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CANNED VALVE SEAL

Abstract

A canned valve seal is disclosed. The valve seal is used within a gland formed in a piston body, the valve seal providing a fluid seal between the body and a valve when the valve is in a closed position, the valve seal includes a stiff component and a sealing material about the stiff component.

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Background/Summary

FIELD OF THE INVENTION

[0001] Embodiments of the invention generally relate to telescopic assemblies.

BACKGROUND

[0002] In many telescopic assemblies, the fluid flow through the piston is used to control some of

the performance characteristics. Often, a flow path will be provided through the piston body and a valve will be used to control the fluid flow therethrough. Because of the required movement between the valve and the piston body a seal is used to provide a fluid seal when the valve is in a closed position.

[0003] Often, the seal is an O-ring. However, O-rings have operational ranges, such as pressure differentials and the like, that can cause detrimental operation. For example, in some pressure differential environments, the initial opening of the valve will cause the O-ring to flutter, make noise, become damaged, be partially and/or entirely displaced from its installed location, and the like.

[0004] In one embodiment, the noise sounds like a “honk”. In one embodiment, the sound is loud enough to be heard by the rider and/or people nearby. In one embodiment, the fluttering can be felt by the rider, such as being transmitted by the pedals, handlebars, etc. In one embodiment, this noise and/or fluttering can continue to occur if the valve is held in a partially opened position instead of being fully opened.

[0005] For example, when there is an increases in the pressure (or a pressure imbalance) between the fluid in two chambers between the piston, the opening of the valve will initiate a high velocity flow as the higher pressure fluid moves through the piston flow path. In one embodiment, the high velocity flow will cause a low-pressure zone around the O-ring. This low-pressure zone will create a “suction effect” attempting to pull the O-ring radially inward. Additionally, under certain conditions, high velocity flow of fluid will impact the “backside” or “gland-facing” side of the O-ring and essentially “wash” or “blow” the O-ring out of position. Furthermore, the “suction effect” and the “wash”/“blow” effect may act together.

[0006] In a deleterious situation, when the O-ring is pulled completely out of its proper location, fluid will continue to at least partially flow unencumbered through the piston flow path regardless of the state of the valve. In other words, the telescoping assembly will no longer be functionally operable.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Aspects of the present invention are illustrated by way of example, and not by way of limitation, in the accompanying drawings, wherein:

[0008] FIG. **1** is a perspective view of a shock assembly, in accordance with an embodiment.

[0009] FIG. **2** is a schematic depiction of a telescopic assembly, in accordance with an embodiment.

[0010] FIG. **3**A is a section view of the valve seal between the body and a valve, in accordance with an embodiment.

[0011] FIG. **3**B is a section view of the valve seal between the body and the valve, in accordance with an embodiment.

[0012] FIG. **3**C is a side cutaway view of the valve seal between the body and the valve, in accordance with an embodiment.

[0013] FIG. **4**A is a section view of the valve seal between the body and the valve, in accordance with an embodiment.

[0014] FIG. **4**B is a section view of the valve seal between the multi part body and the valve, in accordance with an embodiment.

[0015] FIG. **4**C is a section view of the valve seal between the multi part body and the valve, in accordance with an embodiment.

[0016] FIG. **4**D is a section view of the valve seal between the multi part body an O-ring and the valve, in accordance with an embodiment.

[0017] FIG. **4**E is a section view of the valve seal between the multi part body and the valve, in accordance with an embodiment.
[0018] FIG. **5** is a section view of the valve seal between the body and the valve, in accordance with an embodiment.
[0019] FIG. **6** is a perspective view of the valve with features in a face thereof, in accordance with an embodiment.
[0020] FIG. **7**A is a section view of a piston having a closed valve, in accordance with an embodiment.
[0021] FIG. **7**B is a section view of a piston having an open valve, in accordance with an embodiment.
[0022] The drawings referred to in this description should be understood as not being drawn to scale except if specifically noted.

DESCRIPTION OF EMBODIMENTS

[0023] The detailed description set forth below in connection with the appended drawings is intended as a description of various embodiments of the present invention and is not intended to represent the only embodiments in which the present invention is to be practiced. Each embodiment described in this disclosure is provided merely as an example or illustration of the present invention, and should not necessarily be construed as preferred or advantageous over other embodiments. In some instances, well known methods, procedures, and objects have not been described in detail as not to unnecessarily obscure aspects of the present disclosure.
[0024] In general, a suspension system for a vehicle provides a motion modifiable connection between a portion of the vehicle that is in contact with a surface (e.g., an unsprung portion) and some or all of the rest of the vehicle that is not in contact with the surface (e.g., a suspended portion). For example, the unsprung portion of the vehicle that is in contact with the surface can include one or more wheel(s), skis, tracks, hulls, etc., while some or all of the rest of the vehicle that is not in contact with the surface include suspended portions such as a frame, a seat, handlebars, engines, cranks, etc.
[0025] The suspension system will include one or numerous components which are used to couple the unsprung portion of the vehicle (e.g., wheels, skids, wings, etc.) with the suspended portion of the vehicle (e.g., seat, cockpit, passenger area, cargo area, etc.). Often, the suspension system will include one or more telescopic assemblies which are used to reduce feedback from the unsprung portion of the vehicle before that feedback is transferred to the suspended portion of the vehicle, as the vehicle traverses an environment. However, the language used by those of ordinary skill in the art to identify a telescopic assembly used within the suspension system can differ while referring to the same (or similar) types of components. For example, some of those of ordinary skill in the art will refer to a telescopic assembly as a shock absorber (or shock assembly etc.), while others of ordinary skill in the art will refer to the telescopic assembly as a damper (or damper assembly).
[0026] One example of a particular telescopic assembly is provided in FIG. **1**. In FIG. **1**, a perspective view of telescopic assembly **100** comprising a shock assembly is shown wherein the shock assembly includes eyelets **105** and **110**, damper housing **120**, helical spring **115**, piston shaft **130**, and piggyback (or external reservoir **125**).
[0027] However, the telescopic assembly disclosed herein is not limited to “shock assemblies” or to use as a vehicle suspension. The telescopic assemblies of the present embodiments may be used, for example, with a screen door (or the like) to reduce the speed of closure and/or return an open door to a closed position. In another embodiment, the telescopic assembly may be used to hold the hood of a vehicle, the trunk of a car, etc. in an open position. In another embodiment, the telescopic assembly is used in a hold, release, and return configuration such as a dropper seatpost. In another embodiment, the telescopic assembly is used on a suspension inclusive device such as, but not limited to an exoskeleton, a seat frame, a prosthetic, an orthotic, a suspended floor, and the like.
[0028] Embodiments of the present invention are well suited to any environment where a telescopic

assembly is beneficial for energy storage and/or dissipation.
[0029] Referring now to FIG. **2**, a telescopic assembly often comprises a (damping) piston **202** and a piston shaft **204** telescopically mounted in a fluid filled cylinder (e.g., a chamber **206**). The fluid **208** (e.g., damping fluid, working fluid, etc.) may be, for example, a hydraulic oil, a gas such as nitrogen, air, or the like. In one embodiment, the adjustable telescopic assembly will include a mechanical spring, such as helical spring **115**, that surrounds or is mounted in parallel with the body of the adjustable telescopic assembly. In one embodiment, the telescopic assembly will include an air spring instead of a helical spring **115**. In one embodiment, the telescopic assembly will include both a helical spring **115** and an air spring.
[0030] In telescopic assemblies that do not have a through shaft, the available fluid volume within a chamber **206** changes as the shaft **204** moves in and out of the chamber **206**. For example, the maximum amount of working fluid which can be held within the chamber **206** is limited by the shaft **204**. In other words, when the telescopic assembly is completely compressed and the shaft **204** is taking up its maximum volume within the chamber **206**, the remaining fluid volume can be filled with the working fluid. As such, when the shaft **204** is at least partially withdrawn from the chamber **206**, the reduction in shaft volume within the chamber **206** results in an increase in the amount of available fluid volume within the chamber **206**. In a most basic telescopic assembly, that space is filled with a gas such as, but not limited to, air. For purposes of brevity and clarity, the present discussion will refer to the gas as air. Deleteriously, during operation of the telescopic assembly the motion of the piston **202** within the chamber **206** can incorporate the air into the working fluid to form what is often referred to as an emulsion. Basically, when an emulsion is created in chamber **206**, rather than the piston **202** interacting solely with non-compressible working fluid, the piston **202** is instead interacting with a combination of compressible air and the working fluid (i.e., the emulsion). During such a condition, the piston **202** experiences reduced resistance to movement through the chamber **206** thereby resulting in a reduced damping response.
[0031] For additional detail and description of a shock absorber/damper including components and operation, see, as an example, U.S. Pat. Nos. 6,296,092; 10,576,803; and 10,036,443 the contents of which are incorporated by reference herein, in their entirety.
[0032] With reference now to FIG. **3**A, a section view of a valve seal **310** between a piston body **322** and a valve **320** of a piston **202** is shown in accordance with an embodiment.
[0033] In general, piston **202** will include at least one flow path **354** therethrough. This fluid pathway allows the fluid to move from one side of piston **202** to the other as the piston **202** moves within the chamber **206**. In one embodiment, the fluid will move from one side of chamber **206** to the other where the sides are separated by piston **202**. In other embodiments, the fluid will move between chamber **206** and another chamber **293** via the flow path **354** of piston **202**. By setting and/or controlling the flow rate of the fluid through the flow path **354**, the damping characteristics and/or actual operation of the telescopic assembly **100** can be set and/or modified.
[0034] Sometimes, such as in a dropper seat post, or the like, it is important to be able to control the opening and closing of the flow path **354**. For example, when the dropper seatpost is extended, it is held in its extended position by closing the flow path **354**. This is accomplished, in one embodiment, by moving valve **320** with respect to the piston body **322** such that the flow path **354** is blocked (as shown in FIG. **4**A). In so doing, the dropper seatpost will not compress while the valve **320** is in the closed position.
[0035] If the user would like to lower the dropper seatpost, the user would activate a component to move the valve **320** with respect to the piston body **322** such that the flow path **354** is opened. When the valve **320** is in the open position (as shown in FIG. **3**A), the fluid **208** can flow through flow path **354** of piston **202** which will allow the piston to move further into chamber **206** causing the telescopic assembly **100** to compress and thus, the dropper seatpost to drop.
[0036] In one embodiment, an adjuster rod **325** (or the like) is used to open or close valve **320**.
[0037] In one embodiment, valve **320** is a spool valve. However, it should be appreciated that in

another embodiment, the valve may be another type of valve such as a poppet valve, or the like. A spool valve is shown as one embodiment and for purposes of clarity.

[0038] In one embodiment, the valve seal **310** provides a fluid seal between piston body **322** and the valve **320**. When valve **320** is closed (or seated) valve seal **310** seals any fluid flow between valve **320** and piston body **322**. In contrast, when valve **320** is in an open position, or no longer seated, flow path **354** is opened and fluid **208** can flow through port **356** between chambers **206** and/or **293**.

[0039] With reference now to FIG. **3**B, a section view of the valve seal **310** between the piston body **322** and the valve **320** is shown in accordance with an embodiment. In FIG. **3**C, a side cutaway view of the valve seal **310** between the piston body **322** and the valve **320** is shown in accordance with an embodiment. For purposes of clarity, the components and/or functionality of FIGS. **3**B and **3**C that are the same or similar to the components and/or functionality already described in FIG. **3**A are not repeated, but instead the entirety of any components and/or functionality discussions provided herein is incorporated by reference.

[0040] In one embodiment, valve seal **310** includes a sealing material **312** and a stiff component **311** therein. In general, the stiff component **311** will hold or retain the valve seal **310** within gland **315**. That is, the stiff component **311** provides rigidity to the sealing material **312** of the valve seal **310** such that valve seal **310** will remain within gland **315** regardless of the velocity of fluid **208** (e.g., oil, hydraulic fluid, etc.) flowing next to valve seal **310**. In one embodiment, stiff component **311** is selected from one or more various materials, such as, but not limited to: a metal alloy, steel, aluminum, titanium, ceramic, plastic, a composite material, and carbon fiber, and the like. Basically, the stiff component **311** has a higher modulus of elasticity than the sealing material **312** of the valve seal **310**.

[0041] In one embodiment, the sealing material **312** is over molded about stiff component **311** to form the valve seal **310**. In one embodiment, the sealing material **312** is selected from one or more various materials such as, but not limited to: polymer, silicon, rubber, polytetrafluoroethylene (PTFE), an elastomer, nitrile butadiene rubber (NBR), or the like.

[0042] In one embodiment, the sealing material **312** has a portion missing from a portion thereof. In one embodiment, the sealing material **312** does not have a portion missing and the stiff component **311** is completely encased by sealing material **312**.

[0043] In one embodiment, the sealing material **312** of valve seal **310** is formed into a shape wherein the valve seal **310** has a cross-sectional profile with a geometric shape such as, for example, a trapezoid as shown in FIG. **3**B and/or a D-profile as shown in FIG. **3**C. By forming valve seal **310** with such a geometric shape, retention of valve seal **310** within gland **315** is improved. In one embodiment, the sealing material **312** is formed into a shape wherein the valve seal **310** has a cross-sectional profile with a geometric shape such as, for example, a circle, star, square, diamond, D-shaped, rectangular, trapezoidal, etc.

[0044] In one embodiment, valve seal **310** is over molded directly into the gland **315**. In one embodiment, valve seal **310** that is over molded directly into the gland **315** does not include stiff component **311**. In one embodiment, valve seal **310** including stiff component **311**, is over molded directly into the gland **315**.

[0045] With reference now to FIG. **4**A, a section view of the valve seal **310** between the piston body **322** and the valve **320** is shown in accordance with an embodiment. For purposes of clarity, the components and/or functionality of FIG. **4**A that are the same or similar to the components and/or functionality already described in FIGS. **3**A-**3**C are not repeated, but instead the entirety of any components and/or functionality discussions provided herein is incorporated by reference.

[0046] In one embodiment, the portion of piston body **322** that forms gland **315** is a single piece. In one embodiment, as shown in FIG. **4**A, the portion of piston body **322** that forms gland **315** is made up of more than one piece. In one embodiment, the portion of piston body **322** that forms gland **315** is made up of two pieces, e.g., **322***a* and **322***b*. In one embodiment, the portion of piston

body **322** that forms gland **315** is made up of more than two pieces.
[0047] In one embodiment, body pieces **322***a* and **322***b* are threadedly coupled to form the gland **315** of piston body **322**. In one embodiment, there is some type of thread sealer or the like used to provide a fluid seal when body pieces **322***a* and **322***b* are threadedly engaged.
[0048] In one embodiment, valve seal **310** is placed within gland **315** and the body pieces **322***a* and **322***b* are threadedly engaged to hold valve seal **310** within gland **315**. In one embodiment, by providing a multi-piece gland **315** section of piston body **322**, the valve seal **310** that includes stiff component **311** is able to be placed in position within the gland **315** before the placement of valve **320** (or without having to force valve seal **310** about valve **320** which could deleteriously damage the valve seal **310**). In so doing assembly, disassembly, and maintenance is significantly reduced in complexity.
[0049] With reference now to FIG. **4**B, a section view of the valve seal **310** between the multi part piston body **322** and the valve **320** is shown in accordance with an embodiment. In FIG. **4**C, a section view of the valve seal **310** between the multi part piston body **322** and the valve **320** is shown in accordance with an embodiment. With reference now to FIG. **4**D, a section view of the valve seal **310** between the multi part piston body **322** an O-ring **425** and the valve **320** is shown in accordance with an embodiment. In FIG. **4**E, a section view of the valve seal **310** between the multi part piston body **322** and the valve **320** is shown in accordance with an embodiment. For purposes of clarity, the components and/or functionality of FIGS. **4**B-**4**E that are the same or similar to the components and/or functionality already described in FIGS. **3**A-**4**A are not repeated, but instead the entirety of any components and/or functionality discussions provided herein is incorporated by reference.
[0050] In one embodiment, the sealing material **312** is over molded about stiff component **311** to form the valve seal **310**. In one embodiment, the sealing material **312** is formed into a geometric shape such as a trapezoid as shown in FIG. **4**B and/or a D-profile as shown in FIG. **4**C. In one embodiment, the sealing material **312** is formed into a different geometric shape such as a circle, star, square, diamond, D-shaped, rectangular, trapezoidal, etc.
[0051] In one embodiment, as shown in FIGS. **4**B and **4**C, the sealing material **312** over molded about stiff component **311** to form the valve seal **310** is wide enough such that during assembly of the body pieces **322***a* and **322***b* to form the gland **315** of piston body **322**, the upper and lower body pieces **322***a* and **322***b* of the gland **315** squeeze the valve seal **310** causing valve seal **310** to provide both a radial and axial seal. In other words, the squeezed valve seal **310** will provide a fluid seal for the threads of body pieces **322***a* and **322***b* there behind.
[0052] In one embodiment, the geometric shape of the valve **320** facing portion of valve seal **310** is modified to ensure when the valve seal **310** is squeezed by the threading of body pieces **322***a* and **322***b* there is not too much material being pressed into the area forming the seal with the valve **320**. In so doing, when valve **320** is opened the valve seal **310** will not overtake the area (or otherwise deleteriously fill the void of the opened valve **320**) thereby causing a closing issue when the valve spring **715** presses the valve **320** back into its closed position.
[0053] With reference again to FIG. **4**D, in one embodiment instead of the upper and lower body pieces **322***a* and **322***b* of the gland **315** squeezing the valve seal **310** and cause valve seal **310** to provide both a radial and axial seal an O-ring **425** (or sealant, tape, etc.) is used to fluidly seal the threads such that valve seal **310** is not squeezed and as such will not deleteriously fill the void of the opened valve **320**. In one embodiment, the O-ring **425** (or sealant, tape, etc.) is used in conjunction with the squeezing of the valve seal **310** as shown in FIGS. **4**B and **4**C.
[0054] FIG. **4**E, shows one embodiment where only a portion of the valve seal **310** is squeezed while the remainder of the valve seal **310** is not. For example, in one embodiment, the upper and lower body pieces **322***a* and **322***b* of the gland **315** squeeze the rear portion **475** of the valve seal **310** and cause the rear of the valve seal **310** to fluidly seal the threads of body pieces **322***a* and **322***b*. At the same time, the front (or valve facing portion) of valve seal **310** is not squeezed and, as

such, will not deleteriously fill the void caused by the opening of valve **320**. In one embodiment, the O-ring **425** (or sealant, tape, etc.) of FIG. **4**D is used in conjunction with the squeezing of the valve seal **310** as shown in FIG. **4**E.

[0055] With reference now to FIG. **5**, a section view of the valve seal **310** between the piston body **322** and the valve **320** is shown in accordance with an embodiment. For purposes of clarity, the components and/or functionality of FIG. **5** that are the same or similar to the components and/or functionality already described in FIGS. **3**A-**4**E are not repeated, but instead the entirety of any components and/or functionality discussions provided herein is incorporated by reference.

[0056] In one embodiment, the portion of piston body **322** that forms gland **515** is a single piece. In one embodiment, the portion of piston body **322** that forms gland **515** is made up of more than one piece. In one embodiment, the portion of piston body **322** that forms gland **515** is made up of two pieces, e.g., **322***a* and **322***b*. In one embodiment, the portion of piston body **322** that forms gland **515** is made up of more than two pieces.

[0057] In one embodiment, gland **515** of piston body **322** is formed with a dovetail shape to trap the valve seal **310** within the gland **515** and stop the valve seal **310** from making noise, fluttering, and/or being pulled from gland **515** during high velocity flow events.

[0058] In one embodiment, the O-ring **425** (or sealant, tape, etc.) of FIG. **4**D is used in conjunction with the dovetail gland **515**. In one embodiment, the squeezing of the valve seal **310** as shown in FIGS. **4**B, **4**C, and/or **4**E is used in conjunction with the dovetail gland **515**. In one embodiment, the O-ring **425** (or sealant, tape, etc.) of FIG. **4**D and the squeezing of the valve seal **310** as shown in FIGS. **4**B, **4**C, and/or **4**E is used in conjunction with the dovetail gland **515**.

[0059] With reference now to FIG. **6**, a perspective view of the valve **320** with features in a face thereof is shown in accordance with an embodiment. For purposes of clarity, the components and/or functionality of the valve **320** of FIG. **6** that are the same or similar to the components and/or functionality already described in FIGS. **3**A-**5** are not repeated, but instead the entirety of any components and/or functionality discussions provided herein is incorporated by reference.

[0060] In one embodiment, valve **320** includes at least one groove in a face thereof. In one embodiment, the groove is a horizontal groove **510** and/or a vertical groove **505**. In one embodiment the horizontal groove **510** and/or a vertical groove **505** creates an initial pathway for pressure release when the valve **320** is initially opened to the high velocity fluid flow by providing an opening (e.g., the groove) while allowing the valve seal **310** to remain in contact with (and be supported by) the valve **320** such that it does not make noise, vibrate or be deleteriously pulled from the gland **315** within which it resides.

[0061] In one embodiment, the groove in the face of the valve **320** is used in conjunction with O-ring **425** (or sealant, tape, etc.) of FIG. **4**D. In one embodiment, groove in the face of the valve **320** is used in conjunction with the dovetail gland **515** of FIG. **5**. In one embodiment, the groove in the face of the valve **320** is used in conjunction with the squeezing of the valve seal **310** as shown in FIGS. **4**B, **4**C, and/or **4**E. In one embodiment, the groove in the face of the valve **320** is used in conjunction with the O-ring **425** (or sealant, tape, etc.) of FIG. **4**D, the squeezing of the valve seal **310** as shown in FIGS. **4**B, **4**C, and/or **4**E, and/or the dovetail gland **515** of FIG. **5**.

[0062] With reference now to FIG. **7**A, a piston **700** with the valve **720** in a closed configuration is shown in accordance with an embodiment. In one embodiment, piston **700** includes a body **722**, a valve **720**, a valve seal **310**, valve spring **715**, cap **705**, and glide band **710**. In one embodiment, adjuster rod **325** is used to open valve **720**.

[0063] In one embodiment, the valve **720** is a poppet valve. However, it should be appreciated that in another embodiment, the valve may be another type of valve. The use of the poppet valve is provided as one embodiment and for purposes of clarity.

[0064] In one embodiment, valve spring **715** is used to provide the operating force to close valve **720**. In one embodiment, cap **705** is threadedly coupled with body **722**, such that the compression of valve spring **715** is adjustable by the tightening (or loosening) of cap **705** with respect to body

722.
[0065] With reference now to FIG. **7**B, a piston **700** with the valve **720** in an open configuration is shown in accordance with an embodiment. For purposes of clarity, the components and/or functionality of FIG. **7**B that are the same or similar to the components and/or functionality already described in FIG. **7**A is not repeated, but instead the entirety of any components and/or functionality discussions provided herein is incorporated by reference.
[0066] In FIG. **7**B, the valve **720** is in an open position such that flow path **754** is open. In one embodiment, chamber **206** includes port(s) **756** which allow fluid **208** to flow between chamber **206** and chamber **293**.
[0067] Referring now to FIGS. **7**A and **7**B, when valve **720** is in the closed configuration, flow path(s) **754** are closed (or blocked) by valve **720**. However, as shown in FIG. **7**B, and in contrast to FIG. **7**A, when the valve **720** is in an open position flow path **754** is no longer blocked by valve **720** and fluid **208** from chamber **206** and/or **293** can flow through flow path **754** and through port **756** as the telescopic assembly is being extended (or raised). In one embodiment, during the extension of the telescopic assembly fluid **208** will flow from chamber **293** through port **756** as shown by flow path **754** and into chamber **206**.
[0068] The foregoing Description of Embodiments is not intended to be exhaustive or to limit the embodiments to the precise form described. Instead, example embodiments in this Description of Embodiments have been presented in order to enable persons of skill in the art to make and use embodiments of the described subject matter. Moreover, various embodiments have been described in various combinations. However, any two or more embodiments can be combined. Although some embodiments have been described in a language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed by way of illustration and as example forms of implementing the claims and their equivalents.

Claims

1. A telescopic assembly comprising: at least one upper tube; at least one lower tube, wherein said at least one upper tube and said at least one lower tube are telescopically disposed with respect to each other to form at least one fluid chamber of said telescopic assembly; and a piston disposed at least partially within said fluid chamber and dividing said fluid chamber into a first portion and a second portion, said piston comprising: a body with at least one fluid pathway therethrough, said at least one fluid pathway extends between said first portion and said second portion of said fluid chamber; a valve slidably disposed at least partially within said body, wherein said valve controls a fluid flow through said at least one fluid pathway; and a valve seal within a gland formed in said body, said valve seal providing a fluid seal between said body and said valve when said valve is in a closed position, said valve seal comprising: a stiff component; and a sealing material about said stiff component.
2. The telescopic assembly of claim 1 wherein said valve seal is shaped to retain said valve seal in said gland.
3. The telescopic assembly of claim 1 wherein said sealing material is over molded about said stiff component and directly into said gland to form said valve seal.
4. The telescopic assembly of claim 1 wherein said sealing material of said valve seal is formed into a shape wherein said valve seal has a cross-sectional profile with a geometric shape selected from the group consisting of: D-shaped, circular, rectangular, trapezoidal, and diamond-shaped.
5. The telescopic assembly of claim 1 wherein said stiff component is configured to retain said valve seal in said gland.
6. The telescopic assembly of claim 1 wherein said stiff component is formed of at least one

material selected from the group consisting of: a metal alloy, steel, aluminum, titanium, ceramic, plastic, a composite material, and carbon fiber.

7. The telescopic assembly of claim 1 wherein said sealing material is at least one material selected from the group consisting of: a polymer, silicon, rubber, polytetrafluoroethylene (PTFE), an elastomer, and nitrile butadiene rubber (NBR).

8. The telescopic assembly of claim 1 wherein said gland is configured to retain said valve seal in said gland.

9. The telescopic assembly of claim 1 wherein said gland is formed of a plurality of body pieces, said valve seal constrained between said plurality of body pieces to retain said valve seal in said gland.

10. The telescopic assembly of claim 1 wherein said piston further comprises: a pressure relief valve coupled with said body, said pressure relief valve providing a second fluid pathway between said first portion and said second portion of said fluid chamber, said pressure relief valve configured to limit a first pressure in said first portion from exceeding a second pressure in the second portion by more than a predefined value.

11. A piston comprising: a body with at least one fluid pathway therethrough; a valve slidably disposed at least partially within said body, wherein said valve is configured to control fluid flow through said at least one fluid pathway; and a valve seal within a gland formed in said body, said valve seal configured to provide a fluid seal between said body and said valve when said valve is in a closed position, said valve seal comprising: a sealing material formed with a shape to retain said valve seal in said gland.

12. The piston of claim 11 wherein said sealing material of said valve seal is formed into a shape wherein said valve seal has a cross-sectional profile with a geometric shape selected from the group consisting of: D-shaped, circular, rectangular, trapezoidal, and diamond-shaped.

13. The piston of claim 11 wherein said valve seal further comprises: a stiff component, said sealing material over molded about said stiff component to form said valve seal.

14. The piston of claim 13 wherein said sealing material is over molded about said stiff component and directly into said gland to form said valve seal.

15. The piston of claim 13 wherein said stiff component is configured to retain said valve seal in said gland.

16. The piston of claim 13 wherein said stiff component is formed of at least one material selected from the group consisting of: a metal alloy, steel, aluminum, titanium, plastic, ceramic, a composite material, and carbon fiber.

17. The piston of claim 13 wherein said sealing material is at least one of the materials selected from the group consisting of: polymer, silicon, rubber, polytetrafluoroethylene (PTFE), an elastomer, and nitrile butadiene rubber (NBR).

18. The piston of claim 11 wherein said gland is configured to retain said valve seal in said gland.

19. The piston of claim 11 wherein said gland is formed of a plurality of body pieces, said valve seal constrained between said plurality of body pieces to retain said valve seal in said gland.

20. The piston of claim 11 wherein said piston further comprises: a pressure relief valve coupled with said body, said pressure relief valve providing a second fluid pathway between said first portion and said second portion of said fluid chamber, said pressure relief valve configured to limit a first pressure in said first portion from exceeding a second pressure in the second portion by more than a predefined value.