PATCH-SIZED FLUID DELIVERY SYSTEMS AND METHODS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation of U.S. patent application Ser. No. 15/048,693, filed Feb. 19, 2018 and entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 10,099,018, issued Oct. 16, 2018 (Attorney Docket No. R39), which is a divisional of U.S. patent application Ser. No. 12/429,612, filed Apr. 24, 2009 and entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 9,265,879, issued Feb. 23, 2016 (Attorney Docket No. H45), which is a continuation of U.S. patent application Ser. No. 11/704,886, filed Feb. 9, 2007 and entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 8,545,445, issued Oct. 1, 2013 (Attorney Docket No. E72), each of which are hereby incorporated herein by reference in their entireties, which claims the benefit of the following U.S. Provisional Patent Applications, all of which are hereby incorporated herein by reference in their entireties:

[0002] Ser. No. 60/772,313, filed Feb. 9, 2006 end entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0003] Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53);

[0004] Ser. No. 60/793,188, filed Apr. 19, 2006 and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46); and

[0005] Ser. No. 60/889,007, field Feb. 9, 2007 and entitled Two-Stage Transcutaneous Inserter (Attorney Docket No. 1062/E74).

[0006] U.S. patent application Ser. No. 12/429,612, filed Apr. 24, 2009 and entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 9,265,879, issued Feb. 23, 2016 (Attorney Docket No. H45), is also a continuation of U.S. patent application Ser. No. 11/704,899, filed Feb. 9, 2007 and entitled Fluid Delivery Systems and Methods, now U.S. Pat. No. 8,414,522, issued Apr. 9, 2013 (Attorney Docket No. E70), which claims the benefit of the following U.S. Provisional Patent Applications, all of which are hereby incorporated herein by reference in their entireties:

[0007] Ser. No. 60/772,313, filed Feb. 9, 2006 end entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0008] Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53);

[0009] Ser. No. 60/793,188, filed Apr. 19, 2006 and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46); and

[0010] Ser. No. 60/889,007, field Feb. 9, 2007 and entitled Two-Stage Transcutaneous Inserter (Attorney Docket No. 1062/E74).

[0011] U.S. patent application Ser. No. 12/429,612, filed Apr. 24, 2009 and entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 9,265,879, issued Feb. 23, 2016 (Attorney Docket No. H45), is also a continuation of U.S. patent application Ser. No. 11/704,896 filed Feb. 9, 2007 and entitled Pumping Fluid Delivery Systems and Methods Using Force Application Assembly, now U.S. Pat. No. 8,585,377, issued Nov. 19, 2013 (Attorney Docket No. E71), which claims the benefit of the following U.S. Provisional Patent Applications, all of which are hereby incorporated herein by reference in their entireties:

[0012] Ser. No. 60/772,313, filed Feb. 9, 2006 end entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0013] Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53);

[0014] Ser. No. 60/793,188, filed Apr. 19, 2006 and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46); and

[0015] Ser. No. 60/889,007, field Feb. 9, 2007 and entitled Two-Stage Transcutaneous Inserter (Attorney Docket No. 1062/E74).

[0016] U.S. patent application Ser. No. 12/429,612, filed Apr. 24, 2009 and entitled Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 9,265,879, issued Feb. 23, 2016 (Attorney Docket No. H45), is also a continuation of U.S. patent application Ser. No. 11/704,897, filed Feb. 9, 2007 and entitled Adhesive and Peripheral Systems and Methods for Medical Devices, now U.S. Pat. No. 8,113,244, issued Feb. 14, 2012 (Attorney Docket No. E73), which claims the benefit of the following U.S. Provisional Patent Applications, all of which are hereby incorporated herein by reference in their entireties:

[0017] Ser. No. 60/772,313, filed Feb. 9, 2006 end entitled Portable Injection System (Attorney Docket No. 1062/E42);

[0018] Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control (Attorney Docket No. 1062/E53);

[0019] Ser. No. 60/793,188, filed Apr. 19, 2006 and entitled Portable Injection and Adhesive System (Attorney Docket No. 1062/E46); and

[0020] Ser. No. 60/889,007, field Feb. 9, 2007 and entitled Two-Stage Transcutaneous Inserter (Attorney Docket No. 1062/E74).

FIELD OF THE INVENTION

[0021] This application relates generally to patch-sized fluid delivery systems and methods.

BACKGROUND

[0022] Many potentially valuable medicines or compounds, including biologicals, are not orally active due to poor absorption, hepatic metabolism or other pharmacokinetic factors. Additionally, some therapeutic compounds, although they can be orally absorbed, are sometimes required to be administered so often it is difficult for a patient to maintain the desired schedule. In these cases, parenteral delivery is often employed or could be employed.

[0023] Effective parenteral routes of drug delivery, as well as other fluids and compounds, such as subcutaneous injection, intramuscular injection, and intravenous (IV) administration include puncture of the skin with a needle or stylet. Insulin is an example of a therapeutic fluid that is self-injected by millions of diabetic patients. Users of parenterally delivered drugs would benefit from a wearable device that would automatically deliver needed drugs/compounds over a period of time.

[0024] To this end, there have been efforts to design portable devices for the controlled release of therapeutics. Such devices are known to have a reservoir such as a cartridge, syringe, or bag, and to be electronically controlled. These devices suffer from a number of drawbacks