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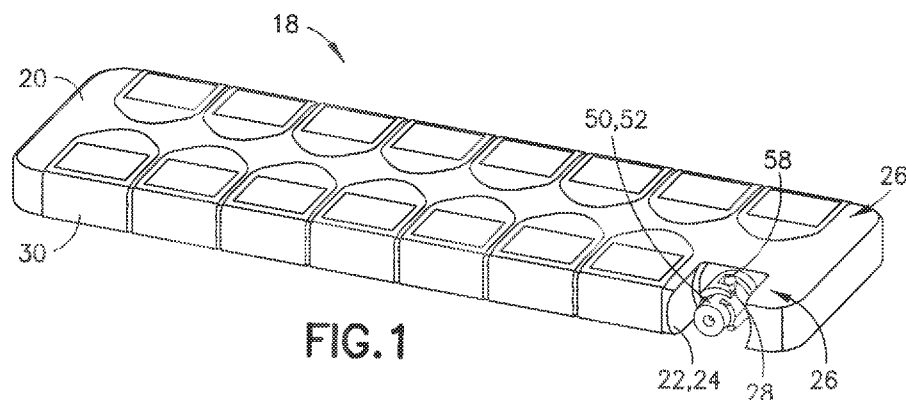
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(54) Title: NEEDLE STORAGE MAGAZINE ASSEMBLY



(57) Abstract: A magazine assembly (1) that stores a plurality of needles (56) configured to engage a medication pen (2) via an adapter (4) for medication delivery, the magazine assembly (1) comprising a magazine housing (20) enclosing a plurality of hub chambers (22) each enclosing one of a plurality of needle hubs (50), a connector (28) in each of the plurality of hub chambers (22), each connector (28) engages one of the plurality of needle hubs (50), and a plurality of enclosures (30) each sealing the plurality of hub chambers (22), wherein a selected enclosure of the plurality of enclosures (30) is removed to expose a selected needle hub (52) of the plurality of needle hubs (50), the adapter (4) attaches to the medication pen (2) to engage the selected needle hub (52) while disengaging the selected needle hub (52) from the hub chamber (22), and the selected needle hub (52) is removed from the magazine housing (20) to prepare the medication pen (2) for medication delivery.



NEEDLE STORAGE MAGAZINE ASSEMBLY

[0001] This application claims the benefit under 35 U.S.C. § 119(e) of U.S. Provisional Patent Application Serial 62/328,697, filed on April 28, 2016, which is hereby incorporated by reference in its entirety.

FIELD

[0002] Various exemplary embodiments of the invention relate to needle storage for medication pens.

BACKGROUND

[0003] Medication pens are typically used to inject medication into a patient. A person who must periodically self-inject doses of medication will typically carry a medication pen and several single-use pen needles. A medication pen is designed for safety and sterility. However, inefficiencies and inconveniences arise.

SUMMARY OF THE INVENTION

[0004] It is an aspect of the present invention to provide a magazine assembly that stores a plurality of needles configured to engage a medication pen via an adapter for medication delivery. Such a magazine assembly provides advantages in minimizing the size of pen needle packaging, minimizing the volume of plastic used to manufacture components and grouping together a number of pen needles making them easy to use and carry. Such advantages are provided in a magazine housing, as well as in the adapter.

[0005] Having a magazine of needles available for medication delivery reduces needle reuse. Needle reuse is undesired for at least the following reasons. The needle dulls after a single use and so subsequent use may cause pain to the patient. Multiple needle use can also reduce the strength of the needle tip which may cause a potential fracture. Also, needle reuse increases sanitary concerns and health risks to the patient.

[0006] The needle assembly of the present invention advantageously reduces reuse for at least the following reasons. Although patients may desire to financially benefit from using a

needle multiple times, the needle assembly is configured to prevent each of the plurality of needles from being used more than once. Convenience is another reason patients reuse needles. Patients may also be concerned about not having another needle available for use or not having access to supplies. However, the needle assembly conveniently provides multiple needles so that an unused needle is more readily available.

[0007] The foregoing and/or other aspects of the present invention can be achieved by providing a magazine assembly that stores a plurality of needles configured to engage a medication pen via an adapter for medication delivery, the magazine assembly comprising a magazine housing enclosing a plurality of hub chambers each enclosing one of a plurality of needle hubs, a connector in each of the plurality of hub chambers, each connector engaging one of the plurality of needle hubs, and a plurality of enclosures sealing the plurality of hub chambers, wherein a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, the adapter attaches to the medication pen to engage the selected needle hub while disengaging the selected needle hub from the hub chamber, and the selected needle hub is removed from the magazine housing to prepare the medication pen for medication delivery.

[0008] Preferably, the adapter includes an adapter body, and a proximal end of the adapter body includes threads that are configured to engage the medication pen. A distal end of the adapter body includes an opening, and the opening is configured to engage one of the plurality of needle hubs. The adapter includes an adapter septum wherein the adapter septum is closed when the adapter does not engage the selected needle hub and the adapter septum is open when the adapter engages the selected needle hub. A proximal end of the selected needle hub compresses the adapter septum and provides a sealing surface. The adapter also includes an adapter cannula that is configured to pierce a septum of the medication pen to establish fluid communication with the medication pen and a distal end of the adapter cannula is disposed in the adapter septum.

[0009] Preferably, the magazine housing includes two magazine arrays disposed opposite each other, each magazine array includes the plurality of hub chambers. The magazine housing further comprises a storage bin that stores used needle hubs, and the storage bin is disposed between the two magazine arrays. Each magazine array preferably includes eight

hub chambers and the enclosures include a foil tab. The storage bin includes an adapter chamber that is configured to store the adapter, and when the adapter is disposed in the adapter chamber of the storage bin, the adapter seals the storage bin. The adapter chamber is configured to engage an end cap and is sealed by one of the plurality of enclosures prior to use.

[0010] The foregoing and/or other aspects of the present invention can further be achieved by providing an adapter configured to engage a medication pen for medication delivery, the adapter comprising an adapter body having a proximal end and a distal end, an adapter septum disposed between the proximal end and the distal end of the adapter body, and an adapter cannula being fixed to the adapter body and partially disposed within the adapter septum, wherein when a needle hub is not engaged to the adapter body, the adapter septum is closed, and when the needle hub is engaged to the adapter body, the needle hub compresses the adapter septum and causes the adapter cannula to pierce the adapter septum to establish fluid communication with the needle hub.

[0011] Additionally, the foregoing and/or other aspects of the present invention can be achieved by providing a magazine that stores a plurality of needles configured to engage a medication pen for medication delivery, the magazine comprising a magazine housing enclosing a plurality of hub chambers each enclosing one of a plurality of needle hubs, a connector in each of the plurality of hub chambers, each connector engaging one of the plurality of needle hubs, and a plurality of enclosures sealing the plurality of hub chambers, wherein a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, the medication pen engages the selected needle hub while disengaging the selected needle hub from the hub chamber, and the selected needle hub is removed from the magazine housing to prepare the medication pen for medication delivery.

[0012] The foregoing and/or other aspects of the present invention can also be achieved by a method of using a plurality of needles in a magazine assembly, the plurality of needles being configured to engage a medication pen via an adapter for medication delivery, the method comprising removing a selected enclosure of a plurality of enclosures to expose a selected needle hub of a plurality of needle hubs in a magazine housing, attaching the adapter

to the medication pen, engaging the adapter to the selected needle hub, and disengaging the selected needle hub from the magazine housing to prepare the medication pen for medication delivery.

[0013] Additional and/or other aspects and advantages of the present invention will be set forth in the description that follows, or will be apparent from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The above aspects and features of the present invention will be more apparent from the description for the exemplary embodiments of the present invention taken with reference to the accompanying drawings, in which:

[0015] Figure 1 illustrates a left perspective view of an exemplary magazine;

[0016] Figure 2 illustrates the right perspective view of an exemplary adapter connected to a medication pen;

[0017] Figure 3 illustrates a partial cross sectional view of the medication pen of Figure 2 beginning to connect to a needle hub in a magazine housing;

[0018] Figure 4 illustrates a partial cross sectional view of the medication pen of Figure 2 fully engaged to a needle hub in the magazine housing;

[0019] Figure 5 illustrates a right perspective view of the magazine assembly where the medication pen engaged to the needle hub is being removed from the magazine housing;

[0020] Figure 6 illustrates a right perspective view of the magazine assembly where the medication pen returns the needle hub to the magazine housing;

[0021] Figure 7 illustrates a right perspective view of the needle hub in the magazine housing in an unlocked position;

[0022] Figure 8 illustrates a right perspective view of the needle hub in the magazine housing in a locked position;

[0023] Figure 9 illustrates a left perspective view of the needle hub;

[0024] Figure 10 illustrates another embodiment of a magazine having a storage bin;

[0025] Figure 11 illustrates the magazine of Figure 10 with an adapter chamber;

[0026] Figure 12 illustrates a cross sectional view of the magazine assembly where the medication pen is placing a needle hub in the storage bin; and

[0027] Figure 13 illustrates a cross sectional view of the magazine assembly where a plurality of needle hubs are disposed in the storage bin.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0028] According to one embodiment, Figure 1 illustrates a magazine 18 that stores a plurality of needles or cannulas used by a medication pen for medication delivery. The magazine 18 includes a magazine housing 20, a plurality of hub chambers 22 each including a connector 28, a selected hub chamber 24, and magazine arrays 26. The magazine housing 20 is in the shape of a credit card and encloses each of the plurality of needles or cannulas.

[0029] The magazine housing 20 includes two magazine arrays 26. Each of the magazine arrays 26 carries one of a plurality of needle hubs 50 in each of the plurality of hub chambers 22. Preferably, each magazine array 26 includes eight hub chambers 22, although more or fewer are contemplated. The magazine arrays 26 are opposite one another in a longitudinal direction. The plurality of needle hubs 50 are inline and adjacent to one another. Such a configuration advantageously provides a small, compact and optimized arrangement of the plurality of needle hubs 50 and allows the magazine 18 to be made from a minimal amount of material. Additionally, the plurality of needle hubs 50 are individually disposed in each of the plurality of hub chambers 22 to advantageously provide a separate cavity for each needle hub 50.

[0030] Each of the plurality of hub chambers 22 includes the connector 28 which secures each of the plurality of needle hubs 50. The connector 28 is preferably a quarter-turn bayonet connection, although a push-pull detent connector can also be used. Further details of the connector 28 are described below.

[0031] Each of the plurality of hub chambers 22 is enclosed by a peel tab or enclosure 30. The peel tabs 30 are preferably foil tabs. Each peel tab 30 individually seals and provides a sterile environment for one of the plurality of needle hubs 50 disposed in the plurality of hub chambers 22. Such a configuration advantageously provides independent access to each of the plurality of needle hubs 50. As a result, one of the plurality of needle hubs 50 can be used without altering the sterile environment of the remaining needle hubs 50.

[0032] Figure 1 also illustrates one of the plurality of peel tabs 30 removed to expose a selected hub chamber 24 of the plurality of hub chambers 22. The selected hub chamber 24 includes a selected needle hub 52 ready for use.

[0033] Figure 2, according to one embodiment, illustrates a medication pen 2 connected to an adapter 4. The adapter 4 is attachable to a standard reusable medication pen 2 (i.e. pen injector). The components of the adapter 4 are illustrated in Figures 3 and 4. Figure 3 illustrates the adapter 4 connected to the medication pen 2 and beginning to engage the selected needle hub 52. The adapter 4 includes an adapter body 6, an adapter cannula 8 and an adapter septum 10. The adapter body 6 is preferably a two piece press-fit assembly that encloses and secures the adapter septum 10. A proximal end of the adapter body 6 includes threads that are configured to engage threads on the medication pen 2. A distal end of the adapter body 6 includes an opening. The opening is configured to engage one of a plurality of needle hubs 50.

[0034] The adapter cannula 8 is fixed to the adapter body 6. The adapter cannula 8 is disposed in the proximal end of the adapter body 6 and is configured to pierce a septum (not shown) of the medication pen 2 to establish fluid communication with the medication pen 2. A distal end of the adapter cannula 8 is disposed in the adapter septum 10. Operation of the adapter cannula 8 with the adapter septum 10 is described below.

[0035] The adapter septum 10 regulates the flow of medicament between the medication pen 2 and the selected needle hub 52. The adapter septum 10 is closed in its natural state. As illustrated in Figure 3, the adapter septum 10 partially engages the adapter cannula 8 at its distal end in the closed position. Since the selected needle hub 52 is not fully engaged with the adapter 4, the adapter septum 10 remains in the closed position. That is, the adapter septum 10 of Figure 3 is in its natural state.

[0036] Preferably, the adapter septum 10 includes a preformed opening for the adapter cannula 8 to pierce. Alternately, a sharpened distal end of the adapter cannula 8 pierces the adapter septum 10 to establish fluid communication. The adapter septum 10 is preferably made of silicon rubber.

[0037] Figure 4 illustrates the adapter septum 10 in an open position. The selected needle hub 52 is fixed to the adapter body 6 via a push-pull detent although other methods are contemplated. When the selected needle hub 52 is fixed to the adapter body 6, the selected

needle hub 52 applies an axial force to the adapter septum 10. The axial force causes the adapter septum 10 to flex (or compress) and allows the adapter cannula 8 to pierce the adapter septum 10 and extend into the selected needle hub 52. The axial force also establishes a sealing surface to prevent a leak path at an interface between a proximal end of the selected needle hub 52 and a distal surface of the adapter septum 10. Accordingly, the selected needle hub 52 is now in fluid communication with the medication pen 2.

[0038] According to one embodiment, Figure 5 illustrates the magazine assembly 1 where the selected needle hub 52 is connected to the medication pen 2 via the adapter 4 and is removed from the magazine 18. Specifically, the selected needle hub 52 disengages the connector 28 in the selected hub chamber 24 of the magazine housing 20. Each of the plurality of needle hubs 50 cannot be easily removed from the magazine housing 20 without using the adapter 4. The medication pen 2 is now ready for medication delivery.

[0039] Figure 6 illustrates, according to one embodiment, that after the selected needle hub 52 is used for medication delivery by the medication pen 2, the medication pen 2 returns the selected needle hub 52 back to the magazine housing 20. Specifically, the selected needle hub 52 engages the connector 28 in the selected hub chamber 24 of the magazine housing 20. The selected needle hub 52 returns to the selected hub chamber 24 that it was originally sealed in. Figures 7 and 8 illustrate the operation of the connector 28 being a quarter turn bayonet connection engaging one of the plurality of needle hubs 50. Operation of the connector 28 is described below.

[0040] Figure 9 illustrates, according to one embodiment, one of the plurality of needle hubs 50. The plurality of needles hubs 50 each includes a hub body 54, a hub cannula 56 and a radial lug 58. A proximal and distal end of the hub body 54 preferably includes threads or the push-pull detent. The proximal end of the hub body 54 is configured to be attached to the adapter 4 and the distal end of the hub body 54 is configured to be attached to the connector 28 in the magazine housing 20.

[0041] The hub cannula 56 is fixed to the hub body 54 and extends from the distal end of the hub body 54. The hub cannula 56 provides a means to deliver medicament to the patient. Specifically, when one of the plurality of needle hubs 50 is connected to the medication pen 2, fluid communication is established. Accordingly, medicament travels to the needle hub 50

and exits through the hub cannula 56. Although not illustrated, the distal end of the hub cannula 56 includes a sharpened bevel cut that is configured to penetrate tissue.

[0042] The radial lug 58 is disposed adjacent to the threads or the push-pull detent at the distal end of the hub body 54. The radial lug 58 acts as a secondary retention means to the connector 28 in the magazine housing 20. Two radial lugs 58 are preferably disposed on the hub body 54 approximately 180° apart.

[0043] As illustrated in Figure 7, when the used needle hub 50 is returned to the magazine housing 20, the used needle hub 50 engages the quarter turn connector 28 via the radial lug 58. The used needle hub 50 is then rotated approximately 90°, as illustrated in Figure 8, to engage the quarter turn connector 28 of the magazine housing 20. Thus, the quarter turn connector 28 is secured to the needle hub 52 via the radial lug 58.

[0044] According to another embodiment, as illustrated in Figures 10-13, the magazine 18 also includes a storage bin 34. Figure 10 illustrates that the storage bin 34 is disposed between the two magazine arrays 26 in the magazine housing 20 and provides a cavity to store needle hubs 50 after use. Instead of returning the used needle hub 50 in one of the plurality of hub chambers 22 as described above, the needle hub 50 is disposed in the storage bin 34. When the used needle hubs 50 are placed in the storage bin 34, the used needle hubs 50 are inaccessible.

[0045] Figure 11 illustrates that the storage bin 34 includes an opening or adapter chamber 32 for the plurality of needle hubs 50 to access. The adapter 4 or an end cap (cover) engages the opening or adapter chamber 32 to seal the storage bin 34. The opening or adapter chamber 32 advantageously provides access to the storage bin 34, as well as provides a space to carry the adapter 4 when the adapter 4 is not in use.

[0046] The storage bin 34 is penetration resistant and leak proof. Such a configuration advantageously prevents used needle hubs 50 from piercing through the storage bin 34. Also any contaminants from the used needle hubs 50 such as blood are contained and do not escape from the storage bin 34. As a result, contaminants from the used needle hubs 50 are safely enclosed and sealed inside the storage bin 34.

[0047] As illustrated in Figure 10, one of a plurality of peel tabs 30 is used to seal the opening or adapter chamber 32. The opening or adapter chamber 32 is preferably a larger size than the plurality of hub chambers 22. Accordingly, the peel tab 30 for the opening or

adapter chamber 32 is larger than the plurality of peel tabs 30 for each of the plurality of hub chambers 22. In an alternate embodiment, the plurality of peel tabs 30 for the opening or adapter chamber 32 and the plurality of hub chambers 22 are all the same size.

[0048] During operation, the adapter 4 is removed from the opening or adapter chamber 32 and is attached to the medication pen 2 as described above. As illustrated in Figure 12, when one of the plurality of needle hubs 50 is used, the medication pen 2 is inserted into the opening or adapter chamber 32 to release the needle hub 50 into the storage bin 34.

Specifically, the medication pen 2 overcomes a light interference fit when pushing the used needle hub 50 into the opening or adapter chamber 32 of the storage bin 34. The opening or adapter chamber 32 then engages the thread at the distal end of the hub body 54 and/or the radial lug 58. Subsequently, the medication pen 2 is rotated approximately 90° and the medication pen 2 is removed from the opening or adapter chamber 32 to disengage the needle hub 50 from the medication pen 2. The needle hub 50 is then disposed into the storage bin 34. This process repeats for each used needle hub 50. Once one of the plurality of needle hubs 50 is placed into the storage bin 34, there is no way to remove the needle hub 50. Thus, the storage bin 34 advantageously secures the plurality of needle hubs 50 after use and prevents accidental reuse.

[0049] Figure 13 illustrates the process of repeatedly storing one of the plurality of used needle hubs 50 in the storage bin 34. After all of the plurality of needle hubs 50 is used and placed into the storage bin 34, the magazine 18 is ready for disposal.

[0050] The foregoing detailed description of the certain exemplary embodiments has been provided for the purpose of explaining the principles of the invention and its practical application, thereby enabling others skilled in the art to understand the invention for various embodiments and with various modifications as are suited to the particular use contemplated. This description is not necessarily intended to be exhaustive or to limit the invention to the precise embodiments disclosed. Any of the embodiments and/or elements disclosed herein may be combined with one another to form various additional embodiments not specifically disclosed, as long as they don't contradict each other. Accordingly, additional embodiments are possible and are intended to be encompassed within this specification and the scope of the invention. The specification describes specific examples to accomplish a more general goal that may be accomplished in another way.

[0051] As used in this application, the terms “front,” “rear,” “upper,” “lower,” “upwardly,” “downwardly,” and other orientational descriptors are intended to facilitate the description of the exemplary embodiments of the present invention, and are not intended to limit the structure of the exemplary embodiments of the present invention to any particular position or orientation. Terms of degree, such as “substantially” or “approximately” are understood by those of ordinary skill to refer to reasonable ranges outside of the given value, for example, general tolerances associated with manufacturing, assembly, and use of the described embodiments.

CLAIMS

1. A magazine assembly that stores a plurality of needles configured to engage a medication pen via an adapter for medication delivery, the magazine assembly comprising:
 - a magazine housing enclosing
 - a plurality of hub chambers each enclosing one of a plurality of needle hubs;
 - a connector in each of the plurality of hub chambers, each connector engages one of the plurality of needle hubs; and
 - a plurality of enclosures each sealing the plurality of hub chambers, wherein
 - a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, the adapter attaches to the medication pen to engage the selected needle hub while disengaging the selected needle hub from the hub chamber, and the selected needle hub is removed from the magazine housing to prepare the medication pen for medication delivery.
2. The magazine assembly of claim 1, wherein
 - the adapter includes an adapter body, and
 - a proximal end of the adapter body includes threads that are configured to engage the medication pen.
3. The magazine assembly of claim 2, wherein
 - a distal end of the adapter body includes an opening, and
 - the opening is configured to engage one of the plurality of needle hubs.
4. The magazine assembly of claim 1, wherein the adapter includes an adapter septum.
5. The magazine assembly of claim 4, wherein the adapter septum is closed when the adapter does not engage the selected needle hub.
6. The magazine assembly of claim 4, wherein the adapter septum is open when the adapter engages the selected needle hub.

7. The magazine assembly of claim 6, wherein a proximal end of the selected needle hub compresses the adapter septum and provides a sealing surface.
8. The magazine assembly of claim 1, wherein the adapter includes an adapter cannula that is configured to pierce a septum of the medication pen to establish fluid communication with the medication pen.
9. The magazine assembly of claim 8, wherein a distal end of the adapter cannula is disposed in the adapter septum.
10. The magazine assembly of claim 1, wherein the magazine housing includes two magazine arrays disposed opposite each other, each magazine array includes the plurality of hub chambers.
11. The magazine assembly of claim 10, wherein
the magazine housing further comprises a storage bin that stores used needle hubs,
and
the storage bin is disposed between the two magazine arrays.
12. The magazine assembly of claim 1, wherein each magazine array includes eight hub chambers.
13. The magazine assembly of claim 1, wherein the enclosure includes a foil tab.
14. The magazine assembly of claim 1, wherein the magazine housing further comprises a storage bin that stores used needle hubs.
15. The magazine assembly of claim 14, wherein the storage bin is penetration resistant.
16. The magazine assembly of claim 14, wherein the storage bin is leak proof.

17. The magazine assembly of claim 14, wherein when used needle hubs are placed in the storage bin, the used needle hubs are inaccessible.
18. The magazine assembly of claim 14, wherein
the storage bin includes an adapter chamber that is configured to store the adapter,
and
when the adapter is disposed in the adapter chamber of the storage bin, the adapter seals the storage bin.
19. The magazine assembly of claim 18, wherein the adapter chamber is configured to engage an end cap.
20. The magazine assembly of claim 18, wherein the adapter chamber is sealed by one of the plurality of enclosures prior to use.
21. An adapter configured to engage a medication pen for medication delivery, the adapter comprising:
an adapter body having a proximal end and a distal end;
an adapter septum disposed between the proximal end and the distal end of the adapter body; and
an adapter cannula being fixed to the adapter body and is partially disposed within the adapter septum, wherein
when a needle hub is not engaged to the adapter body, the adapter septum is closed, and when the needle hub is engaged to the adapter body, the needle hub compresses the adapter septum and causes the adapter cannula to pierce the adapter septum to establish fluid communication with the needle hub.
22. A magazine that stores a plurality of needles configured to engage a medication pen for medication delivery, the magazine comprising:
a magazine housing enclosing
a plurality of hub chambers each enclosing one of a plurality of needle hubs;

a connector in each of the plurality of hub chambers, each connector engages one of the plurality of needle hubs; and

a plurality of enclosures each sealing the plurality of hub chambers, wherein a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, the medication pen engages the selected needle hub while disengaging the selected needle hub from the hub chamber, and the selected needle hub is removed from the magazine housing to prepare the medication pen for medication delivery.

23. A method of using a plurality of needles in a magazine assembly, the plurality of needles is configured to engage a medication pen via an adapter for medication delivery, the method comprising:

removing a selected enclosure of a plurality of enclosures to expose a selected needle hub of a plurality of needle hubs in a magazine housing;

attaching the adapter to the medication pen;

engaging the adapter to the selected needle hub; and

disengaging the selected needle hub from the magazine housing to prepare the medication pen for medication delivery.

AMENDED CLAIMS
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1. A magazine assembly that stores a plurality of needles configured to engage a medication pen via an adapter for medication delivery, the magazine assembly comprising:
 - a magazine housing enclosing
 - a plurality of hub chambers each enclosing one of a plurality of needle hubs;
 - a connector in each of the plurality of hub chambers, each connector engages one of the plurality of needle hubs; and
 - a plurality of enclosures each sealing the plurality of hub chambers, wherein a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, the adapter attaches to the medication pen to engage the selected needle hub while disengaging the selected needle hub from the hub chamber, and the selected needle hub is removed from the magazine housing to prepare the medication pen for medication delivery.
2. The magazine assembly of claim 1, wherein
 - the adapter includes an adapter body, and
 - a proximal end of the adapter body includes threads that are configured to engage the medication pen.
3. The magazine assembly of claim 2, wherein
 - a distal end of the adapter body includes an opening, and
 - the opening is configured to engage one of the plurality of needle hubs.
4. The magazine assembly of claim 1, wherein the adapter includes an adapter septum.
5. The magazine assembly of claim 4, wherein the adapter septum is closed when the adapter does not engage the selected needle hub.

6. The magazine assembly of claim 4, wherein the adapter septum is open when the adapter engages the selected needle hub.
7. The magazine assembly of claim 6, wherein a proximal end of the selected needle hub compresses the adapter septum and provides a sealing surface.
8. The magazine assembly of claim 1, wherein the adapter includes an adapter cannula that is configured to pierce a septum of the medication pen to establish fluid communication with the medication pen.
9. The magazine assembly of claim 8, wherein a distal end of the adapter cannula is disposed in the adapter septum.
10. The magazine assembly of claim 1, wherein the magazine housing includes two magazine arrays disposed opposite each other, each magazine array includes the plurality of hub chambers.
11. The magazine assembly of claim 10, wherein
the magazine housing further comprises a storage bin that stores used needle hubs,
and
the storage bin is disposed between the two magazine arrays.
12. The magazine assembly of claim 10, wherein each magazine array includes eight hub chambers.
13. The magazine assembly of claim 1, wherein the enclosure includes a foil tab.
14. The magazine assembly of claim 1, wherein the magazine housing further comprises a storage bin that stores used needle hubs.

15. The magazine assembly of claim 14, wherein the storage bin is penetration resistant.
16. The magazine assembly of claim 14, wherein the storage bin is leak proof.
17. The magazine assembly of claim 14, wherein when used needle hubs are placed in the storage bin, the used needle hubs are inaccessible.
18. The magazine assembly of claim 14, wherein
the storage bin includes an adapter chamber that is configured to store the adapter,
and
when the adapter is disposed in the adapter chamber of the storage bin, the adapter
seals the storage bin.
19. The magazine assembly of claim 18, wherein the adapter chamber is configured to
engage an end cap.
20. The magazine assembly of claim 18, wherein the adapter chamber is sealed by one of
the plurality of enclosures prior to use.
21. An adapter configured to engage a medication pen for medication delivery, the
adapter comprising:
an adapter body having a proximal end and a distal end;
an adapter septum disposed between the proximal end and the distal end of the
adapter body; and
an adapter cannula being fixed to the adapter body and is partially disposed within the
adapter septum, wherein
when a needle hub is not engaged to the adapter body, the adapter septum is closed,
and when the needle hub is engaged to the adapter body, the needle hub compresses the
adapter septum and causes the adapter cannula to pierce the adapter septum to establish fluid
communication with the needle hub.

22. A magazine that stores a plurality of needles configured to engage a medication pen for medication delivery, the magazine comprising:

a magazine housing enclosing

a plurality of hub chambers each enclosing one of a plurality of needle hubs;

a connector in each of the plurality of hub chambers, each connector engages one of the plurality of needle hubs; and

a plurality of enclosures each sealing the plurality of hub chambers, wherein

a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, the medication pen engages the selected needle hub while disengaging the selected needle hub from the hub chamber, and the selected needle hub is removed from the magazine housing to prepare the medication pen for medication delivery.

23. A method of using a plurality of needles in a magazine assembly, the plurality of needles is configured to engage a medication pen via an adapter for medication delivery, the method comprising:

removing a selected enclosure of a plurality of enclosures to expose a selected needle hub of a plurality of needle hubs in a magazine housing;

attaching the adapter to the medication pen;

engaging the adapter to the selected needle hub; and

disengaging the selected needle hub from the magazine housing to prepare the medication pen for medication delivery.

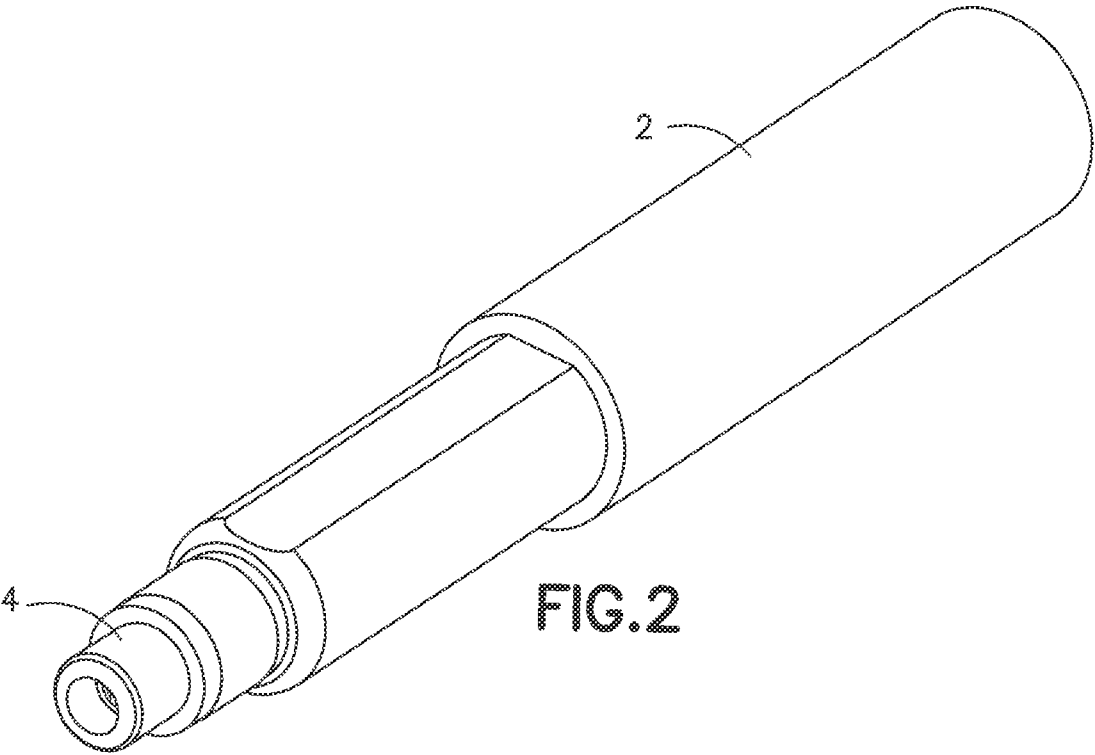
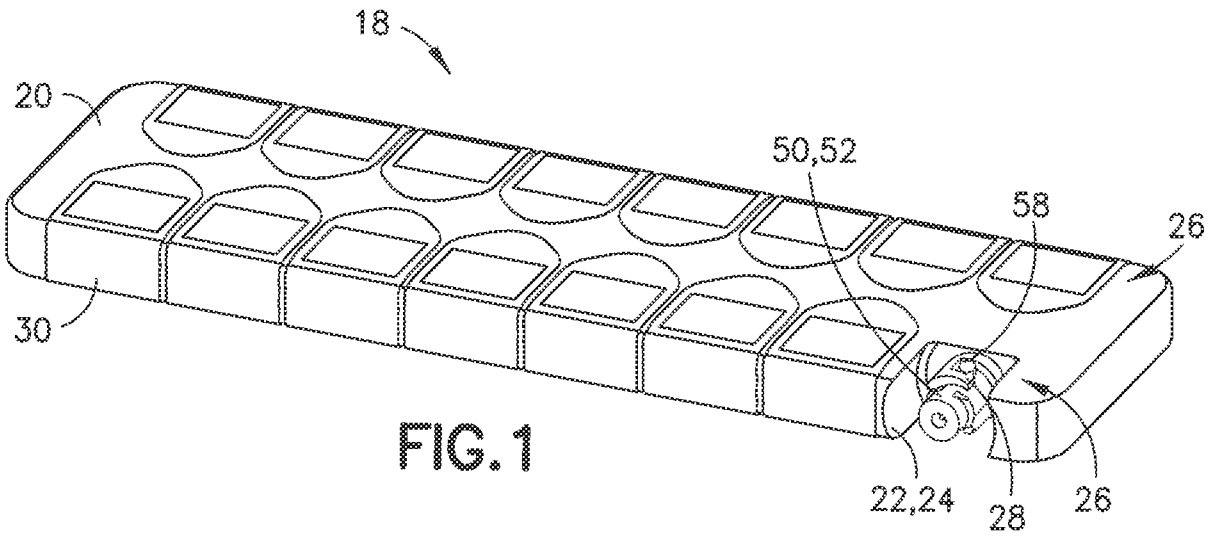
24. The magazine assembly of claim 1, wherein the plurality of hub chambers are grouped in pairs so that each pair of hub chambers is substantially in-line.

25. The magazine assembly of claim 14, wherein after use, the selected needle hub is disposed in the storage bin in an orientation where a centerline of one of the plurality of hub chambers is substantially perpendicular to a centerline of the selected needle hub.

Replacement Sheet

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26. The magazine assembly of claim 14, wherein the plurality of hub chambers and the storage bin are separate cavities.



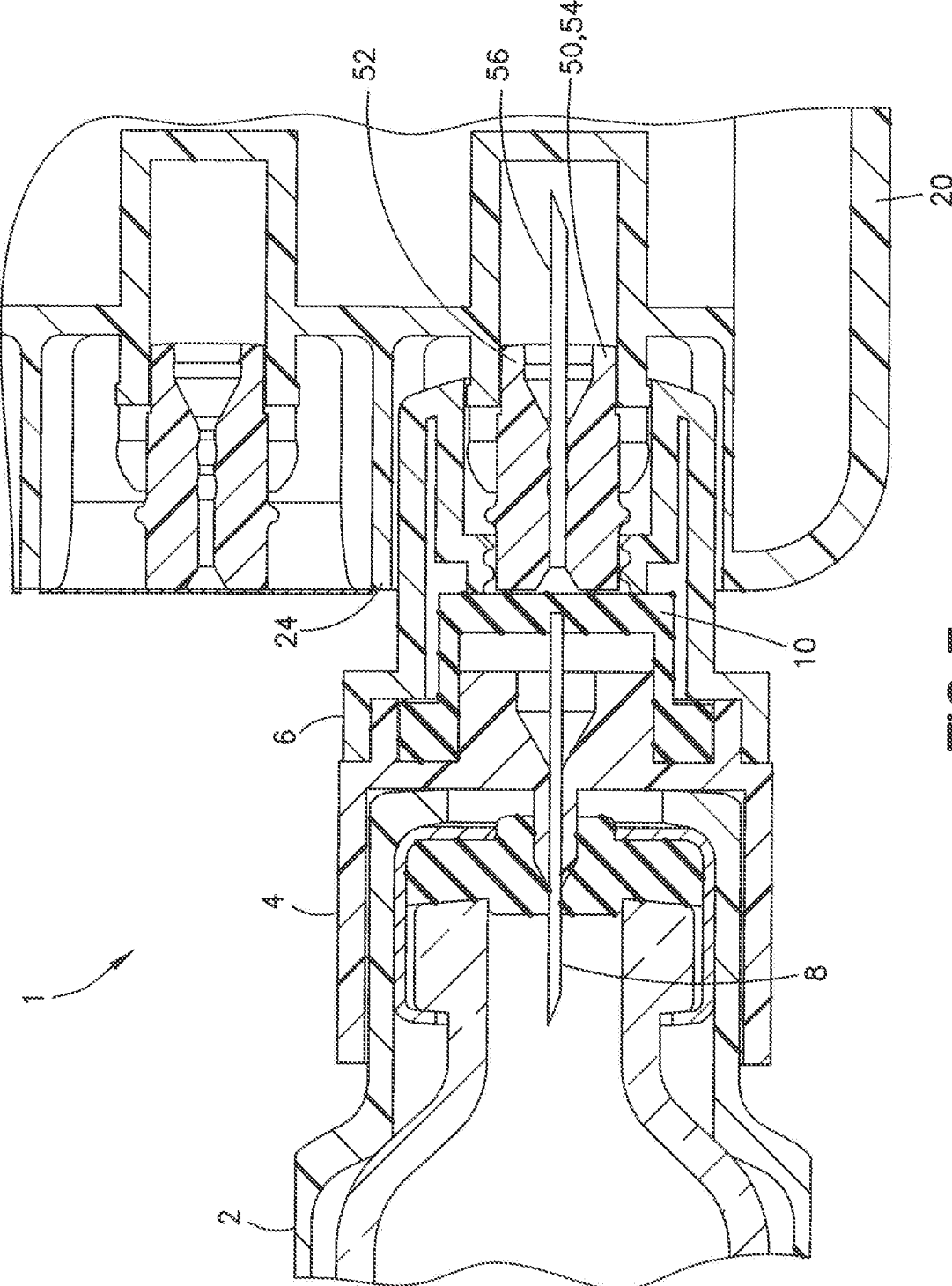


FIG. 3

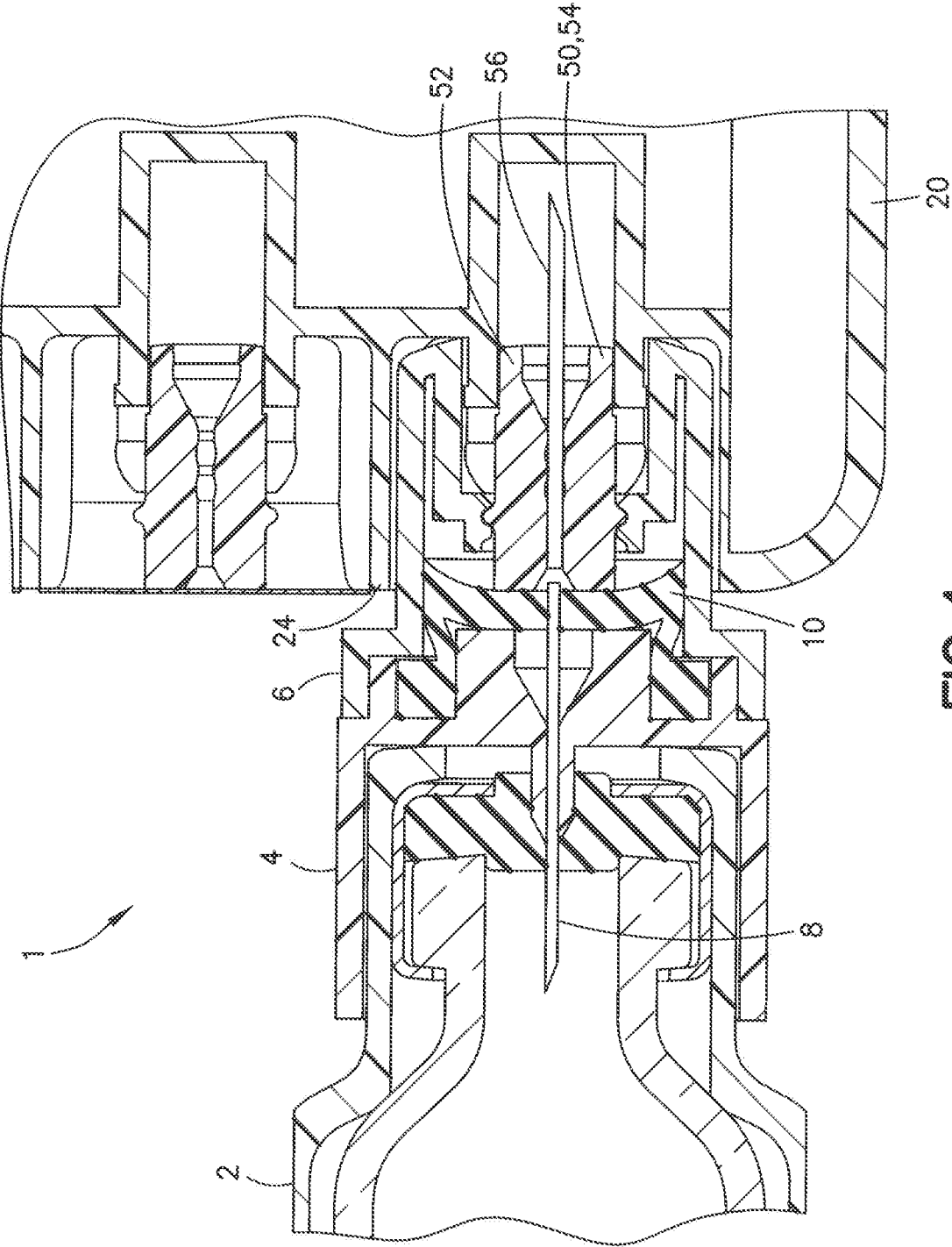
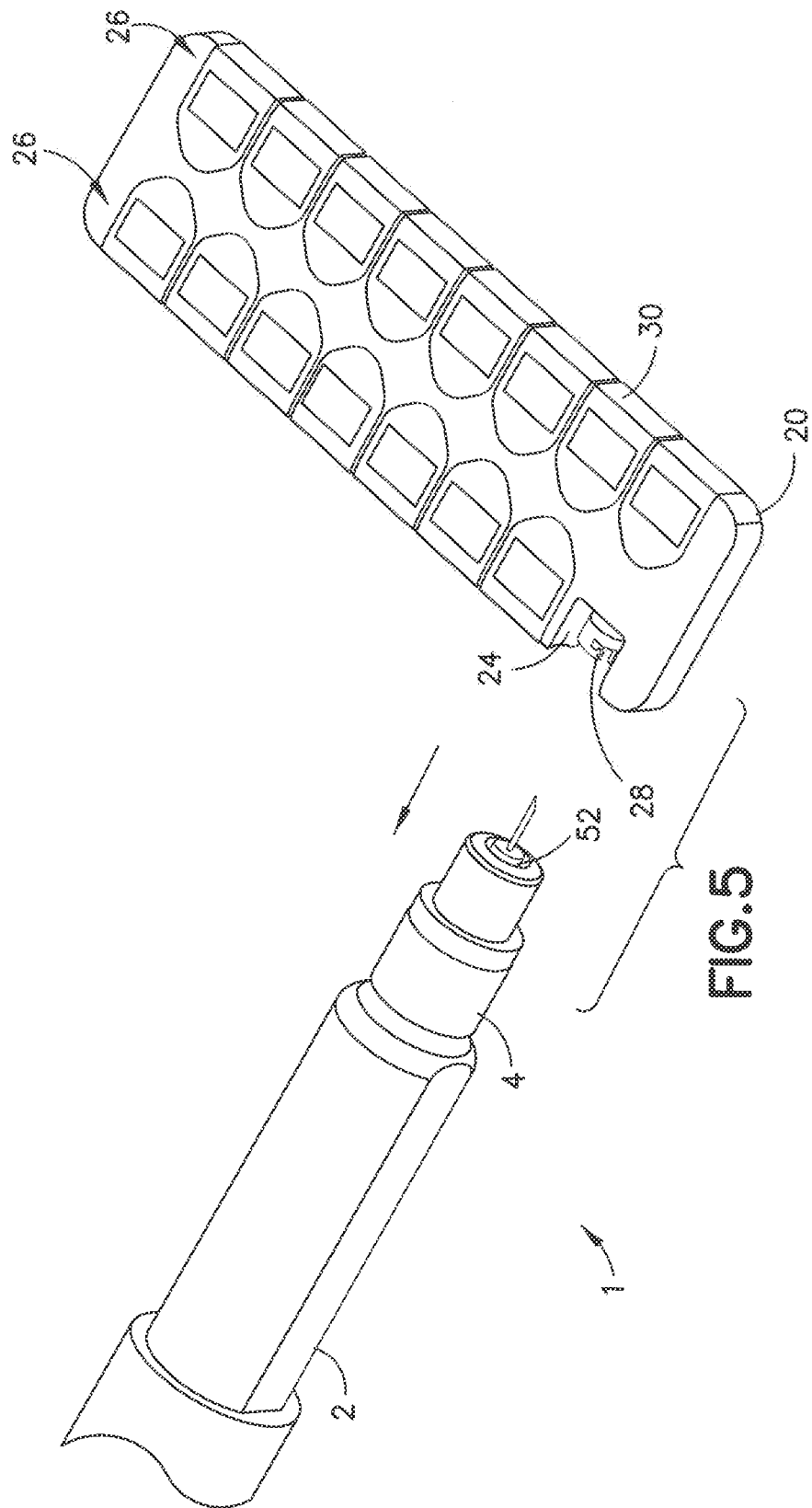
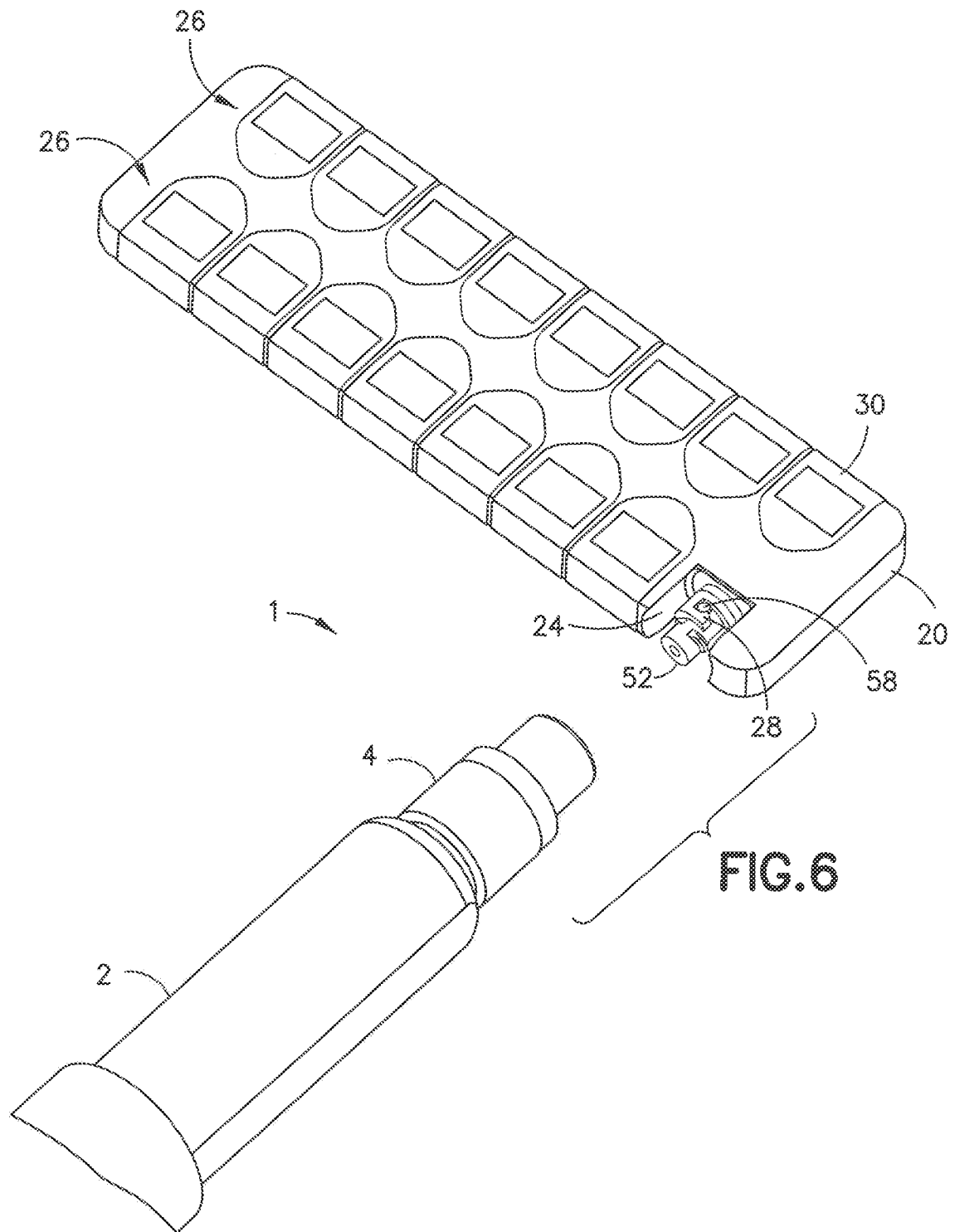


FIG. 4





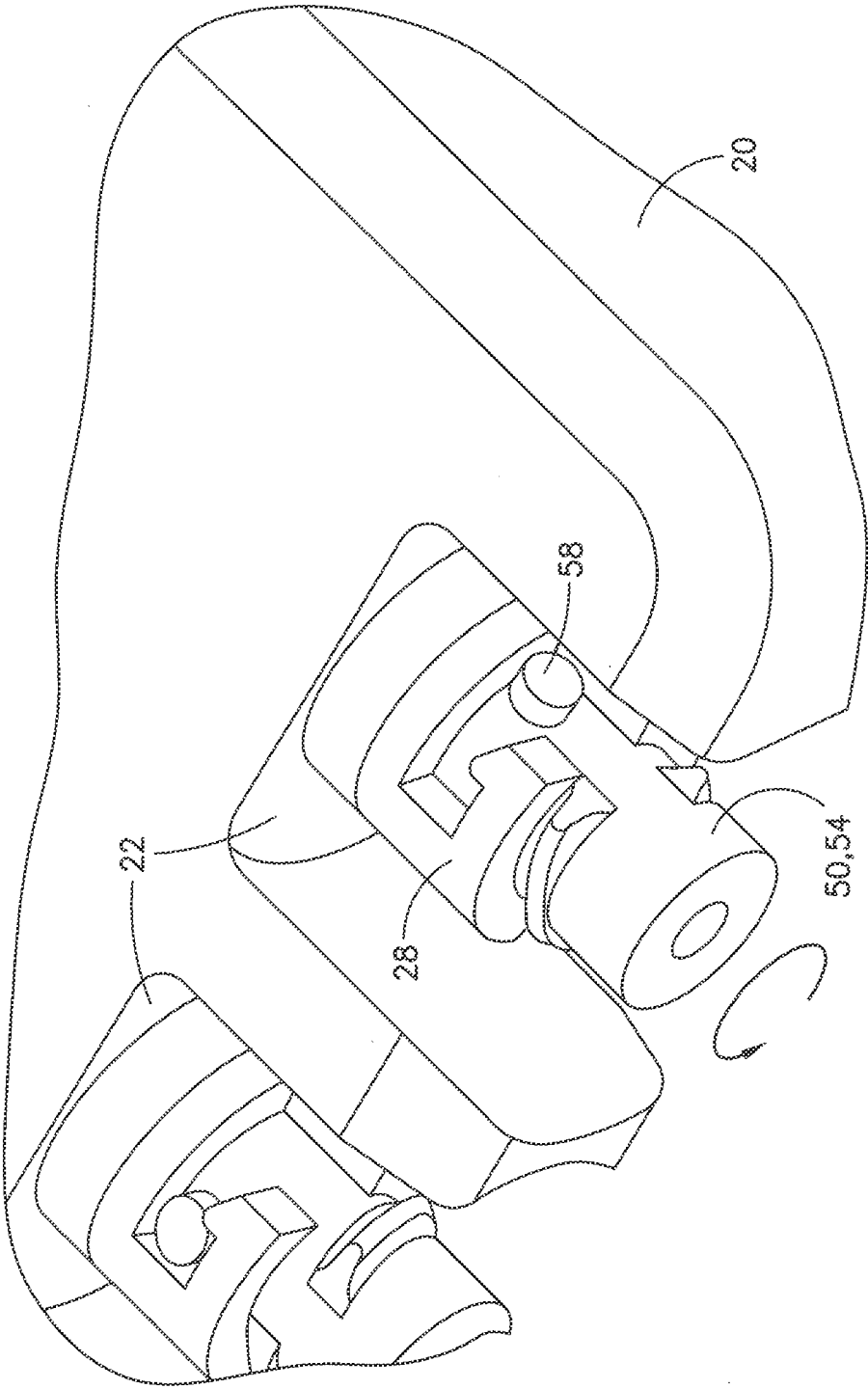


FIG. 7

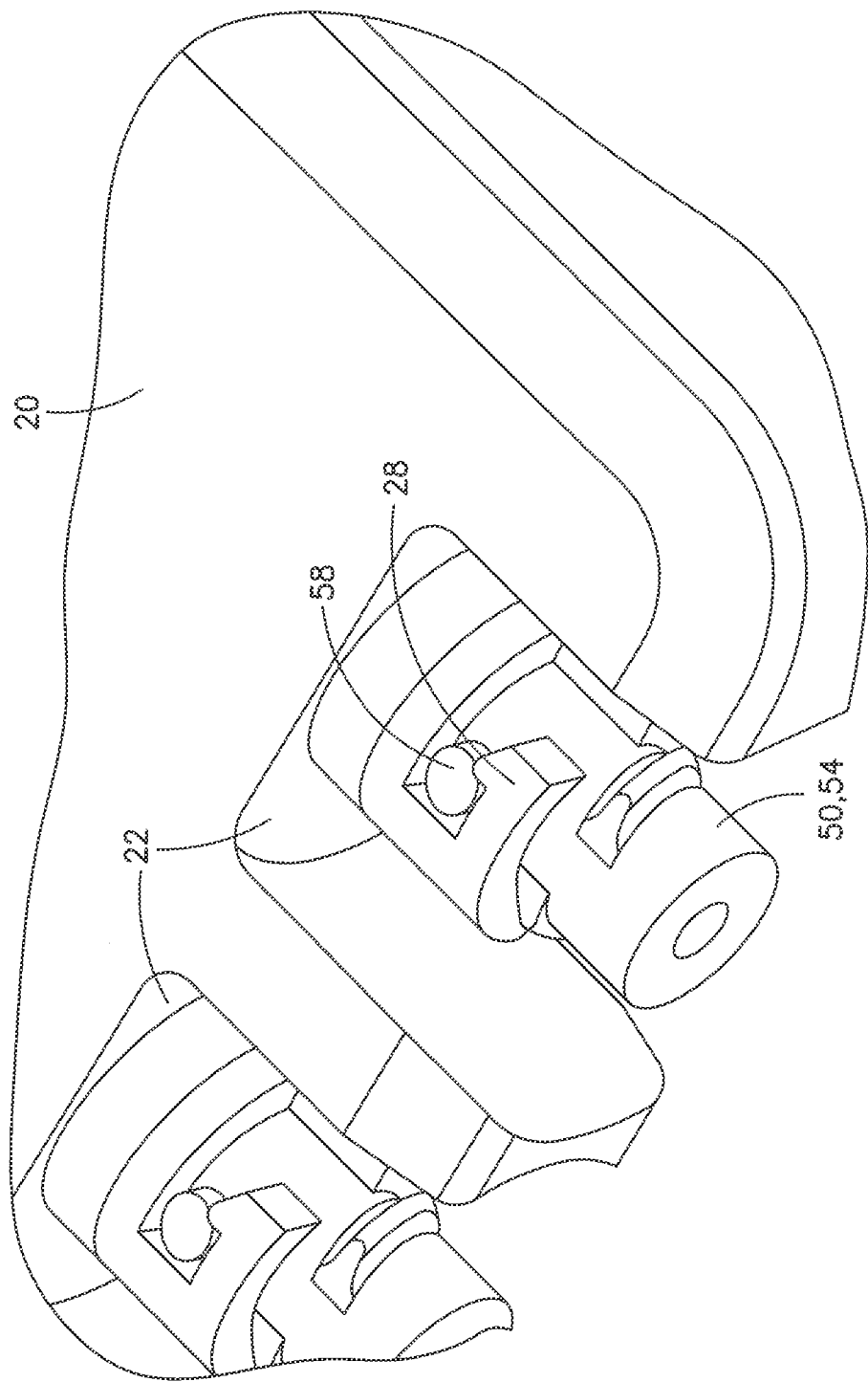


FIG. 8

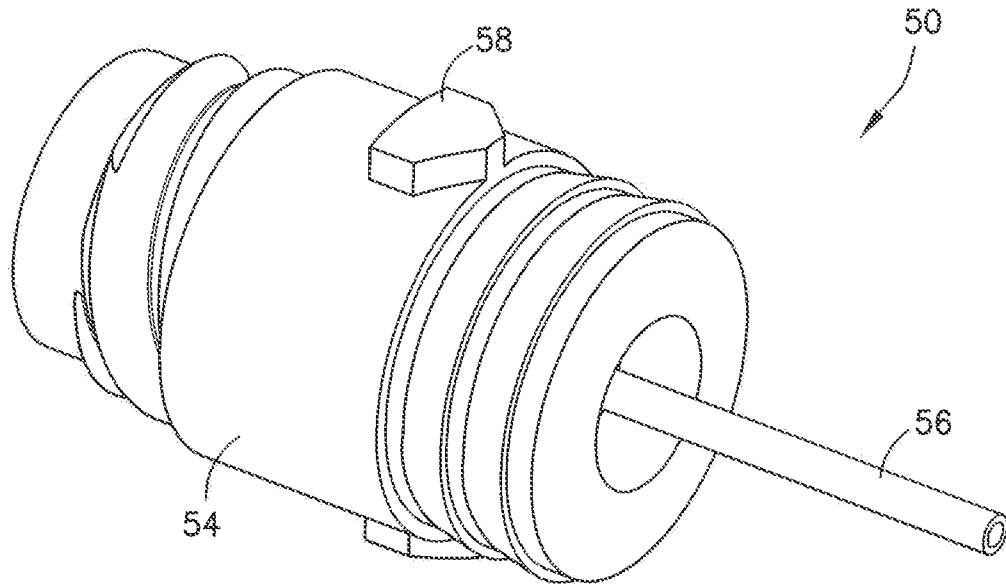


FIG. 9

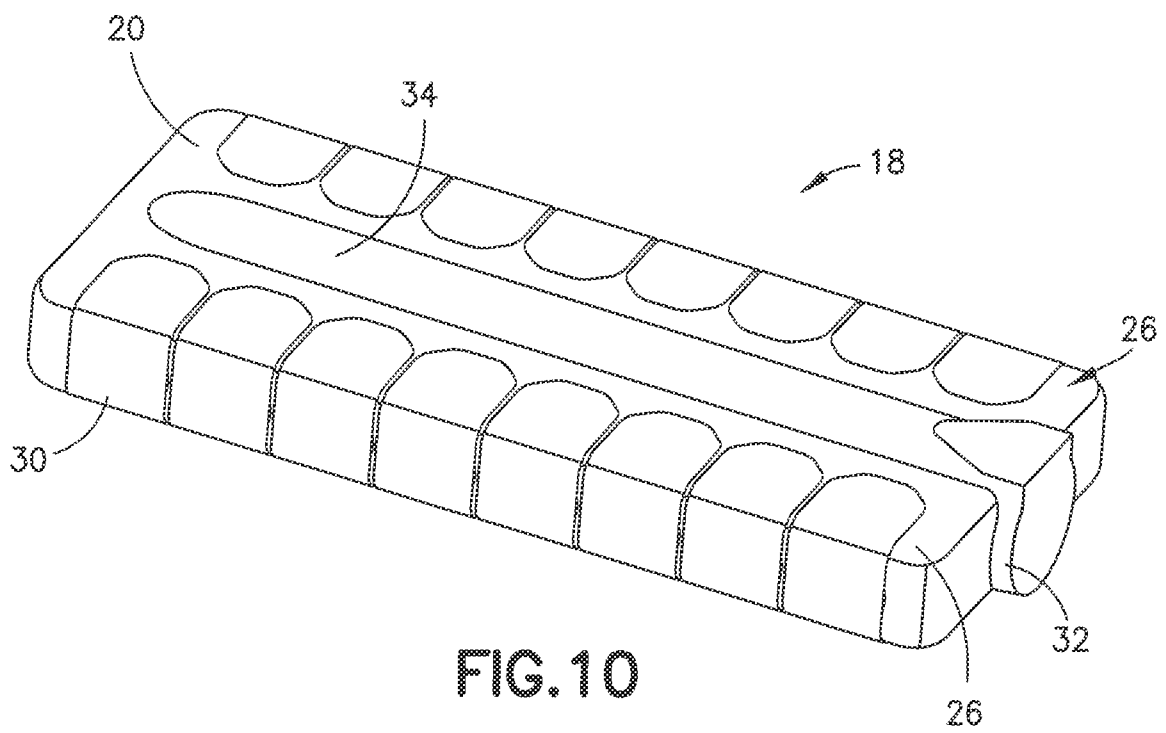


FIG. 10

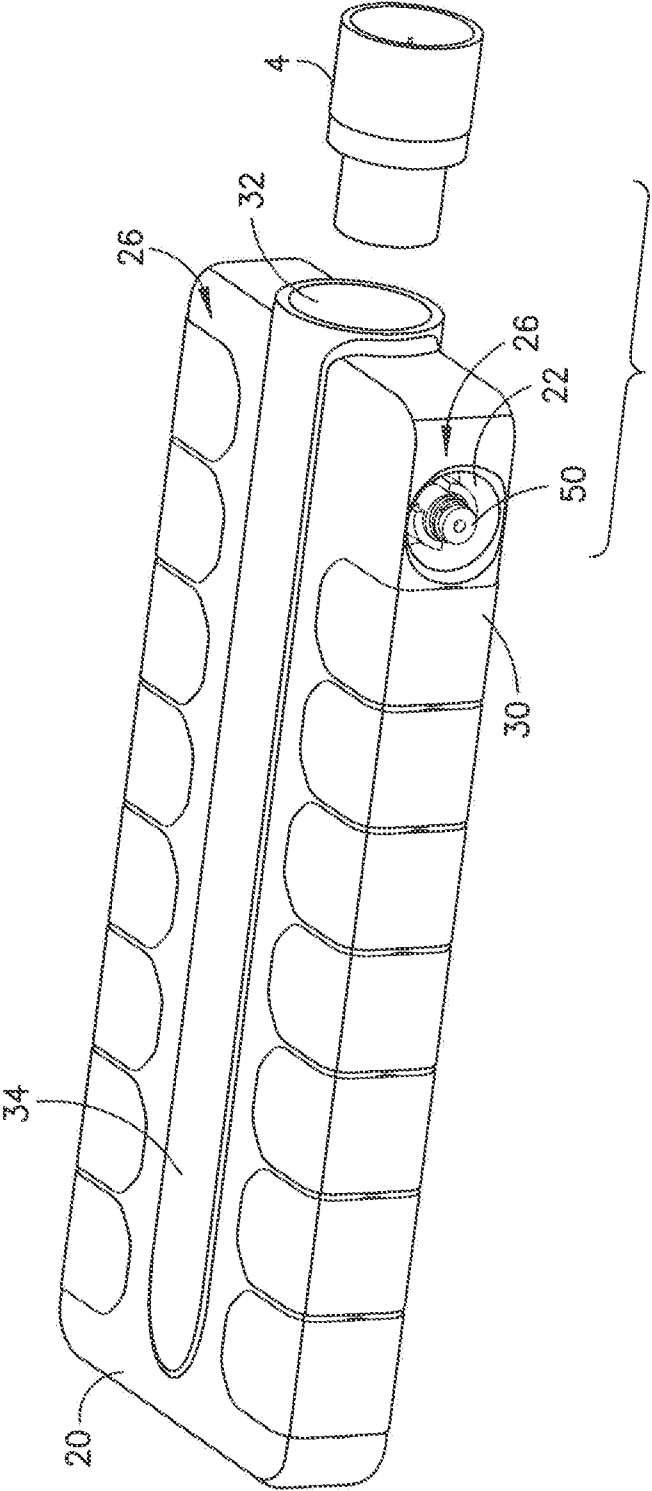


FIG. 11

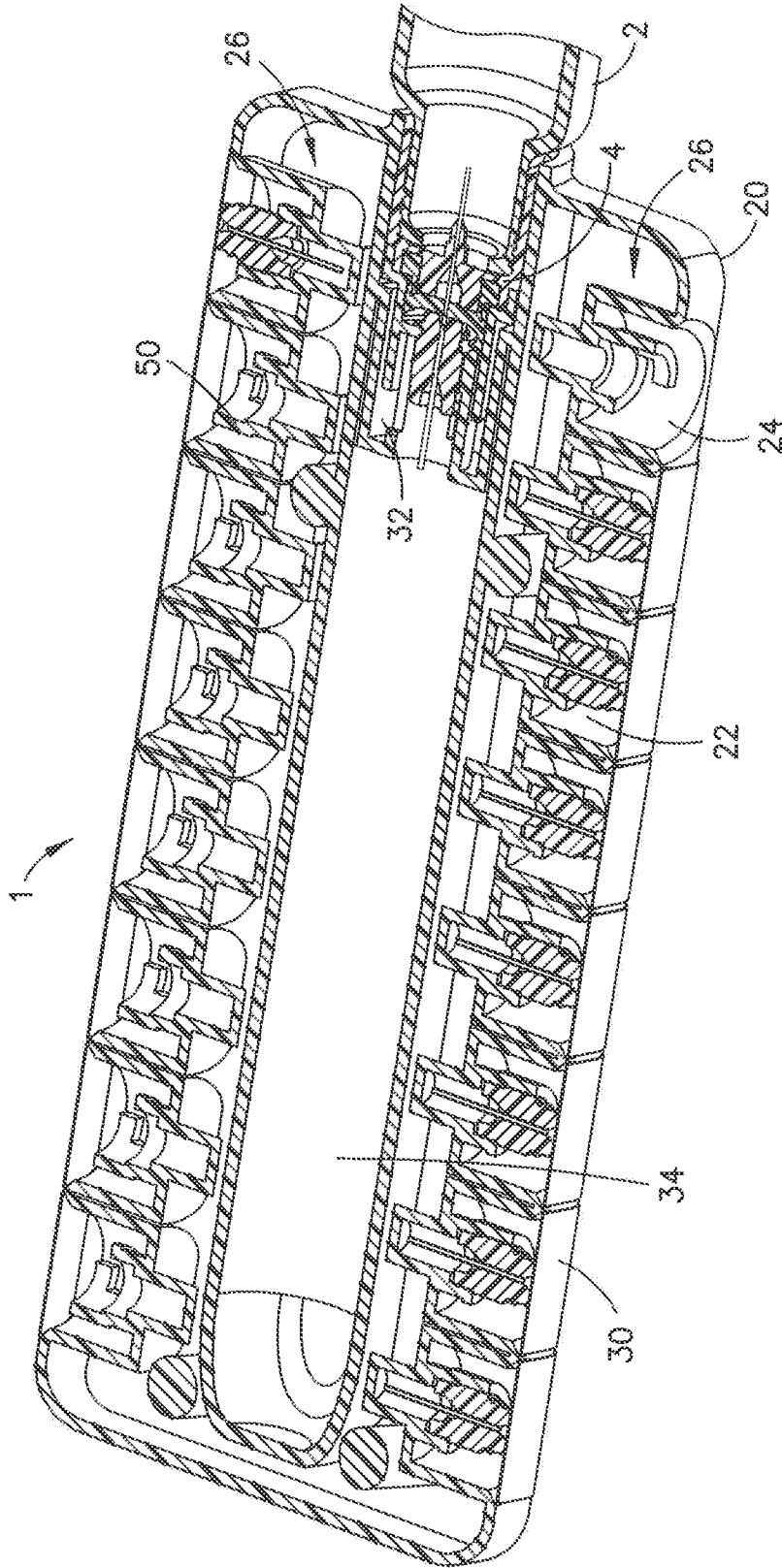


FIG.12

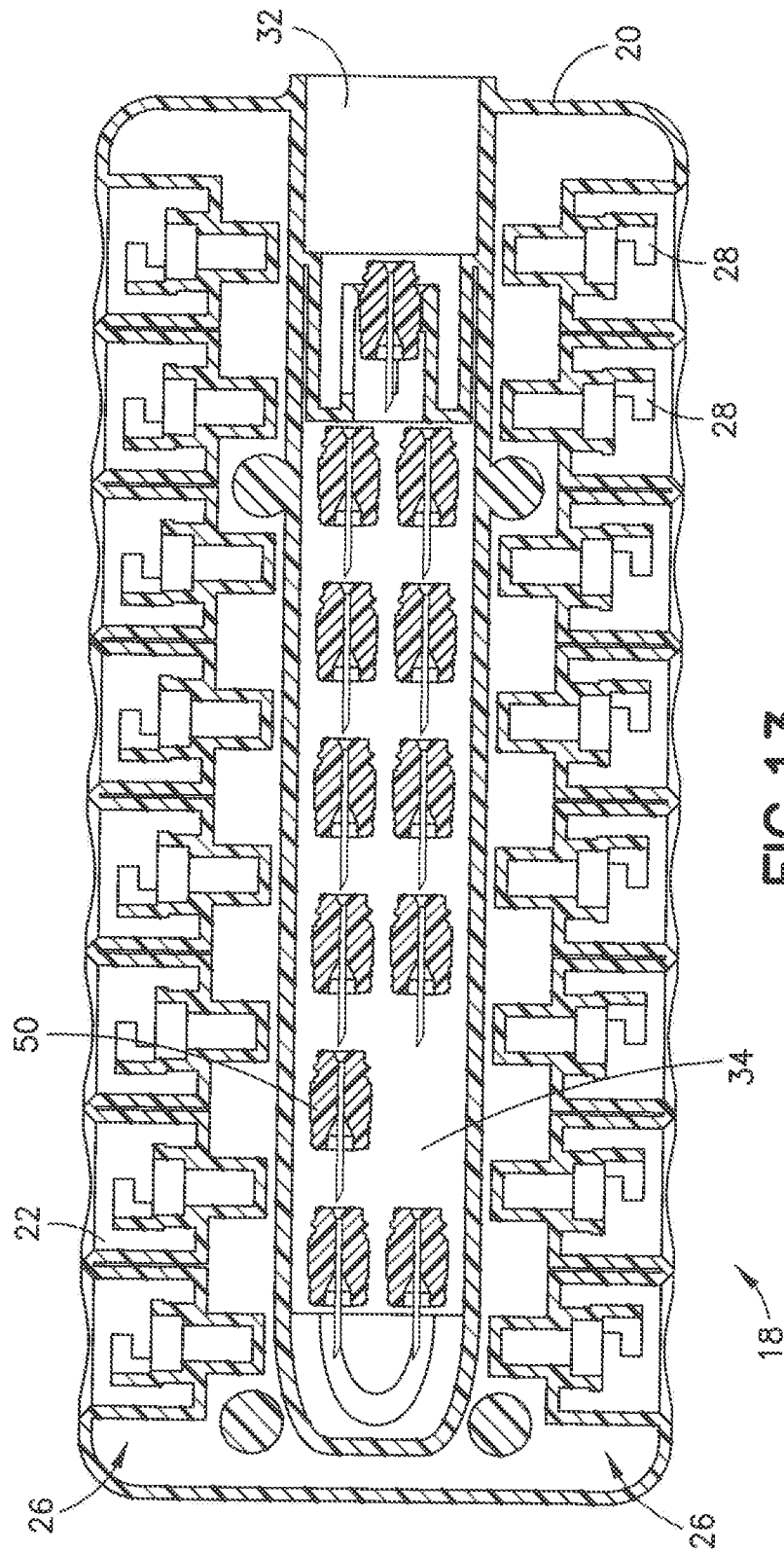


FIG.13

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US17/25471

A. CLASSIFICATION OF SUBJECT MATTER

IPC - A61M5/00, A61M5/32 (2017.01)

CPC - B65D83/02, A61M5/00, A61M5/00, A61M5/32, A61M5/2455, A61M5/008

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2001/0014792 A1 (WEST, R) 12 February 2002; figures 4 and 7	1-3, 10, 22, 23
Y		11-17
Y	US 2012/0041390 A1 (SPOOL, I et al.) 16 February 2012; paragraph [0056]	11, 13
Y	US 2014/0076758 A1 (DASBACH, U et al.) 20 March 2014; paragraph [0027]	12
Y	US 2011/0068034 A1 (HWANG, C et al.) 24 March 2011; figure 7, paragraph [0033]	14-17
A	US 5,931,817 A (NGUYEN, TV) 3 August 1999; entire reference	4-9
A	US 5,829,589 A (NGUYEN, TV) 3 November 1998; entire reference	4-9
A	US 2005/0084631 A1 (ANDERSON, B) 21 April 2005; entire reference	18-20
A	EP 2119423 A1 (DANNY TECHNICAL SERVICES STEVENS) 18 November 2009; entire reference	18-20
A	US 2014/0262884 A1 (APOTHECARY PRODUCTS, INC.) 18 September 2014; entire reference	18-20

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 June 2017 (29.06.2017)

Date of mailing of the international search report

14 AUG 2017

Name and mailing address of the ISA/

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Shane Thomas

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US17/25471

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fee must be paid.

Group I: Claims 1-20, 22, 23 are directed toward a magazine assembly, magazine, and method involving needle hubs in enclosures.

Group II: Claim 21 is directed toward an adapter configured to engage a medication pen for medication delivery.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

----See Supplemental Page----

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-20, 22, 23

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US17/25471

-Continued from Box III: Lack of Unity of Invention-

The special technical features of Group I include the magazine assembly comprising: a magazine housing enclosing a plurality of hub chambers each enclosing one of a plurality of needle hubs; a connector in each of the plurality of hub chambers, each connector engages one of the plurality of needle hubs; and a plurality of enclosures each sealing the plurality of hub chambers, wherein a selected enclosure of the plurality of enclosures is removed to expose a selected needle hub of the plurality of needle hubs, which are not present in Group II.

The special technical features of Group II include the adapter comprising: an adapter body having a proximal end and a distal end; an adapter septum disposed between the proximal end and the distal end of the adapter body; and an adapter cannula being fixed to the adapter body and is partially disposed within the adapter septum, wherein when a needle hub is not engaged to the adapter body, the adapter septum is closed, and when the needle hub is engaged to the adapter body, the needle hub compresses the adapter septum and causes the adapter cannula to pierce the adapter septum to establish fluid communication with the needle hub, which are not present in Group I.

The common technical features shared by Groups I and II are an adapter configured to engage a medication pen for medication delivery, wherein a needle hub may be engaged to the adapter body.

However, these common features are previously disclosed by US 2001/0014792 A1 to West, R et al. (hereinafter 'West'). West discloses an adapter configured to engage a medication pen for medication delivery, wherein a needle hub may be engaged to the adapter body (adapter 50 connects medication delivery pen 1 to pen needle assembly 100; figure 4; paragraph [0023]).

Since the common technical features are previously disclosed by the West reference, these common features are not special and so Groups I and II lack unity.