

[54] DEVICE FOR DISPENSING DRUG BY COMBINED DIFFUSIONAL AND OSMOTIC OPERATIONS

[75] Inventor: Felix Theeuwes, Los Altos, Calif.

[73] Assignee: Alza Corporation, Palo Alto, Calif.

[21] Appl. No.: 11,121

[22] Filed: Feb. 12, 1979

[51] Int. Cl.³ A61M 7/00

[52] U.S. Cl. 128/260

[58] Field of Search 128/222-223, 128/260, 271; 424/19, 22

[56] References Cited

U.S. PATENT DOCUMENTS

| | | | |
|-----------|---------|----------------------------|---------|
| 3,993,072 | 11/1976 | Zaffaroni | 128/260 |
| 4,060,084 | 11/1977 | Chandrasekaran et al. | 128/260 |
| 4,111,201 | 9/1978 | Theeuwes | 128/260 |
| 4,111,202 | 9/1978 | Theeuwes | 128/260 |
| 4,111,203 | 9/1978 | Theeuwes | 128/260 |
| 4,127,127 | 11/1978 | Wong et al. | 128/260 |

Primary Examiner—C. Fred Rosenbaum

Attorney, Agent, or Firm—Paul L. Sabatine; Edward L. Mandell; Thomas E. Ciotti

[57] ABSTRACT

A device is disclosed for delivering an agent to an environment of use at a substantially constant rate over time. The device comprises a wall formed of a microporous material surrounding a compartment housing the agent and a thermodynamic member. The member comprises a film formed of an expandable, semipermeable material surrounding a means for expanding the member. The member can occupy any space-position in the compartment, and it also can be in contact with the wall. In operation, when the device is in the environment, agent is delivered from the device by diffusion through fluid-filled paths in the microporous wall, with external fluid simultaneously entering the compartment through the paths, also, fluid is imbibed by the member from fluid present in the compartment or directly across the wall causing it to expand, fill the compartment and continuously maintain agent in a substantially saturated state at the wall, thereby delivering agent at a substantially zero order rate of release from the device over a prolonged period of time.

21 Claims, 5 Drawing Figures

