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DISPENSER SYSTEM

Abstract

A dispenser includes a front panel that is coupled to a body to at least partially define an interior cavity, an actuator that is rotatably coupled to the front panel at an actuator hinge, a support structure that is configured to receive a portion of a cartridge that contains a fluid to be dispensed, and a moving chassis that includes a spring post that is configured to receive a spring and an actuation dock that is configured to receive a lever arm of the actuator. The cartridge is configured to be installed in an inverted orientation within the interior cavity of the dispenser, and the cartridge includes a pump having a housing flange that is secured to a neck of the cartridge and a drive flange that is configured to move in relation to the housing flange.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] The present application is a continuation of U.S. application Ser. No. 18/237,073, filed on Aug. 23, 2023, which is a divisional application of U.S. application Ser. No. 17/496,192, filed on Oct. 7, 2021, each of which is incorporated by reference herein in its entirety.

BACKGROUND

Field of the Disclosure

[0002] The present disclosure relates to a dispenser system for dispensing a fluid comprising a dispenser and an adaptor configured to cooperate with the dispenser to support a cartridge containing fluid.

Description of the Background of the Disclosure

[0003] Dispensers are used in a wide variety of different environments, ranging from public bathrooms to office blocks, hotels, hospitals, restaurants, and other public or private establishments. Generally, dispensers consist of a dispenser housing and a refillable and/or replaceable reservoir containing the fluid product to be dispensed (e.g., a cartridge).

[0004] Depending on the location, the dispenser will likely be required to dispense a particular type of fluid product, such as, e.g., soap, sanitizing solution, shampoo, etc. Furthermore, it is important that the fluid product dispensed is of a required quality and/or grade. This is particularly important where hygiene is of high importance, such as, e.g., in a hospital setting, where it is important that only the expected fluid is dispensed from the dispenser.

[0005] To this end, dispensers may be configured to operate exclusively with cartridges containing the particular fluid desired, which often results in the dispenser having complex mechanisms with multiple components for preventing use of the dispenser with the wrong type of cartridge, i.e., an incompatible cartridge.

[0006] However, manufacturing a corresponding dispenser tailored for use exclusively with a particular cartridge type is costly and requires a large product range.

[0007] Furthermore, different grades or types of fluid products may be desired, which can require the replacement of the entire dispenser with a new dispenser that is compatible with the new cartridge, or replacement of mechanisms within the dispenser, both of which are costly and inefficient.

[0008] It is an aim of the present disclosure to address or mitigate at least some of these problems.

SUMMARY

[0009] In one aspect, an adaptor includes a central biased region including a central flex axis, a first distal biased region that is connected to the central biased region, and a second distal biased region that is connected to the central biased region. The first distal biased region includes a first distal flex axis and the second distal biased region includes a second distal flex axis. The first distal biased region and the second distal biased region are configured to be at least partially rotated about the central flex axis.

[0010] In some embodiments, the first distal biased region and the second distal biased region are configured to provide an identical range of rotation. In some aspects, the central biased region is configured to provide a different range of rotation than the second distal biased region. In some embodiments, the central biased region defines a first resistance, the first distal biased region defines a second resistance, and the first resistance is different from the second resistance. In some aspects, the central biased region is configured to allow a first pair of retention projections to move relative to each other.

[0011] In some aspects, the first pair of retention projections are spaced apart from the central biased region a first distance and spaced apart from each other a second distance. The first distance may be different from the second distance. In some embodiments, the second distance is configured to be increased by rotation of at least one of the pair of retention projections about the central flex axis.

[0012] In some embodiments, the first distal biased region is connected to the central biased region by a first leg, the second distal biased region is connected to the central biased region by a second leg, and a first catch is positioned on the first leg and a second catch is positioned on the second leg. In some aspects, the adaptor is a single, unitary device.

[0013] In another aspect, a dispenser includes a dispenser body that includes an interior cavity in which a first chassis is configured to be translated relative to a second chassis. Further, the dispenser includes an adaptor that has a central portion disposed between a first leg and a second leg. In some embodiments, the adaptor is configured to be received within a first chassis, and the adaptor includes a central flex axis that extends in a direction that is parallel with a direction in which the first chassis is configured to be translated.

[0014] In some aspects, the first chassis is configured to be translated in a vertical direction. In some embodiments, the first leg and the second leg each extend from opposing sides of the central portion. In some aspects, the adaptor is configured to be received within a U-shaped slot of the first chassis. In some embodiments, the first leg and the second leg are each configured to be rotated about the central flex axis. In some aspects, the central portion includes a first bias that is configured to resist movement of the first leg and the second leg about the central flex axis. In some embodiments, the adaptor is configured to be coupled to a pump drive flange of a cartridge containing a fluid to be dispensed.

[0015] In yet another aspect, a dispenser includes a dispenser body that has an interior cavity in which a first chassis is configured to be translated relative to a second chassis along a central axis. Further, the dispenser has a cartridge including a container and a pump that includes a drive flange defining a drive diameter. In addition, the dispenser includes an adaptor having a pair of legs that are configured to be coupled to the drive flange and the first chassis, and the adaptor and the drive flange are configured to prevent the drive flange from being translated independently of each other.

[0016] In some embodiments, the first leg of the adaptor includes first and second retention projections, the second retention projection being configured to contact the drive flange and the first retention projection being configured to contact the first chassis. In some aspects, the drive flange defines a diameter, the adaptor defines a retention width, and the diameter is configured to correspond to the retention width to achieve a snap-fit between the adaptor and the drive flange.

[0017] In some embodiments, an actuator is configured to be depressed to cause translation of the first chassis, the adaptor, and the drive flange in a first direction, at least one spring is configured to translate the first chassis, the adaptor, and the drive flange in a second direction opposite to the first direction, and the actuator is configured to be depressed in a third direction that is different from the first and second directions.

[0018] In still another aspect, a method of providing a dispenser for dispensing a fluid includes the provision of a dispenser body and the provision of a first adaptor that is configured to couple a first cartridge to the dispenser body. The first adaptor defines a first dimension that corresponds to a portion of the first cartridge. Further, the method includes the provision of a second adaptor that is configured to couple a second cartridge to the dispenser body. The second adaptor defines a second dimension that corresponds to a portion of the second cartridge. In some embodiments, the first dimension is different from the second dimension, and the first adaptor and the second adaptor are configured to be flexible.

[0019] In some embodiments, the first adaptor and the second adaptor are substantially identical to each other except for the first and second dimensions. In some aspects, the first cartridge and the second cartridge are different with respect to at least one of a pump, a cartridge body, and a fluid to

be dispensed. In some embodiments, the first dimension of the first adaptor does not correspond to the portion of the second cartridge and the second dimension of the second adaptor does not correspond to the portion of the first cartridge.

[0020] In some aspects, when the first adaptor is operably received within the dispenser body, the first cartridge is capable of dispensing a fluid. In some embodiments, only one of the first adaptor and the second adaptor can be operably received within the dispenser body. In some aspects, the dispenser body includes a front cover that is rotatably mounted to a back body about a first hinge axis and the front cover includes an actuator that is rotatable about a second hinge axis that is spaced apart from the first hinge axis.

[0021] In some embodiments, the actuator is configured to contact a moving chassis within the dispenser body when the front cover is mounted to the back body in a closed position. In some aspects, in the closed position, when the actuator rotates about the second hinge axis, the moving chassis translates within the dispenser body. In some embodiments, in the closed position, when the actuator rotates about the second hinge axis, the first adaptor or the second adaptor, translates with the moving chassis.

[0022] In another aspect, a dispenser system comprising a dispenser for dispensing a fluid is provided, the dispenser system comprising a dispenser body at least partially defining an interior of the dispenser which is configured to house a cartridge containing fluid to be dispensed. Further, the dispenser system includes a moving chassis that is configured for movement with respect to the body and an adaptor configured to be removably coupled to the moving chassis to form a support structure for supporting a cartridge of a predetermined type in the dispenser. To that end, the adaptor cooperates with the moving chassis of the dispenser to form a support structure for supporting a cartridge in the dispenser. Accordingly, a dispenser having a single moving chassis design can be adapted for use with a desired cartridge type by use of the adaptor. Accordingly, for a variety of cartridge types corresponding to a variety of fluid products, a single dispenser and moving chassis design can be used and adapted to be compatible with a particular cartridge type by the use of a corresponding adaptor. As a result, the dispenser is efficiently manufactured, cost effective, and consolidates a quantity of parts, while being capable of use with a variety of cartridge types.

[0023] In some embodiments, the adaptor and moving chassis are coupled together to form a support structure for supporting a particular cartridge type to maintain the integrity of the dispenser, such that users receive the expected fluid during use. In addition, when a cartridge becomes depleted, a full cartridge of identical type can replace the depleted cartridge for operable use within the dispenser. As such, the adaptor and the moving chassis are compatible with cartridge types and/or particular cartridges.

[0024] Furthermore, in the event that the dispenser is required to dispense a different type of fluid, the adaptor can be replaced with an alternative adaptor configured to support a different type of cartridge without the need to replace the entire moving chassis or dispenser. Accordingly, the dispenser can be reconfigured to operate with a different type of cartridge if required, and such reconfiguration can be carried out in place. Further, in the event of lost or damaged parts, the adaptor can be replaced without requiring replacement of the moving chassis or dispenser. This results in a versatile dispenser system of simple construction that can be reconfigured efficiently by maintenance professionals, which is more cost effective and less wasteful.

[0025] It will be appreciated that, by supporting the cartridge with the support structure, the cartridge is coupled to the moving chassis such that at least a portion of the cartridge is secured for movement with the moving chassis. The adaptor and the moving chassis are coupled together such that movement of the moving chassis with respect to the body causes movement of the adaptor with respect to the body. When a cartridge is supported by the support structure, movement of the moving chassis therefore causes corresponding movement of the cartridge.

[0026] In some embodiments, both the moving chassis and adaptor must be present in the dispenser

to support the cartridge of a predetermined type in the dispenser for dispensing. To that end, the moving chassis and the adaptor cooperate to support the cartridge of a predetermined type. Without either component, the support structure is not formed and the cartridge of a predetermined type cannot be supported in the dispenser for dispensing.

[0027] In some embodiments, the adaptor is configured to be removably coupled to the moving chassis such that movement of the moving chassis is translated directly into movement of the adaptor throughout an entire range of movement of the moving chassis. To that end, there is no lost motion between the moving chassis and the adaptor. In some embodiments, the moving chassis is configured for vertical movement when in normal use. In some embodiments, the moving chassis is not configured to be removed from the dispenser. In some embodiments, the moving chassis is configured to be permanently coupled to the dispenser body.

[0028] In some embodiments, the support structure defines an opening for receipt of said cartridge. In some embodiments, the adaptor is configured to flex in a direction toward and away from said opening. In some embodiments, the adaptor is configured to flex toward and away from an opening defined by the support structure that is configured for receipt of the cartridge. In this way, the adaptor is configured to flex toward and away from the cartridge when in use, thereby facilitating location of the cartridge in the support structure to effectively load the cartridge in the body. This provides a simple and effective way of loading the cartridge in the dispenser housing, while keeping the number of moving parts and overall component numbers comprising the support structure to a minimum. For example, since the adaptor is configured to flex, additional springs are not required, thereby reducing the number of components as well as the amount of metal required to construct the dispenser system.

[0029] In some embodiments, the adaptor is configured to flex relative to the moving chassis, when the adaptor is coupled to the moving chassis. In other words, from the frame of reference of the moving chassis, the adaptor is configured to flex when it is coupled to the moving chassis. The fluid may comprise a soap, shampoo, hand sanitizer, lotion, cleaning agent or other desired fluid. As used herein, the term “soap” is intended to include any liquid detergent or cleaning product suitable for being dispensed from a fluid dispenser.

[0030] In some embodiments, the support structure is configured to exclusively support a cartridge of a predetermined type. Accordingly, the dispenser system can be used exclusively with the correct cartridge type, ensuring that the fluid being dispensed is as required and expected.

[0031] In some embodiments, the adaptor is configured for snap-fit engagement with the cartridge. In some embodiments, the support structure is configured for snap-fit engagement with the cartridge. In this way, a simple and easy means of supporting the cartridge in the dispenser is provided. It will be appreciated that the snap-fit functionality of the adaptor with the cartridge is facilitated by the adaptor being configured to flex in a direction toward and away from the opening of the support structure.

[0032] In some embodiments, the adaptor comprises a catch element for engaging a corresponding portion of said cartridge. In this way, the corresponding portion of the cartridge is coupled to the support structure for movement with the moving chassis. In some embodiments, the catch element is biased toward engagement with said cartridge. This provides a simple and effective means of retaining the cartridge in place. In other words, the cartridge is more effectively coupled to the support structure.

[0033] In some embodiments, the adaptor comprises at least one resilient leg extending from a central portion, wherein the leg is configured to flex about the central portion. In some embodiments, the adaptor comprises a pair of resilient legs configured to flex about the central portion. Accordingly, the resilient leg facilitates flexing of the adaptor in a direction toward and away from the opening of the support structure. This provides an adaptor with a simple structure which is configured to flex. In some embodiments, the resilient leg comprises the catch element.

[0034] In some embodiments, the adaptor comprises a pair of legs arranged symmetrically about

the central portion. In some embodiments, each of the pair of legs comprises a catch element. Accordingly, the resilient legs are configured to flex toward and away from an axis of symmetry of the adaptor such that the catch elements are therefore arranged to move toward and away from the axis of symmetry.

[0035] When a cartridge is loaded in the dispenser and the adaptor is coupled to the moving chassis, the pair of legs, and hence the catch elements provided thereon, are configured to flex in a direction toward and away from the opening of the support structure, i.e., toward and away from the cartridge, e.g., a longitudinal axis of the cartridge. By providing opposing catch elements in this way, effective retention of the cartridge in place can be achieved. In some embodiments, a pair of catch elements are provided, for example diametrically opposite each other with respect to the axis of symmetry of the adaptor and/or opening of the support structure. Accordingly, the pair of catch elements can act to grip a portion of the cartridge to retain it in place.

[0036] In some embodiments, the catch element comprises a projection, projecting toward the axis of symmetry of the adaptor. In some embodiments, where a pair of catch elements are provided, the catch elements comprise projections configured to extend toward each other. In some embodiments, at least a portion of the leg comprises a bow shaped profile to facilitate flexing of the adaptor. Accordingly, the profile of the adaptor is formed to facilitate the flexing capability of the adaptor, such that no additional springs or components are required. This reduces the number of components required in the dispenser system and also reduces the amount of metal required to manufacture the dispenser. The bow shaped profile also facilitates snap-fit engagement of the catch with the cartridge. In some embodiments, the support structure comprises a retention arrangement for coupling the adaptor to the moving chassis. Accordingly, the adaptor and moving chassis are reliably coupled together.

[0037] In some embodiments, the retention arrangement comprises a snap-fit arrangement. In some embodiments, the retention arrangement is biased toward coupling of the adaptor and the moving chassis. Accordingly, a simple and effective way of coupling the adaptor and the moving chassis is provided. In some embodiments, the adaptor comprises a resiliently biased structure comprising a retention element for coupling to a corresponding retention element of the moving chassis, wherein the retention element of the adaptor and the corresponding retention element of the moving chassis comprise the retention arrangement.

[0038] In some embodiments, the retention arrangement comprises a projection and corresponding aperture. For example, the retention element of the adaptor may comprise a projection and the corresponding retention element of the moving chassis may comprise an aperture, or vice versa. In some embodiments, the retention element of the adaptor is provided at a free end of the resilient leg. In some embodiments, a retention element of the adaptor is provided at a free end of each resilient leg.

[0039] In some embodiments, the moving chassis and adaptor comprise a location arrangement for locating the adaptor in the correct position with respect to the moving chassis. Accordingly, correct positioning of the adaptor with respect to the moving chassis can be achieved. This facilitates correct location of the cartridge in the dispenser. In some embodiments, the location arrangement comprises a projection and corresponding aperture or recess. For example, the adaptor may comprise the projection and the moving chassis may comprise the aperture or recess, or vice versa.

[0040] In some embodiments, the moving chassis comprises a cavity for receipt of the adaptor. In some embodiments, the location arrangement comprises a locating element of the adaptor and a corresponding locating element of the cavity. In some embodiments, the locating element of the adaptor is provided by the central portion of the adaptor. This facilitates effective location of the adaptor with respect to the moving chassis.

[0041] In some embodiments, the location arrangement comprises a projection and corresponding aperture or recess. For example, the locating element of the adaptor may comprise a projection and the corresponding locating element of the cavity may comprise an aperture or recess, or vice versa.

In some embodiments, the adaptor is configured to be operatively coupled to the moving chassis such that the adaptor is secured for movement with the moving chassis, and the adaptor is configured to engage a portion of the cartridge, such that movement of the moving chassis is translated directly into movement of the portion of the cartridge throughout an entire range of movement of the moving chassis.

[0042] In some embodiments, the moving chassis and adaptor are configured to move together such that a portion of the cartridge which is supported by the moving chassis and adaptor moves together with the moving chassis and adaptor. In some embodiments, the cartridge is supported by the moving chassis and adaptor such that movement of the moving chassis is translated into movement of the portion of the cartridge throughout an entire range of movement of the moving chassis. Accordingly, there is no loss of motion between the portion of the cartridge and the moving chassis. This results in a consistent dose of fluid being dispensed from the dispenser.

[0043] In some embodiments, the adaptor comprises a single component. Accordingly, a dispenser system with a simple construction is provided. Furthermore, should the dispenser system need to be used with a different type of cartridge, this can be achieved simply by replacing a single component, i.e., the adaptor, for an adaptor corresponding to the desired cartridge type. This reduces the parts required for manufacture of the dispenser system in the first instance, and also reduces the number of parts that need to be replaced should a dispenser need to be reconfigured for use with a different cartridge type. This is more cost efficient and reduces waste.

[0044] In some embodiments, the adaptor is formed of a plastic material. This facilitates the resilient nature of the adaptor and also reduces the amount of metal required to produce the dispenser system. In some embodiments, the adaptor is a first adaptor configured to be removably coupled to the moving chassis to form a support structure for supporting a first cartridge in the dispenser, and the dispenser system further comprises a second adaptor configured to be removably coupled to the moving chassis to form a support structure for supporting a second cartridge, different to the first cartridge, in the dispenser, wherein the first adaptor and second adaptor are arranged to be interchangeably coupled to the moving chassis.

[0045] In a further aspect, a dispenser assembly is provided comprising a dispenser system as disclosed herein and a cartridge containing fluid to be dispensed. In some embodiments, the cartridge further comprises a pump configured to dispense fluid from the cartridge, the pump comprising a movable component (e.g., comprising a piston) which is configured to be supported by the support structure for movement with the moving chassis.

[0046] In some embodiments, the cartridge comprises a pump having a movable component and a fixed component configured such that movement of the movable component with respect to the fixed component generates a pumping action to dispense fluid from the cartridge. By supporting the movable component of the cartridge in the support structure, the movable component is coupled for movement with the moving chassis, such that the pump action of the cartridge pump is achieved and fluid dispensed from the cartridge.

[0047] In some embodiments, the cartridge comprises a fixed portion (e.g., comprising a cylinder of the pump) wherein the dispenser system is configured to retain the fixed portion of said cartridge against movement with respect to the dispenser housing. In some embodiments, the dispenser itself retains the fixed portion of the cartridge against movement. For example, the cartridge may comprise a cartridge body located in the dispenser body, wherein the dispenser body itself (e.g., an outer wall of the dispenser body) prevents movement of the cartridge body with respect to the body.

[0048] In some embodiments, the fixed portion comprises a fixed portion of the cartridge pump. In some embodiments, the dispenser system (e.g., the support structure) comprises a static component configured to retain the fixed portion of the cartridge against movement with respect to the dispenser body. In some embodiments, the static component is integral with the dispenser body.

[0049] In some embodiments, the cartridge and dispenser system (e.g., the support structure)

comprise complimentary guide formations, such that the cartridge can only be loaded in the dispenser in a predetermined orientation. Accordingly, incorrect loading of the cartridge in the dispenser housing is prevented or inhibited.

[0050] In a further aspect, a dispenser includes a body defining an interior of the dispenser which is configured to house a cartridge containing a fluid to be dispensed. Further, the dispenser includes a moving chassis configured for movement with respect to the dispenser body, a first adaptor configured to be removably coupled to the moving chassis to form a support structure for supporting a first cartridge in the dispenser, and a second adaptor configured to be removably coupled to the moving chassis to form a support structure for supporting a second cartridge, different to the first cartridge, in the dispenser. The first adaptor and second adaptor are arranged to be interchangeably coupled to the moving chassis. To that end, the moving chassis is arranged to cooperate with both the first adaptor and the second adaptor, interchangeably. The first adaptor, which is configured for operation with a first cartridge, can be replaced with the second adaptor, which is configured for operation with a first cartridge, without needing the entire moving chassis or dispenser to be replaced, and vice versa.

[0051] Each of the first and second adaptors co-operates with the moving chassis of the dispenser to form a respective support structure for supporting a respective type of cartridge in the dispenser. Accordingly, a dispenser having a single moving chassis design can be adapted for use with a desired cartridge type via use of the adaptor. Consequently, for a given range of cartridges, e.g., corresponding to a given range of fluid products, a single dispenser and moving chassis design can be used and adapted to be compatible with a particular cartridge via a corresponding adaptor. This is simple to manufacture, more cost effective, and less wasteful.

[0052] The dispenser system can be easily re-configured to operate with a different type of cartridge if required. For example, it may be that the first cartridge comprises a first fluid type and the second cartridge comprises a second fluid type. This results in a versatile dispenser system of simple construction that can be easily re-configured to operate with different cartridges with minimal changes to the system, which is more cost effective and less wasteful. Furthermore, use of the first and second adaptors ensures that only corresponding cartridges can be used with the dispenser, ensuring that the quality, grade, and/or type of fluid dispensed is as required.

[0053] In some embodiments,, the first adaptor comprises a first retention element for coupling the first adaptor to the moving chassis and the second adaptor comprises a second retention element for coupling the second adaptor to the moving chassis, wherein the moving chassis comprises a corresponding retention element which corresponds to the first retention element of the first adaptor and which also corresponds to the second retention element of the second adaptor, such that the first retention element and the second retention element are arranged to be interchangeably coupled to the corresponding retention element of the moving chassis. To that end, the moving chassis comprises a single retention element structure, which corresponds to both the first retention element of the first adaptor and also the second retention element of the second adaptor, such that the moving chassis is compatible with both the first and second adaptors. In other words, only a single design of moving chassis is required that is compatible with both the first and second adaptor retention elements.

[0054] In some embodiments, the moving chassis comprises a cavity for receipt of the first and/or second adaptor, wherein the first adaptor and second adaptor are arranged to be interchangeably located in the cavity. To that end, the cavity of the moving chassis is configured to cooperate with both the first and second adaptors, such that a single design of moving chassis can be used with both the first and second adaptors.

[0055] In some embodiments, the first adaptor comprises a first catch element for engaging a corresponding portion of said first cartridge, the second adaptor comprises a second catch element for engaging a corresponding portion of said second cartridge, and the first catch element of the first adaptor and the second catch element of the second adaptor are different. To that end, the first

adaptor comprises a catch element that is configured to engage a first cartridge and the second adaptor comprises a catch element that is configured to engage a second cartridge. The catch elements of the first adaptor and the second adaptor are different such that they are configured to support different types of cartridge. This allows the dispenser system to support different cartridge types simply by changing the adaptor which is coupled to the moving chassis. This means that a single dispenser body and moving chassis design can be used to house a range of cartridge types. Only a corresponding adaptor will be required which is compatible with the desired cartridge type. Accordingly, a versatile dispenser system is provided which reduces manufacturing requirements and also reduces cost and waste of materials.

[0056] In some embodiments, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12 cartridge types may be included in a particular product range, for example, corresponding to different fluids. Accordingly, a corresponding number of adaptors can be provided. It will be appreciated that any number of cartridge types, configurations, or sizes may be included in a given product range and that corresponding adaptors can be provided for each cartridge type. In some embodiments, cartridges of the different types may include the same fluid but differing fluid volumes.

[0057] In some embodiments, the dispenser system comprises one or more additional adaptors configured to be removably coupled to the moving chassis to form a corresponding support structure for supporting a respective cartridge, wherein the first, second, and one or more additional adaptors are arranged to be interchangeably coupled to the moving chassis.

[0058] In a further aspect, a dispenser assembly is provided comprising a dispenser system as disclosed herein, a first cartridge containing a fluid to be dispensed and a second cartridge containing a fluid to be dispensed. In some embodiments, the first and second cartridges each comprise a pump configured to dispense fluid from the respective cartridge, the pump comprising a movable component (e.g., a piston) which is configured to be supported by the respective support structure for movement with the moving chassis.

[0059] In some embodiments, the first and second cartridges each further comprise a fixed portion (e.g., a cylinder of the pump) wherein the dispenser system is configured to retain the fixed portion of said respective cartridge against movement with respect to the dispenser housing. In some embodiments, the first and second cartridges and the dispenser system (e.g., the respective support structure) comprise complimentary guide formations, such that the first and second cartridge can only be loaded in the dispenser in a predetermined orientation.

[0060] In some embodiments, the support structure for a respective cartridge is configured to support a first portion of the cartridge for movement with the moving chassis, and the dispenser system is configured to retain a second portion of the cartridge against movement with respect to the dispenser housing. In some embodiments, the first portion comprises the moveable component of a pump coupled to the cartridge. In some embodiments, the second portion comprises a body of the cartridge. In some embodiments, the second portion comprises a fixed portion of the pump.

[0061] In some embodiments, the dispenser system comprises a static component that is configured to retain the second portion of the cartridge against movement with respect to the dispenser housing, wherein the moving chassis is biased away from the static component. In some embodiments, the dispenser itself retains the second portion of the cartridge against movement. For example, the cartridge may comprise a cartridge body located in the dispenser body, wherein the dispenser body itself (e.g., an outer wall of the dispenser body) prevents movement of the cartridge body with respect to the body.

[0062] In some embodiments, the fixed portion comprises a fixed portion of the cartridge pump. In some embodiments, the dispenser system (e.g., the support structure) comprises a static component configured to retain the fixed portion of the cartridge against movement with respect to the dispenser body. In some embodiments, the static component is integral with the dispenser body. Accordingly, the total number of components required to manufacture the dispenser system is kept to a minimum. In some embodiments, the moving chassis is provided by a single component.

Accordingly, the total number of components required to manufacture the dispenser system is kept to a minimum.

[0063] In some embodiments, the dispenser comprises an actuator operatively coupled to the moving chassis, such that in use, fluid is dispensed from the dispenser upon actuation of the actuator. In some embodiments, the moving chassis is configured for movement in a first direction with respect to the dispenser body, and the actuator is configured for movement in a second direction, different to the first direction.

[0064] For example, the actuator may be a push button configured to actuate movement of the moving chassis up on the application of a force by a user. Alternatively, the dispenser actuator may be a sensor arrangement, such as a proximity sensor, configured to actuate the dispenser once a user comes within a predetermined distance of the sensor. It will be appreciated that any suitable actuator may be used.

[0065] In another aspect, an assembly includes a cartridge containing fluid to be dispensed and an adaptor configured to be removably coupled to a dispenser to form a support structure for supporting the cartridge in said dispenser. In some embodiments, the adaptor is configured to flex to facilitate coupling of the adaptor to the cartridge.

[0066] In still another aspect, an adaptor is provided for use with a dispenser for dispensing fluid and a cartridge containing a fluid to be dispensed, wherein the adaptor is configured to be removably coupled to the dispenser to form a support structure for supporting said cartridge in the dispenser. In some embodiments, the adaptor is configured to flex to facilitate coupling of the adaptor to said cartridge.

[0067] In another aspect, a dispenser includes a body defining an interior of the dispenser that is configured to house a cartridge containing fluid to be dispensed. Further, the dispenser includes a moving chassis configured for movement with respect to the dispenser body. The moving chassis is configured to be removably coupled to an adaptor to form a support structure for supporting a first portion of a cartridge in the dispenser.

[0068] In some embodiments, the dispenser is configured such that movement of the moving chassis is translated directly into movement of the first portion of the cartridge throughout an entire range of movement of the moving chassis.

[0069] It will be appreciated that the features described herein may apply to any aspect disclosed herein. All combinations contemplated are not recited explicitly for the sake of brevity.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0070] Embodiments will now be described, by way of example only and with reference to the accompanying drawings, in which:

[0071] FIG. 1 is a perspective view of an embodiment of a dispenser assembly when in a closed position;

[0072] FIG. 2 is a perspective view of the dispenser assembly of FIG. 1 when in an open position and with a cartridge being depicted in a pre-loaded state;

[0073] FIG. 3 shows a perspective view of the dispenser assembly of FIG. 1 when in the open position and with the cartridge of FIG. 2 being depicted in a loaded state;

[0074] FIG. 4 is an enlarged view of the region B of the dispenser assembly and the cartridge of FIG. 3;

[0075] FIG. 5 is a perspective view of a first adaptor of the dispenser assembly of FIG. 1;

[0076] FIG. 6 is a perspective view of the first adaptor and a moving chassis of the dispenser assembly of FIG. 1, the first adaptor being depicted in a pre-installation state;

[0077] FIG. 7 is a front elevational view of the moving chassis and the first adaptor of the

dispenser assembly of FIG. 6, the first adaptor being depicted in an installed state;
[0078] FIG. 8 is a cross-sectional plan view of the first adaptor and the moving chassis of the dispenser assembly taken along the line 8-8 of FIG. 7;
[0079] FIG. 9 shows a perspective view of a second adaptor of the dispenser assembly of FIG. 1;
[0080] FIG. 10 shows a perspective view of a third adaptor of the dispenser assembly of FIG. 1;
[0081] FIGS. 11-13 show cross sectional views of the operation of a cartridge pump of the dispenser assembly of FIG. 1;
[0082] FIG. 14 is a cross sectional view of the operation of the dispenser assembly of FIG. 1; and
[0083] FIG. 15 is a perspective view of the moving chassis being depicted with shot restrictors installed thereon.

DETAILED DESCRIPTION

[0084] The present disclosure is directed to a dispenser assembly for dispensing fluid. The dispenser assembly includes a dispenser housing and a fluid cartridge. While the embodiments of the present disclosure may take many different forms, several embodiments are discussed herein with the understanding that the present disclosure is to be considered as exemplary, and it is not intended to limit the invention to the embodiments illustrated.

[0085] Further, the fluid discussed herein may comprise a soap, shampoo, hand sanitizer, lotion, cleaning agent or other desired fluid. Further, the term “fluid” as used herein is intended to include both viscous and non-viscous fluids, as well as fluids of pure concentrate, mixtures, chemicals, naturally occurring fluids, and any other fluid capable of being dispensed. As used herein, the term “soap” is intended to include any liquid detergent or cleaning product suitable for being dispensed from a fluid dispenser. Additives may be included in the fluid and/or soap, such as, for example, fragrances, preservatives, moisturizers, dyes, and particulates, among others.

[0086] Referring to the drawings, FIGS. 1 and 2 illustrate a dispenser assembly 100 including a dispenser 110 for accommodating a refill or cartridge 120. The dispenser 110 is configured for dispensing a fluid. The fluid may comprise a soap, shampoo, hand sanitizer, lotion, cleaning agent or other desired fluid.

[0087] As illustrated in FIGS. 1 and 2, the dispenser 110 is configured to contain and operably engage the cartridge 120 containing fluid to be dispensed. In the illustrated embodiment, the cartridge 120 is a bottle type container, but other types of cartridges are included within the scope of this disclosure, such as, e.g., bags, liners, rigid and non-rigid containers, and thin-walled and thick-walled containers, among others.

[0088] As illustrated in FIGS. 1 and 2, the dispenser 110 includes a cover or front panel 130 and a body 140 that includes a sidewall 144 extending from a backplate 148 to at least partially define an interior cavity 152 of the dispenser 110. The body 140 includes a bottom end 156 that is opposite a top end 160, a front end 164 that is opposite a rear end 168, and opposing sides 172. In the illustrated embodiment, the front panel 130 is disposed at the front end 164, the backplate 148 is disposed at the rear end 168, and the sidewall 144 extends between the front end 164 and the rear end 168. In some implementations, the sidewall 144 is provided as being translucent and transparent windows 176 are arranged on the opposing sides 172, although other configurations are possible.

[0089] In one instance, the front panel 130 and the body 140 are movable relative to each other between an open position (see FIG. 2), where the interior cavity 152 is exposed and/or uncovered, and a closed position (see FIG. 1), where the interior cavity 152 of the dispenser 110 is covered and/or concealed. In the closed position, the front panel 130 spans across the front end 164, from the top end 160 to the bottom end 156. Further, the sidewall 144 of the body 140 extends continuously from the top end 160 to the bottom end 156 in a generally U-shape, and an opening 180 is located at the top end 160 approximately centrally between the front and rear ends 164, 168 and between the opposing sides 172. In the illustrated embodiment, the backplate 148 and the sidewall 144 are integrally formed as a single component. However, it will be appreciated that the

backplate **148** and the sidewall **144** may be provided as separate components and, further, that the sidewall **144** may be provided as multiple portions or sections coupled together.

[0090] Referring to FIG. **1**, the front panel **130** and the body **140** mate together along at least a portion of a periphery **184** formed between a perimeter **188** of the front panel **130** and a peripheral edge **192** (see FIG. **2**) of the sidewall **144**, thereby causing a snug fit therebetween. In some embodiments, a gasket (not shown) of elastomeric material, or any other suitable material, may be positioned between the front panel **130** and the body **140** to prevent egress or ingress of liquids, gases, sounds, or optical emissions. The gasket may be carried by the front panel **130** and/or the body **140**.

[0091] As illustrated in FIGS. **1** and **2**, a lock or release device **200** is disposed within the opening **180** at the top end **160** of the body **140** and a latch or locking tongue **204** is carried by the front panel **130**. FIG. **1** illustrates the release device **200** in a first configuration in which a button wall **208** is exposed at the sidewall **144**. FIG. **2** illustrates the release device **200** in a second configuration in which a key wall **212** is exposed at the sidewall **144** for use with a unique key (not shown). Together, the release device **200** and the locking tongue **204** comprise at least part of a locking mechanism that is configured to releasably secure the front panel **130** to the body **140** in the closed position.

[0092] With continued reference to FIGS. **1** and **2**, the front panel **130** includes a front wall **220** that spans across the perimeter **188**. The perimeter **188** of the front panel **130** includes a peak **224** that is located centrally thereon and at an uppermost point opposite a notch **228** formed at a lower section **232**. A trigger or actuator **236** is configured to be pivotably coupled to the front panel **130** and mounted within the notch **228** substantially flush with the front wall **220** and the perimeter **188** in the lower section **232**. In the illustrated embodiment, the actuator **236** is coupled to the front panel **130** in the lower section **232** by an actuator hinge **240** from which lever arms **242** (see FIG. **2**) protrude vertically upwardly and outwardly for operable engagement with the body **140**, as will be described in more detail further below.

[0093] In the illustrated embodiment, the front panel **130** and the body **140** are pivotable or rotatable about an access hinge **244** at the bottom end **156** of the body **140** to expose the interior cavity **152** and to permit access thereto. The actuator hinge **240** is spaced apart from the bottom end **156** and, thus, the actuator hinge **240** is spaced apart from the access hinge **244** about which the body **140** and the front panel **130** are pivotable or rotatable. Additionally or alternatively, the front panel **130** and the body **140** may be completely detachable from each other without the use of the hinge. In some embodiments, the front panel **130** may be adapted to slide relative to the body **140** to expose or cover the interior cavity **152**, or the front panel **130** may rotate in a different direction than shown.

[0094] An example of the cartridge **120** which can be loaded into the dispenser **110** is shown in FIG. **2**. The cartridge **120** includes an open mouth (not shown) defined by a neck **246** through which fluid leaves the cartridge **120**. The cartridge **120** may be formed as any suitable container, for example, a bottle type container, although other configurations are possible. The cartridge **120** also includes a pump **248** mounted within the open mouth (not shown) of the neck **246** and configured to apply a suction force within a cartridge body **252** for pumping fluid therefrom, ultimately being pumped through a nozzle **256** to a user's hands positioned below the dispenser **110**. Further, the pump **248** includes a housing flange **260** that is secured to the neck **246** of the cartridge **120** and protrudes outwardly therefrom. The cartridge **120** defines a central axis **C** extending generally vertically and axially through the neck **246** and the cartridge body **252**, as shown in FIG. **2**. In the illustrated embodiment, the nozzle **256** and the pump **248** are axially aligned with the central axis **C**, although other configurations are possible.

[0095] Still referring to FIG. **2**, a support structure **264** of the dispenser **110** includes collar **266** carried by the body **140** and arranged to retain the housing flange **260** of the cartridge **120** against movement with respect to the dispenser **110**. The cartridge **120** and the support structure **264**

include complimentary guide formations arranged such that the cartridge **120** is loaded in the dispenser **110** in one or more predetermined orientations. In one implementation, the neck **246** of the cartridge **120** is provided with a pair of flat portions **268** and the dispenser **110** includes a corresponding pair of guide projections **272**. The flat portions **268** of the cartridge **120** and the corresponding guide projections **272** of the dispenser **110** cooperate such that the cartridge **120** is inserted into the dispenser **110** in one of two orientations. In the illustrated embodiment, the guide projections **272** are provided by the collar **266** of the body **140**, although other configurations are possible.

[0096] FIGS. **3** and **4** illustrate the cartridge **120** being received by the support structure **264** of the body **140** of the dispenser **110** when the cartridge **120** is moved into the interior cavity **152** of the body **140**, as indicated by the directional arrow of FIG. **2**. As best seen in FIG. **4**, the housing flange **260** of the pump **248** is received within a corresponding pair of guide tracks **276** formed by the collar **266** and positioned below the guide projections **272**. When the cartridge **120** is received in any of the predetermined orientations, the housing flange **260** is arranged to slide within the guide tracks **276** and to prevent vertical translation of the cartridge **120** relative to the dispenser **110**. As such, the housing flange **260** has a predetermined diameter **D1** and thickness **T1** (see FIG. **11**) corresponding with the dimensions of the guide tracks **276**. Further, the housing flange **260** is configured to abut the neck **246** of the cartridge **120** to form a seal therebetween, thereby preventing fluid or air from escaping.

[0097] Referring again to FIG. **2**, the pump **248** is provided with a pump housing (not shown) that is coupled within the neck **246** of the cartridge **120** and a valve **284** that is movable within the pump housing (not shown). In the illustrated embodiment, the valve **284** carries a drive flange **288** configured to move in relation to the housing flange **260** and, in particular, the drive flange **288** moves vertically and concentrically with respect to the housing flange **260**. The drive flange **288** has a predetermined diameter **D2** and thickness **T2** (see FIG. **11**) corresponding with the dimensions of the support structure **264** of the dispenser **110** for compatible operation therewith, which will be further described below. However, it will be appreciated that any suitable pump construction may be used to dispense fluid from the cartridge **120**. Further, the pump **248** may be provided as a foam-type, a liquid-type, or any other suitable type of pump for dispensing a fluid-like product for consumption.

[0098] It will be appreciated that the cartridge **120** is intended to be representative of various types and versions that may be used with the dispenser **110**. Such types or versions of cartridges **120** may differ in particular dimensions, i.e., the diameter **D1** and thickness **T1** of the housing flange **260** or the diameter **D2** and thickness **T2** of the drive flange **288** (see FIG. **11**), which correspond to particular compatibility features of the dispenser **110**. Further, the types or versions of cartridges **120** may vary with respect to the fluid contained therein, the type of pump **248** used, the materials and/or construction of the cartridge body **252**, or in other aspects.

[0099] In the illustrated embodiment of FIGS. **2-4** and **11-13**, the drive flange **288** and the housing flange **260** are generally circular, although other configurations are possible. For example, the drive flange **288** and/or the housing flange **260** may instead be provided in the form of rectangular tabs (not shown) or, alternatively, the drive flange **288** and/or the housing flange **260** may be provided in a rectangular shape, or a triangular shape, or trapezoidal shape, or an irregular shape, or any other suitable shape capable of having corresponding dimensions to the support structure **264** of the dispenser assembly **100**. In addition, the pump **248** may be removably coupled to the neck **246** of the cartridge **120** to be reusable with multiple cartridges **120** or, alternatively, the pump **248** may be permanently or semi-permanently coupled to the neck **246** of the cartridge **120** and intended for use with one cartridge **120**. In the illustrated embodiment, the pump **248** is coaxial with the central axis **C** and extends substantially vertically through and outwardly from the neck **246** of the cartridge **120**, but other arrangements are possible. For example, the valve **284** and drive flange **288** may extend outwardly from the neck **246** of the cartridge **120** at an angle relative to the central axis **C**.

[0100] With reference to FIGS. 3 and 4, the support structure **264** further includes a drive unit **292** having a moving chassis **296** that is arranged for vertical translation within the interior cavity **152**. Further, the drive unit **292** includes an adaptor **300** that is configured to be removably received within the moving chassis **296**, such that the moving chassis **296** and adaptor **300** together are configured to receive and operably engage a predetermined cartridge type in the dispenser **110**. In one instance, the moving chassis **296** is provided as a separate component to the dispenser **110** and the collar **266** is integral with the dispenser **110**, but other configurations are possible. The adaptor **300** is configured to have dimensions that correspond to the drive flange **288** for enabling compatible operation therewith, as will be further described below.

[0101] Still referring to FIGS. 3 and 4, the moving chassis **296** of the drive unit **292** defines a receptacle **304** configured for receiving an operable component, e.g., the drive flange **288**, of the cartridge **120**, where the operable component corresponds to the cartridge type. In the illustrated embodiment, the receptacle **304** is configured for receiving the drive flange **288** carried by and operably connected with the pump **248** of the cartridge **120** to dispense fluid. As illustrated in FIG. 2, the drive unit **292** defines a drive axis A that is centrally located in the receptacle **304** and extends vertically through the body **140** of the dispenser **110**. When the cartridge **120** is located in the dispenser **110**, the drive flange **288** of the cartridge **120** occupies the receptacle **304** of the support structure **264** and, as a result, the drive axis A of the dispenser **110** is coaxial with the central axis C of the cartridge **120**, as best seen in FIG. 3. Further, the moving chassis **296** is configured to be translated in a vertical direction, i.e., along the drive axis A, relative to the collar **266**, such as, e.g., by actuation of the dispenser **110** to dispense fluid.

[0102] With reference to FIGS. 5 and 6, the adaptor **300** includes a joint or central portion **308** that connects a first leg **312** to a second leg **316**, both of which extend outwardly from opposite sides of the central portion **308**. In the illustrated embodiment, the adaptor **300** is symmetrical about a longitudinal axis S that is centrally disposed between the first leg **312** and the second leg **316** and intersects the central portion **308**. However, in other embodiments, the adaptor **300** may be asymmetrical or may be symmetrical about a different axis. The first leg **312** and the second leg **316** are capable of being rotated about the central portion **308**, causing the central portion **308** to bend or flex. In some implementations, the first leg **312** and the second leg **316** also bend or flex when being rotated about the central portion **308**. As shown in FIG. 5, a central flex axis F is defined by the central portion **308** and extends vertically, perpendicularly to the longitudinal axis S. Each of the first leg **312** and the second leg **316** is configured to be displaced (e.g., rotated) about the central flex axis F. In one instance, each of the first leg **312** and the second leg **316** is rotated both inwardly, i.e., toward each other, and outwardly, i.e., away from each other, about the flex axis F, as indicated by the bi-directional arrows.

[0103] Referring to FIG. 5, the first leg **312** includes a first latch **324** at a first distal end **328** that is opposite the central portion **308** and the second leg **316** includes a second latch **332** at a second distal end **336** that is opposite central portion **308**, the first latch **324** and the second latch **332** being provided for retention of the adaptor **300** within the moving chassis **296**. The first latch **324** and the second latch **332** may be individually referred to as retention projections or elements and collectively referred to as a first pair of retention projections or elements. Each of the first latch **324** and the second latch **332** is generally triangular-shaped and extends from a first curved arm **340** and a second curved arm **344**, respectively, connected to the respective first distal end **328** of the first leg **312** and the second distal end **336** of the second leg **316**. In addition, the first distal end **328** and the second distal end **336** of the adaptor **300** are also provided as curved sections. The first latch **324** protrudes laterally outwardly, i.e., away from the longitudinal axis S, from the first curved arm **340** and a first crevice **348** is defined therebetween. Similarly, the second latch **332** protrudes laterally outwardly, i.e., away from longitudinal axis S, from the second curved arm **344** and a second crevice **352** is defined therebetween.

[0104] Still referring to FIG. 5, a first rib **356** extends laterally inwardly, i.e., toward the

longitudinal axis S, from the first latch **324** toward the first leg **312** for preventing the first latch **324** from becoming excessively displaced (e.g., rotated). Similarly, a second rib **360** extends laterally inwardly, e.g., toward the longitudinal axis S, from the second latch **332** toward the second leg **316** for preventing the second latch **332** from becoming excessively displaced (e.g., rotated). Moreover, a first tab **364** extends longitudinally outwardly, i.e., parallel to the longitudinal axis S, from the first curved arm **340** and a second tab **370** extends longitudinally outwardly, i.e., parallel to the longitudinal axis S, from the second curved arm **344** to provide surfaces for bi-directional manipulation, such as by a user's fingers and/or thumb. In some embodiments, a range of rotation about the first distal flex axis F1 and a range of rotation about the second distal flex axis F2 are equal. However, a range of rotation about the central flex axis F is greater than the range of rotation of either the first distal flex axis F1 and the second distal flex axis F2.

[0105] It will be appreciated that the first latch **324** and the second latch **332** are configured to be displaced relative to the central portion **308** by way of translation and rotation, e.g., bending or flexing, about the central flex axis F. Further, the first latch **324** is capable of being displaced (e.g., rotated) about a first distal flex axis F1 that is defined between the first curved arm **340** and the first distal end **328** and extends vertically, perpendicularly to the longitudinal axis S. Similarly, the second latch **332** is capable of being displaced (e.g., rotated) about a second distal flex axis F2 that is defined between the second curved arm **344** and the second distal end **336** and extends vertically, perpendicularly to the longitudinal axis S. As shown in FIGS. 5 and 8, the first latch **324** and the second latch **332** are spaced equidistant from the central portion **308**, although other configurations are possible. Further, the first latch **324** and the second latch **332** are spaced apart from each other a distance W, which is greater than the distance that either the first latch **324** or the second latch **332** is spaced from the central portion **308**.

[0106] In the illustrated embodiment, the first latch **324** and the second latch **332** are capable of being displaced both inwardly, i.e., toward each other, and outwardly, i.e., away from each other, about the central flex axis F by displacement (e.g., rotation) of the first leg **312** and the second leg **316**, respectively. Further, the first latch **324** is capable of being rotated both inwardly, i.e., toward the longitudinal axis S, and outwardly, i.e., away from the longitudinal axis S, about the first distal flex axis F1. Still further, the second latch **332** is also capable of being rotated both inwardly, i.e., toward the longitudinal axis S, and outwardly, i.e., away from the longitudinal axis S, about the second distal flex axis F2. Accordingly, displacement of the first latch **324** can occur as a result of its dependency on the first leg **312**, such that when the first leg **312** is displaced about the central flex axis F and/or the central portion **308**, the first latch **324** is also displaced. Thus, a position of the first latch **324** is a function of a position of the first leg **312** relative to the longitudinal axis S and/or the second leg **316**. Further, displacement of the second latch **332** can occur as a result of its dependency on the second leg **316**, such that when the second leg **316** is displaced about the central flex axis F and/or the central portion **308**, the second latch **332** is also displaced. Thus, a position of the second latch **332** is a function of a position of the second leg **316** relative to the longitudinal axis S and/or the first leg **312**. In addition, the distance W between the first latch **324** and the second latch **332** is a function of the position of the first leg **312** and the second leg **316** relative to the central portion **308** and the central flex axis F, such that rotation can increase or decrease the distance W between the first latch **324** and the second latch **332**. In a similar fashion, rotation of the first latch **324** about the first curved arm **340** and the first distal flex axis F1, as well as rotation of the second latch **332** about the second curved arm **344** and the second distal flex axis F2, can increase or decrease the distance between the first latch **324** and the second latch **332**.

[0107] In addition, the first latch **324** is capable of being displaced independently of the first leg **312** and independently of the central flex axis F. That is, independent displacement of the first latch **324** can occur about the first distal flex axis F1, without effect to the position of the first leg **312** and the second leg **316**. In addition, the second latch **332** is capable of being displaced independently of the second leg **316** and independently of the central flex axis F. That is,

independent displacement of the second latch **332** can occur about the second distal flex axis **F2**, without effect to the position of the second leg **316** and the first leg **312**. It will also be appreciated that the first latch **324** and the second latch **332** can be displaced independently of each other about the first distal flex axis **F1** and second distal flex axis **F2**, respectively.

[0108] In the illustrated embodiment of FIG. 5, the first latch **324** and the second latch **332** are positioned rearward of the first curved arm **340** and the second curved arm **344**, while the first leg **312** including the first latch **324** and the second leg **316** including the second latch **332** are positioned forward of the central portion **308**. Further, the first curved arm **340** and the second curved arm **344** are each curved in the rearward direction opposite to the forward direction in which the central portion **308** curves. As a result of these relative positions and curvatures, clockwise and counterclockwise rotation of the first latch **324** about the first curved arm **340**, i.e., the first distal flex axis **F1**, causes displacement to occur in an opposite direction as compared to the central portion **308**, i.e., the central flex axis **F**. Similarly, clockwise and counterclockwise rotation of the second latch **332** about the second curved arm **344**, i.e., the second distal flex axis **F2**, causes displacement to occur in an opposite direction as compared to the central portion **308**, i.e., the central flex axis **F**. For example, clockwise rotation of the first latch **324** about the first distal flex axis **F1** causes laterally inward displacement of the first latch **324**, but clockwise rotation of the first latch **324** by way of the first leg **312** about the central portion **308** and/or central flex axis **F** causes laterally outward displacement of the first latch **324**. In a similar manner, clockwise rotation of the second latch **332** about the second distal flex axis **F2** causes laterally outward displacement of the second latch **332**, but clockwise rotation of the second latch **332** by way of the first leg **312** about the central flex axis **F** causes laterally inward displacement of the first latch **324**. It will be appreciated that the inverse is true of counterclockwise rotation of the first latch **324** relative to each of the central portion **308** and/or the central flex axis **F** and the first curved arm **340** and/or first distal flex axis **F1** and, further, of counterclockwise rotation of the second latch **332** relative to each of the central portion **308** and/or the central flex axis **F** and the second curved arm **344** and/or second distal flex axis **F2**.

[0109] FIG. 5 depicts a rest position of the adaptor **300**. By way of the arcuate or curved shape of the central portion **308**, as well as the materials, thickness, and dimensions thereof, the central portion **308** defines a central biased region **374** that imparts a resistance against displacement (e.g., rotation) of each of the first leg **312** and the second leg **316** from the rest position, thereby causing springback to occur upon displacement in any direction therefrom. Accordingly, that resistance must be overcome for each of the first leg **312** and the second leg **316** to be displaced (e.g., rotated) about the central flex axis **F**, whether being rotated laterally inwardly or laterally outwardly. In this way, each of the first leg **312** and the second leg **316** is configured to spring or snap back into the rest position from a displaced position by the central portion **308** and, in particular, by the resistance imparted to each of the first leg **312** and the second leg **316** from the central biased region **374** of the central portion **308**. Further, the central biased region **374** is configured to allow the first latch **324** and the second latch **332**, i.e., the first pair of projections, to move relative to each other by way of the first leg **312** and the second leg **316**.

[0110] Further, by way of the arcuate or curved shape of the first curved arm **340** and the first distal end **328**, as well as the materials, thickness, and dimensions thereof, a first distal biased region **378** is formed by the first curved arm **340** and the first distal end **328**. The first distal biased region **378** is intersected by the first distal flex axis **F1** and imparts a resistance against displacement (e.g., rotation) of the first latch **324** from the rest position about the first distal flex axis **F1**, thereby causing springback to occur upon displacement in any direction therefrom. Accordingly, that resistance must be overcome for the first latch **324** to be displaced (e.g., rotated) about the first distal flex axis **F1**, whether being rotated laterally inwardly or laterally outwardly. Accordingly, the first latch **324** is configured to spring or snap back into the rest position from a displaced position by the first curved arm **340** and, in particular, by the resistance imparted to the first latch **324** from

the first distal biased region **378** of the first curved arm **340** during displacement. As will be appreciated from FIG. 5, the first distal biased region **378** is connected to the central biased region **374** by the first leg **312** and can be displaced (e.g., rotated) about the central flex axis F by way of the first leg **312**. In this manner, the first distal biased region **378**, including the first distal flex axis F1, can be rotated about the central flex axis F and/or the central biased region **374**.

[0111] In a similar fashion, by way of the arcuate or curved shape of the second curved arm **344** and the second distal end **336**, as well as the materials, thickness, and dimensions thereof, a second distal biased region **382** is formed by the second curved arm **344** and the second distal end **336**.

The second distal biased region **382** is intersected by the second distal flex axis F2 and imparts a resistance against displacement (e.g., rotation) of the second latch **332** from the rest position, thereby causing springback to occur upon displacement in any direction therefrom. Accordingly, that resistance must be overcome for the second latch **332** to be displaced (e.g., rotated) about the second distal flex axis F2, whether being rotated laterally inwardly or laterally outwardly.

Accordingly, the second latch **332** is configured to spring or snap back into the rest position from a displaced position by the second curved arm **344** and, in particular, by the resistance imparted to the second latch **332** from the second distal biased region **382** of the second curved arm **344** during displacement. As will be appreciated from FIG. 5, the second distal biased region **382** is connected to the central biased region **374** by the second leg **316** and can be displaced (e.g., rotated) about the central flex axis F by way of the second leg **316**. In this manner, the second distal biased region **382**, including the second distal flex axis F2, can be rotated about the central flex axis F and/or the central biased region **374**.

[0112] It is contemplated that the central biased region **374** imparts a first resistance that is different than a second resistance imparted by the first distal biased region **378** and a third resistance imparted by the second distal biased region **382** or, alternatively, that the central biased region **374** may impart an equal magnitude of resistance as imparted by the first distal biased region **378** and/or the second distal biased region **382**. It is further contemplated that the first distal biased region **378** and the second distal biased region **382** impart equal magnitudes of resistance, although in some cases the second resistance of the first biased region **378** is different from the third resistance of the second distal biased region **382** without departing from the scope of this disclosure. Further, a first range of rotation allowed by the central biased region **374** may be greater than a second range of rotation allowed by the first distal biased region **378** and a third range of rotation allowed by the second distal biased region **382**. In some embodiments, range of rotation is proportional to resistance, such that greater resistance results in lower range of rotation. In this way, different resistances can be related to different ranges of rotation.

[0113] Still referring to FIG. 5, the adaptor **300** defines a height H0 that varies therealong. In one instance, the height H0 is identical along the first leg **312** and the second leg **316** but smaller at the central portion **308**. In particular, the reduced height H0 of the adaptor **300** at the central portion **308** is provided for engagement with a locator **386** that extends from the moving chassis **296** into a pocket **390** that is configured to receive the central portion **308**, as seen in FIG. 8. In the embodiment of FIG. 5, the first leg **312** and the second leg **316** each include a plurality of protrusions **396** extending therefrom, which may be spaced apart from each other and positioned along one or more surfaces of the first leg **312** and the second leg **316**, respectively. In the illustrated embodiment, the plurality of protrusions **396** are disposed on a top surface **400** and a bottom surface (not shown) of each of the first leg **312** and the second leg **316**, although other configurations are possible.

[0114] Staying with FIG. 5, the adaptor **300** comprises a first catch **404** provided on the first leg **312** and a second catch **408** provided on the second leg **316** for retention of the drive flange **288**. The first catch **404** and the second catch **408** may be individually referred to as retention projections or elements and collectively referred to as a second pair of retention projections or elements. Further, it will be appreciated that the first leg **312** includes the first latch **324** and the

first catch **404**, otherwise referred to as the first set of retention projections or elements, and the second leg **316** includes the second latch **332** and the second catch **408**, otherwise referred to as the second set of retention projections or elements. In the illustrated embodiment, the first catch **404** and the second catch **408** are spaced equidistant from the central portion **308** and between the central portion **308** and the first distal end **328** and the second distal end **336**, respectively, of the first leg **312** and the second leg **316**, respectively. Referring to the adaptor **300** of FIG. 5, the first catch **404** and the second catch **408** each extend laterally inwardly toward each other to define a predetermined dimension or distance **E1**, which is a retention width. In one instance, the first catch **404** includes a first ramp **412** that extends to a first tip **416** and a first channel **420** is defined underneath the first catch **404** between the first leg **312** and the first tip **416**. Similarly, the second catch **408** includes a second ramp **424** that extends to a second tip **428** and a second channel **432** (see FIG. 7) that is defined underneath the second catch **408** between the second leg **316** and the second tip **428**. The first ramp **412** and the second ramp **424** each extend downwardly and laterally inwardly from the top surface **400** of the adaptor **300** to the first tip **416** and the second tip **428**, respectively. Further, the first catch **404** and the second catch **408** are arranged on the adaptor **300** to define a channel height **EE1** (see FIG. 11) that is less than the height **H0** of the adaptor **300**. [0115] With respect to the adaptor **300** of FIG. 5, the predetermined distance **E1** is measured between the first leg **312** within the first channel **420** of the first catch **404** and the second leg **316** within the second channel **432** of the second catch **408** (see FIG. 11). In this way, the adaptor **300** is configured with a predetermined dimension, i.e., distance **E1** (see FIG. 11), for compatibility with one or more predetermined cartridge types, such that a cartridge type that is compatible with the dispenser assembly **100** and the adaptor **300** will have corresponding dimensions to the predetermined distance **E1** and a cartridge that is not compatible will not have corresponding dimensions to the predetermined distance **E1**. In the illustrated embodiment, the predetermined distance **E1** is provided to correspond with the diameter **D2** of the drive flange **288** of the cartridge **120** (as illustrated in FIG. 11), such that the first catch **404** and the second catch **408** contact the drive flange **288** for movement therewith. Further, the channel height **EE1** is provided to correspond with the thickness **T2** of the drive flange **288** of the cartridge **120**, such that the first catch **404** and the second catch **408** receive the drive flange **288** within the first channel **420** and the second channel **432**. In this way, the drive flange **288** is configured to be compatible with the adaptor **300**, having corresponding dimensions for enabling compatible operation therewith. It is contemplated that the adaptor **300**, including the first leg **312** and the first catch **404** and the second leg **316** and the second catch **408**, can be differently shaped and sized to define a larger or smaller channel height **EE1** or multiple channel heights. Further, it is contemplated that the drive flange **288** may be differently sized and shaped to define multiple thicknesses **T2** and/or multiple diameters **D2** to correspond to the adaptor **300**. Accordingly, the adaptor **300** and the drive flange **288** can be provided in a variety of configurations, i.e., shapes and sizes, to achieve an operable engagement with one another.

[0116] With reference to FIG. 6, the moving chassis **296** includes a slot **436** for receiving the adaptor **300**, as indicated by the directional arrow. In the illustrated embodiment, the slot **436** is defined between an upper member **440** and a lower member **444** that is opposite the upper member **440**, the lower member **444** defining a lower surface **448** and a recessed edge **452** that extends about the receptacle **304**. In one instance, the upper member **440** and the lower member **444** are generally U-shaped, although other configurations are possible. The upper member **440** has a lip **456** that extends about the receptacle **304** and varies in height as it protrudes vertically upward from the upper member **440**. In addition, the moving chassis **296** has a forward end **458** that is arranged adjacent to the front panel **130** when the dispenser assembly **100** is in a closed position (see FIG. 14).

[0117] In addition, the moving chassis **296** has a back end **464** that includes spring posts **468** that are each configured to receive a spring **472** (see FIG. 14). As illustrated in FIG. 6, the spring posts

468 each are generally conical structures that become narrower as they extend vertically upward from a spring seat **476** that is partially surrounded by a curved border **480**. Further, the back end **464** of the moving chassis **296** includes a shaft **484** formed by a pair of shaft walls **488**, which are L-shaped and extend from a central member **492**, and a gap **496** extends between the pair of shaft walls **488**. The shaft **484** is configured to be coupled to a rail (not shown) of the body **140** for translation therealong, such as, e.g., sliding, although other configurations are possible.

[0118] Referring to FIGS. **6** and **7**, the moving chassis **296** also includes a pair of actuation docks **500** that each have opposing inner walls **504** and outer walls **508**. An angled docking wall **512** extends from an upper end **516** that spans between the inner wall **504** and the outer wall **508**. Further, an arcuate brace **520** extends between the inner wall **504** and the outer wall **508** below the upper end **516**. In the illustrated embodiment, the angled docking wall **512** extends vertically upwardly and forwardly relative to the upper end **516** of the actuation dock **500**, and an actuation surface **524** (see FIG. **7**) extends continuously from the angled docking wall **512** to the upper end **516**. The actuation docks **500** are configured to receive the lever arms **242** (see FIG. **14**) of the actuator **236**, such that when the front panel **130** is pivoted about the body hinge (not shown) toward the body **140** the lever arms **242** are brought into contact with the actuation surface **524** of the angled docking walls **512**. Further, as the front panel **130** is further pivoted to the closed position, the lever arms **242** slide from the angled docking walls **512** to the upper end **516** of the actuation docks **500** while maintaining contact with the actuation surface **524**. In this way, the lever arms **242** are positioned for operable engagement with the moving chassis **296**.

[0119] As illustrated in FIGS. **7** and **8**, the adaptor **300** is configured to be received by the moving chassis **296** to form the drive unit **292** of the support structure **264**. The height **H0** (see FIG. **5**) of the adaptor **300** corresponds to a height of the slot **436** for receiving the adaptor **300** therein without excess friction, e.g., in a clearance fit. In addition, the central portion **308** and part of the first leg **312** and the second leg **316** are received within a pocket **390** formed by pocket walls **528** (see FIG. **8**) at the back end **464** of the moving chassis **296**, where the reduced height **H0** of the adaptor **300** at the central portion **308** corresponds to the locator **386** to prevent unauthorized or improper adaptors from being operably received within the slot **436**, and also to ensure proper installation of the adaptor **300**.

[0120] Referring to FIG. **8**, the first catch **404** and the second catch **408** are located opposite one another relative to the receptacle **304** and equidistant from the central flex axis **F** of the central portion **308**. Due to the arcuate shape of the first leg **312** and the second leg **316**, the adaptor **300** partially surrounds the receptacle **304** of the moving chassis **296** while allowing space within the slot **436** for laterally outward displacement of each of the first leg **312** and the second leg **316** about the central flex axis **F**.

[0121] As best seen in the sectional view of FIG. **8**, the first latch **324** is received within a first aperture **532** defined between a first bumper **536** and a first side **540** of the moving chassis **296**. Similarly, the second latch **332** is received within a second aperture **544** defined between a second bumper **548** and a second side **552** of the moving chassis **296**. To accomplish insertion of the adaptor **300** within the slot **436**, the first latch **324** and the second latch **332** slide along the first side **540** and the second side **552**, respectively, at the front end **458** of the moving chassis **296**, which causes laterally inward displacement of the first latch **324** and the second latch **332**. Upon reaching the first aperture **532** and the second aperture **544**, the first latch **324** and the second latch **332** snap back into the rest position due to the resistance imparted by the first distal biased region **378** and the second distal biased region **382**, such that the first latch **324** extends into the first aperture **532** and the second latch **332** extends into the second aperture **544**. In this way, the adaptor **300** is coupled to the moving chassis **296**.

[0122] In the illustrated embodiment of FIG. **8**, when the adaptor **300** is received within the slot **436** and coupled to the moving chassis **296** prior to engagement with the drive flange **288**, the first crevice **348** is spaced apart from the first side **540** of the moving chassis **296** and the second crevice

352 is spaced apart from the second side **552** of the moving chassis **296**. In addition, due to the shape and size of the adaptor **300**, a spacing is provided between the first bumper **536** and the first latch **324** and between the second bumper **548** and the second latch **332**. Further, there is a spacing between the first leg **312** and the adjacent pocket walls **528** and between the second leg **316** and the adjacent pocket walls **528**, such that laterally outward displacement (e.g., rotation) can occur about the central flex axis **F** while the adaptor **300** is received within the slot **436** and coupled to the moving chassis **296**. In this way, the adaptor **300** is configured to flex within the slot **436** of the moving chassis **296** while simultaneously being coupled to the moving chassis **296**.

[0123] In addition, the adaptor **300** is configured to be removed from the slot **436** by displacement of the first leg **312** and the second leg **316**. This is accomplished by a user squeezing the tabs **364**, **370** together to cause the first leg **312** and the second leg **316** to be displaced laterally inwardly, e.g., toward each other, which causes the first latch **324** and the second latch **332** to be displaced from the first aperture **532** and the second aperture **544**, respectively. Then, the user removes the adaptor **300** from the slot **436** of the moving chassis **296** and releases the tabs **364**, **370**, allowing the first leg **312** and the second leg **316** to spring back into the rest position.

[0124] As illustrated in FIGS. **7** and **8**, the drive axis **A** is approximately centrally positioned within the receptacle **304** and approximately centrally disposed between the central flex axis **F** and both of the first distal flex axis **F1** and the second distal flex axis **F2** of the adaptor **300** when operably received within the slot **436** of the moving chassis **296**. In the illustrated embodiment, the central flex axis **F** and both of the first distal flex axis **F1** and the second distal flex axis **F2** are parallel with the drive axis **A**, such that displacement (e.g., rotation) occurs about these vertical axes. Accordingly, the adaptor **300** is configured to be translated vertically by way of its position within the slot **436** of the moving chassis **296** while simultaneously being configured to flex about the central flex axis **F**, as described below with respect to FIGS. **11-13**.

[0125] FIG. **9** illustrates another embodiment of an adaptor **600** that is configured to be received within the slot **436** of the moving chassis **296** for use with a compatible cartridge **120**, as shown with respect to the adaptor **300** in FIGS. **6-8**. Referring to FIG. **9**, the adaptor **600** is substantially identical to the adaptor **300** of FIGS. **5-8**, except that the adaptor **600** is configured to be compatible with a different cartridge than the adaptor **300** of the first embodiment. In particular, the adaptor **600** includes a first catch **604** that extends laterally inwardly farther than the first catch **404** of the first embodiment of the adaptor **300**, and a second catch **608** that extends laterally inwardly farther than the second catch **408** of the first embodiment of the adaptor **300**. Further, the first catch **604** includes a first ramp **612** that extends downwardly and laterally inwardly toward a first tip **616** and the second catch **608** includes a second ramp **620** that extends downwardly and laterally inwardly toward a second tip **624**. In addition, the first catch **604** includes a first base member **628** that extends laterally inwardly from the first leg **312** approximately halfway ($\frac{1}{2}$) between the first leg **312** and the first tip **616**, and the second catch **608** includes a second base member **632** that extends laterally inwardly from the second leg **316** approximately halfway ($\frac{1}{2}$) between the second leg **316** and the second tip **624**. A predetermined distance **E2**, which is a retention width, is defined between the first base **628** of the first catch **604** and the second base **632** of the second catch **608**. Further, a cavity **640** is formed adjacent each of the first catch **604** and the second catch **608**, respectively, of the adaptor **600**, such that the first catch **604** and the second catch **608** are generally hollow. In addition, a first rib **644** extends inwardly from the first leg **312** at an angle relative to the longitudinal axis **S** and a second rib **648** extends inwardly from the second leg **316** at an angle relative to the longitudinal axis **S**. The first rib **644** and the second rib **648** are configured to abut the drive flange **288** of the cartridge **120** that is sized and shaped to be compatible with the adaptor **600**. In particular, the diameter **D2** of the drive flange **288** corresponds to the predetermined distance **E2** for compatible operation with the adaptor **600**. In this way, the first rib **644** and the second rib **648** allow the drive flange **288** to be more easily captured between the first catch **604** and the second catch **608** while also preventing tilting or rotation relative to the adaptor **600**.

[0126] FIG. 10 illustrates yet another embodiment of an adaptor 700 that is configured to be received within the slot 436 of the moving chassis 296 for use with a compatible cartridge type. The adaptor 700 is substantially identical to the adaptor 300 of FIGS. 5-8 and the adaptor 600 of FIG. 9, except that the adaptor 700 is configured to be compatible with a different cartridge than both the adaptor 300 of the first embodiment and the adaptor 600 of the second embodiment. In particular, the adaptor 700 includes a first catch 704 that extends laterally inwardly farther than the first element 604 of the second embodiment of the adaptor 600, and a second catch 708 that extends laterally inwardly farther than the second catch 608 of the second embodiment of the adaptor 600. Further, the first catch 704 includes a first ramp 712 that extends downwardly and laterally inwardly toward a first tip 716 and the second catch 708 includes a second ramp 720 that extends downwardly and laterally inwardly toward a second tip 724. In addition, the first catch 704 includes a first base member 728 that extends laterally inwardly from the first leg 312 approximately two-thirds ($\frac{2}{3}$) between the first leg 312 and the first tip 716 to form a first channel 730 therebetween and the second catch includes a second base member 732 that extends laterally inwardly from the second leg 316 approximately two-thirds ($\frac{2}{3}$) between the second leg 316 and the second tip 724 to form a second channel 734 therebetween. A predetermined distance E3, which is a retention width, is defined between the first base member 728 of the first catch 704 and the second base member 732 of the second catch 708. Further, a cavity is 740 formed adjacent each of the first catch 704 and the second catch 708, respectively, of the adaptor 700, such that the first catch 704 and the second catch 708 are generally hollow. In addition, a first rib 744 extends inwardly from the first leg 312 at an angle relative to the longitudinal axis S and a second rib 748 extends inwardly from the second leg 316 at an angle relative to the longitudinal axis S. The first rib 744 and the second rib 748 are configured to abut the drive flange 288 of another cartridge 120 that is compatible with the adaptor 700. In particular, the diameter D2 of the drive flange 288 corresponds to the predetermined distance E3 for compatible operation with the adaptor 700. In this way, the first rib 744 and the second rib 748 allow the drive flange 288 to be more easily captured between the first catch 704 and the second catch 708 while also preventing tilting or rotation relative to the adaptor 700.

[0127] As can be appreciated from FIGS. 5, 9, and 10, the predetermined distance E2 is greater than the predetermined distance E3 and less than the predetermined distance E1. The predetermined distances E1, E2, and E3 of the adaptors 300, 600, and 700, respectively, may range from about 0.3 inch (7.62 mm) to about 2 inches (50.8 mm), although other configurations are possible. In one instance, the predetermined distance E1 is about 1 inch (25.4 mm), the predetermined distance E2 is about 0.85 inch (21.59 mm), and the predetermined distance E3 is about 0.7 inch (17.78 mm), although other configurations are possible. It is contemplated that the drive flange 288 may have a diameter D2 in a range of about 0.3 inch (7.62 mm) to about 2 inches (50.8 mm) and, preferably, within a range of about 0.7 inch (17.78 mm) to about 1 inch (25.4 mm).

[0128] As illustrated in FIGS. 11-13, when the drive flange 288 is compatible with the adaptor 300 that is present within the slot 436 of the moving chassis 296, such that the predetermined distance E1 corresponds to the diameter D2, the drive flange 288 is configured to slide over each of the first and second catch 404, 408 to become captured within the first and second channels 420, 432 and secured to the moving chassis 296. Further, as the drive flange 288 slides over each of the first and second catch 404, 408, each of the first leg 312 and the second leg 316 is displaced (e.g., rotated) outwardly about the central flex axis F and against the resistance imparted by the central biased region 374 (see FIG. 5) of the central portion 308, as well as any additive resistance provided by the material, thickness, dimensions, and curvature of the arcuate shape of each of the first leg 312 and the second leg 316.

[0129] Referring to FIG. 11, with the cartridge 120 installed within the support structure 264 of the body 140 in an inverted orientation within the dispenser 110, the housing flange 260 is received within the guide tracks 276 of the collar 266 and the flat portions 268 of the neck 246 are received

by the guide projections **272** of the collar **266**. In this installed position, the central axis C of the cartridge **120** is aligned with the drive axis A of the drive unit **292**, such that the drive flange **288** of the pump **248** is coaxial with the drive axis A. However, as depicted in FIG. **11**, the pump **248** is in a pre-primed state in which the valve **284** is fully retracted within the pump housing (not shown). As a result, the drive flange **288** is spaced apart vertically from the adaptor **300** and the receptacle **304** and, more specifically, the drive flange **288** is positioned above the adaptor **300** and below the collar **266**. FIG. **11** illustrates that the housing flange **260** has a thickness T1 and diameter D1, that the drive flange **288** has a thickness T2 and diameter D2, and that the adaptor **300** has a predetermined distance E1, which is substantially equivalent or equal to the diameter D2 of the drive flange **288**. As a result, the adaptor **300** and the drive flange **288** shown are compatible. If the drive flange **288** was of a smaller diameter D2 and, thus, was incompatible, the first and second catches **404**, **408** of the adaptor **300** would pass the drive flange **288** without contact, rendering the drive flange **288** inoperable with the drive unit **292**. Alternatively, if the drive flange **288** was of a larger diameter D2 and, thus, was incompatible, the first and second catches **404**, **408** would be unable to translate above the drive flange **288** and no sliding engagement would occur, i.e., the drive unit **292** would jam. In the illustrated embodiment, because the valve **284** is fully retracted within the pump housing (not shown) of the cartridge **120**, the valve **284** and, thus, the drive flange **288** is prevented from translating vertically upward.

[0130] FIG. **12** illustrates a capture stage of the dispenser assembly **100** in which the actuator **236** has been depressed in a substantially longitudinal direction, e.g., rearward, to rotate about the actuator hinge **240** of the front panel **130** for exerting a vertically upward force upon the drive unit **292** by way of the lever arms **242**. In the illustrated embodiment, the drive unit **292**, i.e., the moving chassis **296** and the adaptor **300**, is translated vertically upward to capture the drive flange **288** between the first leg **312** and the second leg **316** of the adaptor **300** and between the first catch **404** and the second catch **408**. In addition, the drive flange **288** is captured within the first channel **420** and the second channel **432** of the adaptor **300** such that it is secured between the first catch **404** and the moving chassis **296** as well as between the second catch **408** and the moving chassis **296**. At the stage of FIG. **12**, the adaptor **300** has been translated vertically, i.e., lifted, to cause the drive flange **288** to slide along the first ramp **412** and the second ramp **424**, which results in the first leg **312** and the second leg **316** becoming displaced (e.g., rotated) about the central axis F. After the first tip **416** and the second tip **428** of the adaptor **300** are lifted above the drive flange **288**, the central biased region **374** of the central portion **308** (hidden in FIG. **12** but shown in FIG. **5**) causes the first leg **312** and the second leg **316** to snap back into the rest position, thereby capturing the drive flange **288** laterally between the first catch **404** and the second catch **408** and vertically between the adaptor **300** and the moving chassis **296**. Since the cartridge **120** is secured against vertical translation due to installation within the collar **266**, and because the valve **284** is secured against vertical translation due to being fully retracted within the pump housing (not shown) at this stage, the drive flange **288** is not translated in the vertical direction as the adaptor **300** passes above it due to manual operation of the actuator **236**. In this way, the drive flange **288** of the pump **248** becomes captured with the drive unit **292**.

[0131] Referring to FIG. **13**, the drive unit **292** has been translated vertically downward back to an initial position, with the drive flange **288** captured between the adaptor **300** and the moving chassis **296**. In this initial position, the first leg **312** and the second leg **316** of the adaptor **300** are each simultaneously coupled to the moving chassis **296**, e.g., by way of the first latch **324** and the second latch **336**, and to the drive flange **288**, e.g., by way of the first catch **404** and the second catch **408**. The downward vertical translation is caused by the forces exerted by the springs **472** between the collar **266** and the moving chassis **296**, such that the moving chassis **296** is biased toward the initial position. Due to the downward vertical translation of the drive flange **288** and, thus, the valve **284** of the pump **248**, the pump **248** has become primed by applying a suction to the cartridge body **252** of the cartridge **120** that pulls fluid into the pump **248** for being dispensed upon

an actuation and/or operation of the drive unit **292**. As illustrated in FIG. **13**, the drive flange **288** is engaged with the adaptor **300** and secured to the moving chassis **296** to translate together vertically within the dispenser **110**, such that when the actuator **236** is depressed in the longitudinal direction, the drive flange **288**, adaptor **300**, and moving chassis **296** all translate vertically upward to a stroke position where fluid is dispensed. Then, the springs **472** (see FIG. **14**) exert sufficient force upon the moving chassis **296** to cause vertical translation downward that returns the drive flange **288**, moving chassis **296**, and adaptor **300** to the initial position. In this way, manual operation of the dispenser assembly **100** is accomplished by strokes, i.e., translation from the initial position to the stroke position and then back to the initial position. Accordingly, the drive flange **288**, the moving chassis **296**, and the adaptor **300** are all configured to translate in a first direction, e.g., vertically upward, before the springs **472** (see FIG. **14**) translate the drive flange **288**, the moving chassis **296**, and the adaptor **300** in a second direction, e.g., vertically downward, to the initial position. In addition, by way of the actuator hinge **240**, the actuator **236** is configured to be depressed in a third direction, e.g., longitudinally rearward, that is different from the first and second directions, although other configurations are possible.

[0132] As illustrated in FIG. **14**, where the dispenser **110** is depicted in the closed position, the actuator **236** is at a rest position, prior to being depressed or rotated about the actuator hinge **240**. In the illustrated embodiment, the lever arm **242** is in contact with and pressed against the actuation surfaces **524** of the actuation docks **500**, the spring **472** is at a rest position and extends approximately the full length of the post **468**, and the drive unit **292** is at an initial position. Accordingly, the drive unit **292** and the actuator **236** are provided so as to avoid lost motion, which can occur when movement of a first component does not cause movement of a second component that is directly linked to the first component. Here, movement (e.g., rotation) of the actuator **236** about the actuator hinge **240** immediately causes vertical translation of the moving chassis **296** and one of the adaptors **300**, **600**, **700** when installed therein. Thus, lost motion is avoided by the present actuator **236** and drive unit **292** of the dispenser assembly **100**, as depicted in FIG. **14**.

[0133] However, it is contemplated that the drive unit **292** can provide the ability to effect lost motion with the actuator **236**. For example, the actuator **236** may be provided with shortened lever arms **242** that do not come into contact with the actuation surface **524** at the initial position. Instead, a gap (not shown) may be present between the lever arms **242** and the actuation surfaces **524** of the moving chassis **296**, such that only after the actuator **236** is pivoted about the actuator hinge **240** some partial radial distance, e.g., between about 3 degrees and about 10 degrees relative to the actuator hinge **240**, the lever arms **242** come into contact with the actuation surfaces **524** to cause vertical translation of the drive unit **292**. In this exemplary way, lost motion may be achieved by the present dispenser assembly **100** to prevent short-strokes that may damage or clog the pump **248** (see FIG. **3**), among other performance and user experience issues.

[0134] It is further contemplated that the dispenser assembly **100** incorporating the adaptor **300** (see FIGS. **11-13**) can provide lost motion between the drive unit **292** and the drive flange **288**. For example, the adaptor **300** may capture the drive flange **288** within modified first and second channels (not shown) that have a larger channel height **EE1**, such that vertical translation of the drive unit **292** does not immediately cause vertical translation of the drive flange **288**.

[0135] On the other hand, it may be desired that the drive unit **292** restricts the amount of fluid dispensed. For example, with reference to FIGS. **14** and **15**, a pair of shot restrictors **770** may be coupled to the moving chassis **296** to reduce the distance that the moving chassis **296** translates during actuation. The shot restrictors **770** are provided in the form of generally U-shaped clips that are removably coupled to the angled docking walls **512** of the actuation docks **500**, as illustrated in FIG. **15**. The shot restrictors **770** are configured to allow the lever arms **242** to slide therealong when the front panel **130** is pivoted from the open position to the closed position (see FIGS. **1** and **2**). Further, after the front panel **130** reaches the closed position, the shot restrictors **770** cause the lever arms **242** to push the moving chassis **296** vertically upward toward the collar **266** without

depressing the actuator **236**. That is, the distance between the moving chassis **296** and the collar **266** is reduced by the shot restrictor **770** being located between the lever arms **242** and the moving chassis **296**. In addition, the shot restrictors **770** reduce the vertical distance between the moving chassis **296** and the collar **266** by extending over the upper end **516**, between the moving chassis **296** and the collar **266**. In this way, the shot restrictors **770** are configured to reduce the distance that the moving chassis **296** can translate in two directions, i.e., vertically upward and vertically downward. By shortening the vertical translation distance of the drive unit **292**, the distance that the drive flange **288** translates is shortened, particularly with respect to the priming stage or the return to the initial position. In effect, this results in a modified initial position that is vertically displaced above the original initial position. As a result, the pump **248** is fully primed and, thus, less fluid is pulled into the pump **248** for being dispensed by actuation of the drive unit **292**.

[0136] Further, each of the adaptors **300**, **600**, **700** are associated with three different states when received within the dispenser assembly **100**. For example, in a first state, the adaptor **300** is received within the moving chassis **296** and no cartridge **120** is installed therein. In a second state, the adaptor **300** is received within the moving chassis **296** and a first type of the cartridge **120** is installed therein, the adaptor **300** and the cartridge **120** being compatible, i.e., the first catch **404** and the second catch **408** of the first adaptor correspond to the drive flange **288** of the first type of the cartridge **120** and/or pump **248** such that the predetermined distance E1 is compatible with the diameter D2. In this second state, the first type of the cartridge **120** is capable of dispensing a fluid by operation of the dispenser **110**. In a third state, the adaptor **300** is received within the moving chassis **296**, a second type of the cartridge **120**, different from the first type of cartridge **120**, is installed therein, and the first adaptor **300** is not compatible with the second type of cartridge **120**, i.e., the first catch **404** and the second catch **408** of the first adaptor **300** are incompatible with the drive flange of the second type of the cartridge **120** such that the predetermined distance E1 is incompatible with the diameter D2. In the third state, the incompatible drive flange is not captured between the adaptor **300** and the moving chassis **296** and, thus, the incompatible drive flange is not translated with the drive unit **292** to dispense fluid. Accordingly, the first, second, and third states of the adaptor **300** are mutually exclusive. It will be appreciated that the first, second, and third states are identical for the adaptor **600** of FIG. 9 and the adaptor **700** of FIG. 10.

[0137] In some embodiments, the adaptors **300**, **600**, **700** are formed of a stiff plastic, e.g., polyoxymethylene (POM), acrylonitrile butadiene styrene (ABS), nylon, polyethylene, or any other suitable material with relatively high stiffness and stability, although other materials may be used. The adaptors **300**, **600**, **700** are formed as a single, unitary component, although multiple components or assemblies may be provided without departing from the scope of the disclosure.

[0138] It is contemplated that each embodiment of the adaptors **300**, **600**, **700** may be provided with markings, indicia, coloring, or other means of communicating aspects related to compatibility with one or more cartridges **120**. For example, the adaptors **300**, **600**, **700** and the corresponding drive flange **288** may each include an identical coloration, numerical symbols, or the like to indicate compatibility.

[0139] Further, it is contemplated that the adaptors **300**, **600**, **700** may be provided as a kit with the corresponding cartridge **120**. For example, the dispenser **110** may be provided with the body **140** and the adaptor **300** that is configured to couple one type or version of the cartridge **120** to the body **140**. The adaptor **300** defines the predetermined distance E1 that corresponds to at least the diameter D2 of the drive flange **288** of the cartridge **120**. Further, the dispenser **110** can be provided with the adaptor **600** that is configured to couple another type or version of the cartridge **120** to the body **140**. The second adaptor **600** defines the predetermined distance E2 that corresponds to at least the diameter D2 of the drive flange **288** of the cartridge **120**, which is different from and incompatible with the predetermined distance E1. Accordingly, the dispenser **110** may be provided with both the adaptors **300** and **600**, but only one can be received within the body **140**, i.e., within the slot **436** of the moving chassis **296**, at a time.

[0140] It is contemplated that the adaptors **300**, **600**, **700** may be provided with greater or fewer numbers of catches and/or latches. In addition, it is contemplated that the adaptor **300**, **600**, **700** may shaped differently than shown. For example, the adaptor **300** may lack the latches **324**, **332** while still being operably engaged with the drive flange **288** and received within the moving chassis **296**. For example, central biased region **374** and the predetermined distance E1 of the adaptor **300** provide for a snap-fit capture of the drive flange **288** of compatible diameter D2. Further, the adaptor **300** is received within the slot **436** of the moving chassis **296** and prevented from vertical movement, e.g., by the upper member **440** and the lower member **444**, lateral movement, e.g., by the first bumper **536** and the second bumper **548**, and longitudinal movement, e.g., by the locator **386** in the pocket **390**. Accordingly, it is contemplated that differently shaped adaptors may be used within the dispenser assembly **100**.

[0141] It is further contemplated that the dispenser assembly **100** may be provided with an electronics module (not shown), e.g., a printed circuit board (PCB), and a power source (not shown), e.g., a battery, for measuring, recording, transmitting, and/or information related to the operation and/or status of the dispenser assembly **100**. In one example, an electronic module (not shown) records or counts the frequency with which the dispenser assembly **100** is used, such as with a magnet (not shown) that is coupled to the moving chassis **296** for vertical translation therewith to interact with a sensor (not shown) of the electronic module (not shown) at particular coordinates.

[0142] Although one or more preferred embodiments have been described, it will be appreciated that various changes or modifications may be made without departing from the scope defined in the appended claims.

Claims

1. A dispenser, comprising: a front panel that is coupled to a body to at least partially define an interior cavity; an actuator that is rotatably coupled to the front panel at an actuator hinge, wherein the actuator has a lever arm; a support structure that is configured to receive a portion of a cartridge that contains a fluid to be dispensed, wherein the cartridge is configured to be installed in an inverted orientation within the interior cavity of the dispenser, and wherein the cartridge includes a pump having a housing flange that is secured to a neck of the cartridge and a drive flange that is configured to move in relation to the housing flange; and a moving chassis that includes a spring post that is configured to receive a spring and an actuation dock that is configured to receive the lever arm of the actuator, such that when the front panel is pivoted about a body hinge toward the body, the lever arm is brought into contact with an upper end of the actuation dock for operable engagement with the moving chassis, wherein the spring biases the moving chassis to an initial position, and wherein, when the actuator is depressed, the lever arm of the actuator is configured to contact the upper end of the actuation dock, such that the moving chassis is translated from the initial position to a stroke position to actuate the pump of the cartridge.
2. The dispenser of claim 1, wherein the lever arm includes a pair of lever arms, the actuation dock includes a pair of actuation docks, and the spring post includes a pair of spring posts.
3. The dispenser of claim 1, wherein the front panel includes a front wall that spans across a perimeter thereof, and wherein the actuator is mounted within a notch of the front wall and the lever arm protrudes from the actuator hinge.
4. The dispenser of claim 1, wherein the upper end spans between an inner wall and an outer wall, and a docking wall extends forwardly from the upper end of the actuation dock.
5. The dispenser of claim 1, wherein, in operation, the actuator is configured to be depressed in a rearward direction, the moving chassis is translated in an upward direction from the initial position to the stroke position, and the spring exerts a force upon the moving chassis to cause vertical translation in a downward direction to return it from the stroke position to the initial position.

6. The dispenser of claim 1, wherein the drive flange and the housing flange are circular.
7. The dispenser of claim 1, wherein the moving chassis defines a receptacle that is configured to receive the drive flange of the cartridge.
8. The dispenser of claim 1, wherein the moving chassis has a lower member that is generally U-shaped and defines a lower surface.
9. The dispenser of claim 1, wherein body has a bottom end that is opposite a top end and a front end that is opposite a rear end, and wherein the front panel is disposed at the front end and a backplate is disposed at the rear end.
10. The dispenser of claim 1, wherein at least one window is provided on the dispenser.
11. A dispenser, comprising: a front panel that is coupled to a body to at least partially define an interior cavity, wherein the front panel is rotatable about an access hinge at a bottom end of the body; an actuator that is rotatably coupled to the front panel at an actuator hinge, wherein the actuator has a pair of lever arms, and wherein the actuator hinge is spaced apart from the access hinge; a support structure that is configured to receive a portion of a cartridge that contains a fluid to be dispensed, wherein the cartridge is configured to be installed in an inverted orientation within the interior cavity of the dispenser, and wherein the cartridge includes a pump having a housing flange that is secured to a neck of the cartridge and a drive flange that is configured to move in relation to the housing flange; and a moving chassis that includes a pair of actuation docks that are configured to receive the pair of lever arms of the actuator, wherein, when the actuator is depressed, the pair of lever arms of the actuator are configured to contact upper ends of the pair of actuation docks, such that the moving chassis is translated from an initial position to a stroke position to actuate the pump of the cartridge.
12. The dispenser of claim 11, wherein the support structure includes a collar that is carried by the body and arranged to retain the housing flange against movement relative to the dispenser.
13. The dispenser of claim 11, wherein the cartridge and the support structure include complementary guide formations arranged such that the cartridge is configured to be loaded in the dispenser in one or more predetermined orientations.
14. The dispenser of claim 11, wherein the support structure includes guide projections arranged such that the cartridge is configured to be retained against movement relative to the dispenser.
15. The dispenser of claim 11, wherein the pump of the cartridge is at least one of a foam-type pump or a liquid-type pump.
16. The dispenser of claim 11, wherein, when the front panel is pivoted about the access hinge toward the body, the pair of lever arms are brought into contact with upper ends of the pair of actuation docks for operable engagement with the moving chassis.
17. A dispenser, comprising: a front panel that is coupled to a body to at least partially define an interior cavity, wherein the front panel is rotatable about an access hinge at a bottom end of the body; at least one window; an actuator that is rotatably coupled to the front panel at an actuator hinge, wherein the actuator has a pair of lever arms, and wherein the actuator hinge is spaced apart from the access hinge; a support structure that is configured to receive a portion of a cartridge that contains a fluid to be dispensed, wherein the cartridge is configured to be installed in an inverted orientation within the interior cavity of the dispenser, wherein the dispenser includes guide projections arranged such that the cartridge is configured to be retained against movement relative to the dispenser, and wherein the cartridge includes a pump having a housing flange that is secured to a neck of the cartridge and a drive flange that is configured to move in relation to the housing flange; and a moving chassis that includes a pair of actuation docks that are configured to receive the pair of lever arms of the actuator and a pair of spring posts that are configured to receive springs, wherein, when the actuator is depressed, the pair of lever arms of the actuator is configured to contact upper ends of the pair of actuation docks, such that the moving chassis is translated from an initial position to a stroke position to actuate the pump of the cartridge.
18. The dispenser of claim 17, wherein, in operation, the actuator is configured to be depressed in a

rearward direction, the moving chassis is translated in an upward direction from the initial position to the stroke position, and the spring exerts a force upon the moving chassis to cause vertical translation in a downward direction to return it from the stroke position to the initial position.

19. The dispenser of claim 18, wherein the drive flange and the housing flange are circular.

20. The dispenser of claim 11, wherein the pump of the cartridge is at least one of a foam-type pump or a liquid-type pump.
