Cl.** **604/207; 604/211**

(58) **Field of Search** 604/207, 208,
604/210, 211, 218, 187, 232

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,017,190 5/1991 Simon et al. .
5,304,152 4/1994 Sams .
5,599,314 2/1997 Neill .
5,674,204 10/1997 Chanoch .
5,679,111 10/1997 Hjertman et al. .
5,725,508 3/1998 Sams .

FOREIGN PATENT DOCUMENTS

0 327 910 8/1989 (EP) .
0 450 905 10/1991 (EP) .
WO 93/07922 4/1993 (WO) .

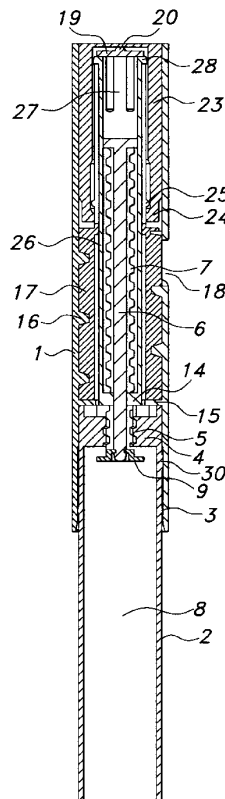
Primary Examiner—John D. Yasko

(74) *Attorney, Agent, or Firm*—Steve T. Zelson, Esq

(57) **ABSTRACT**

The present invention provides an injection syringe comprises a housing including a holder for containing a cartridge of medicine, a piston rod with a non-circular cross-section having an outer thread, a piston rod drive, a one way coupling having an annular ring of internal ratchet notches, which annular ring can be integral with the housing, and a pawl having at least a pair of resilient arms each having a free end.

11 Claims, 5 Drawing Sheets



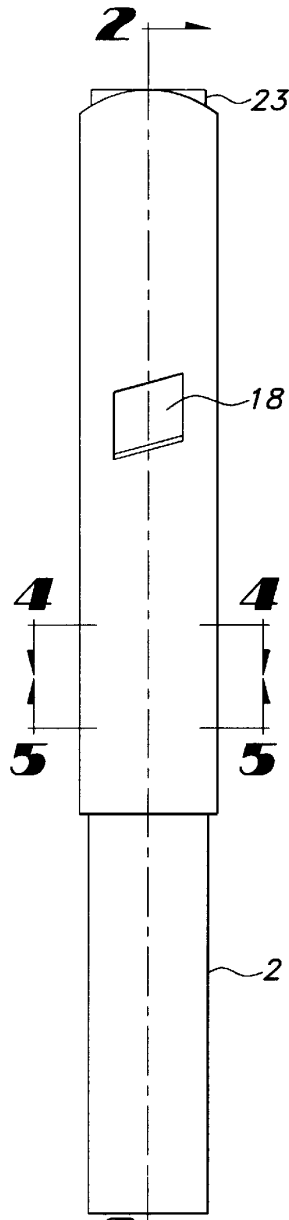


FIG 1

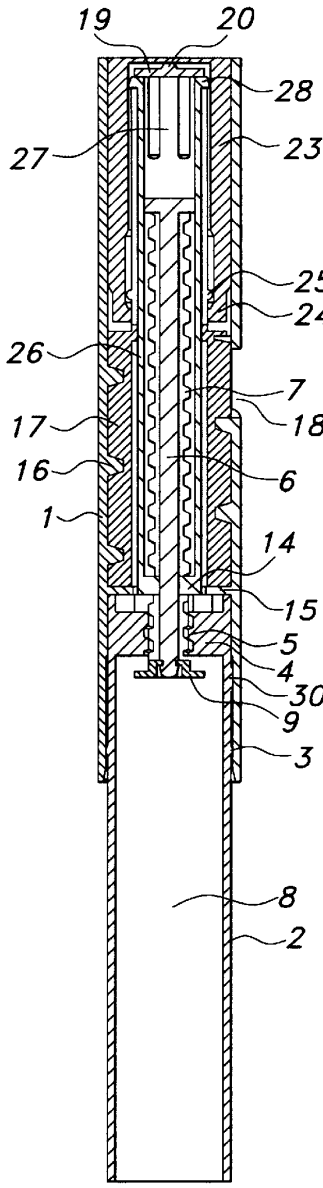


FIG 2

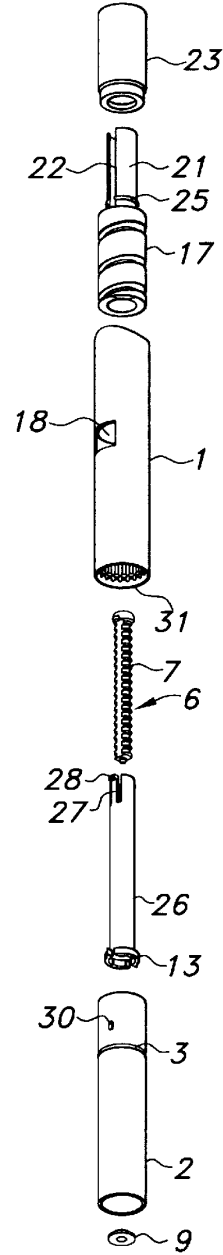


FIG 3

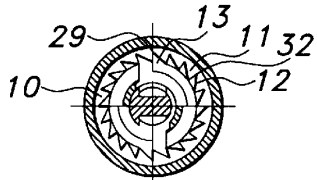


FIG 4

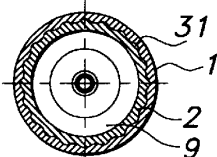


FIG 5

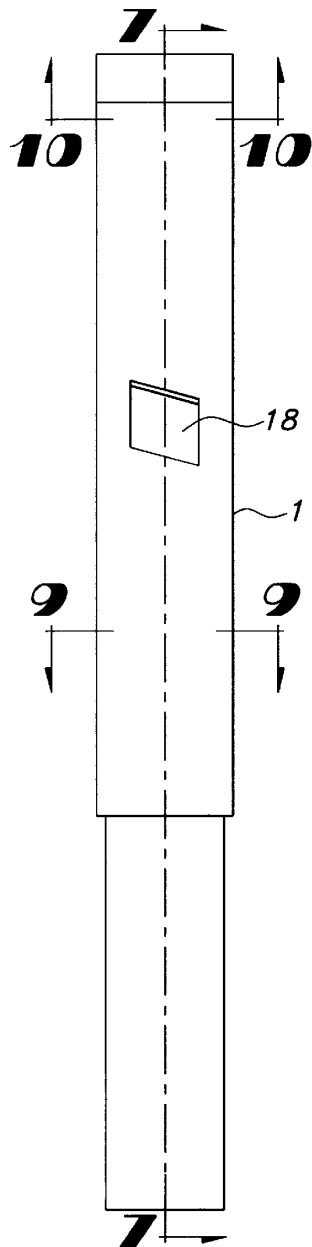


FIG 6

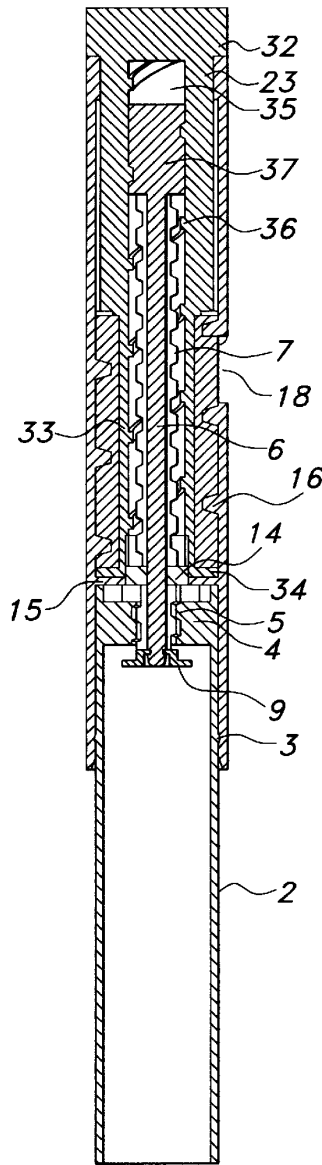


FIG 7

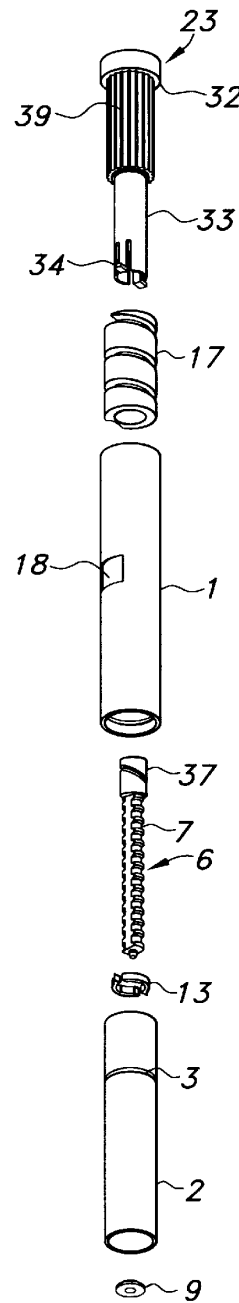


FIG 8

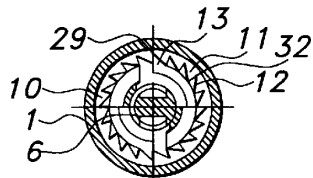


FIG 9

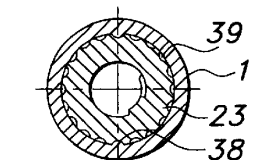


FIG 10

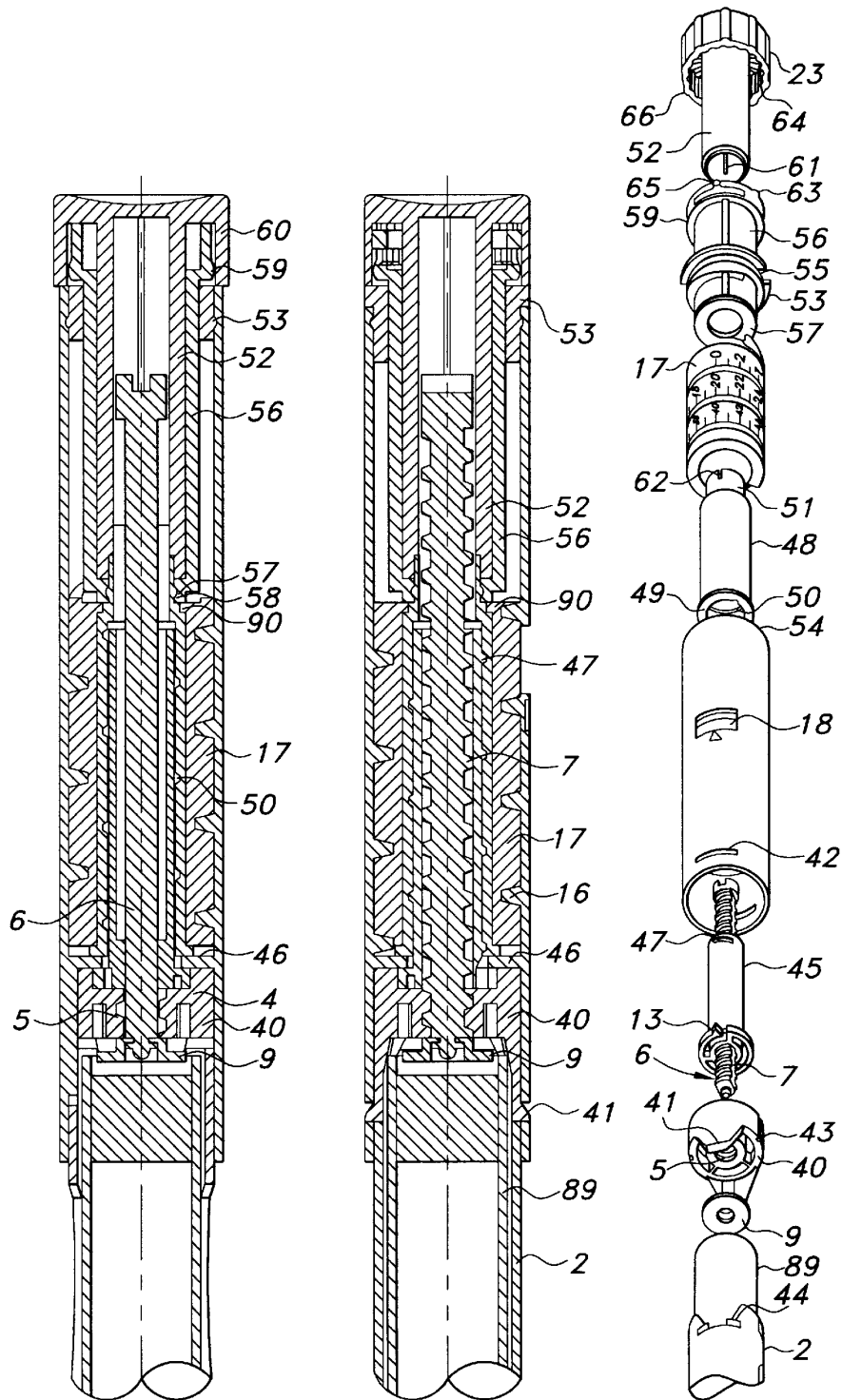


FIG 11 FIG 12 FIG 13

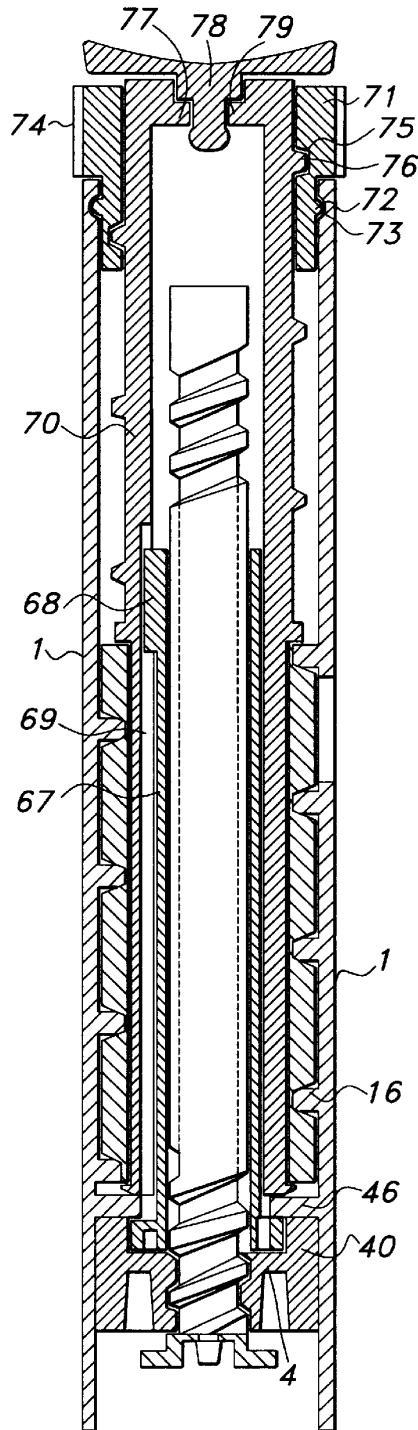


FIG 14

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.