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Hansen

(54) **RETROFIT WELLBORE FLUID INJECTION SYSTEM**

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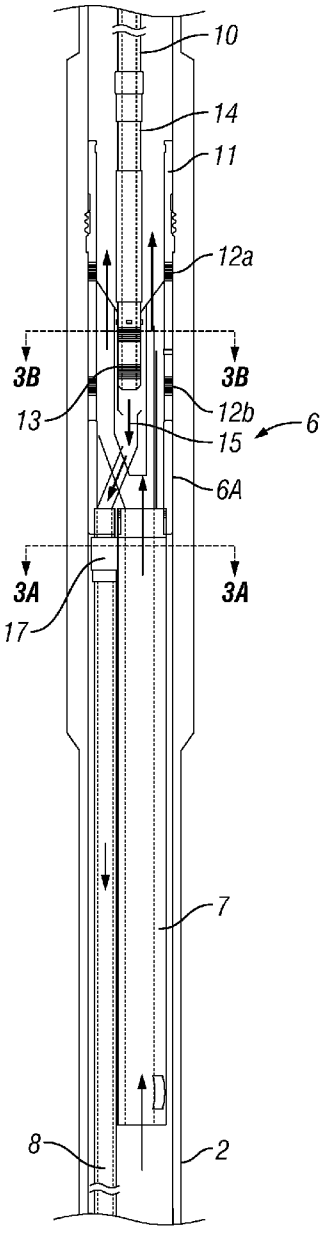
(57) **ABSTRACT**

A fluid injection system for a wellbore includes an adapter configured to be retained in a safety valve landing nipple. The landing nipple is disposed in a production tubing inserted in the wellbore. The adapter includes a first sealed fluid passage between a part of the tubing disposed above the adapter and a first fluid injection line disposed in a part of the tubing below the adapter. The adapter includes a second sealed fluid passage between a part of the tubing below the adapter and a second fluid injection line disposed inside the tubing above the adapter. The second fluid injection line extends to a wellhead at an upper end of the wellbore.



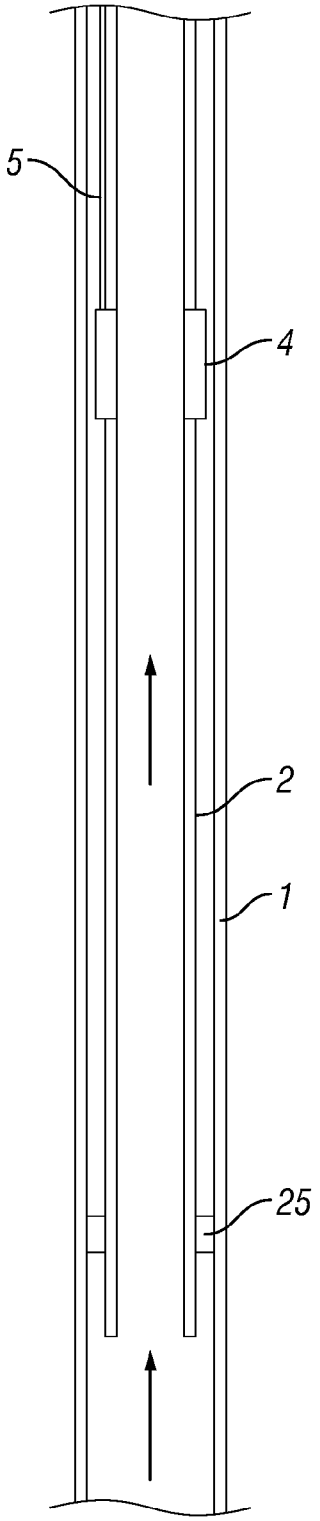


FIG. 1
(Prior Art)

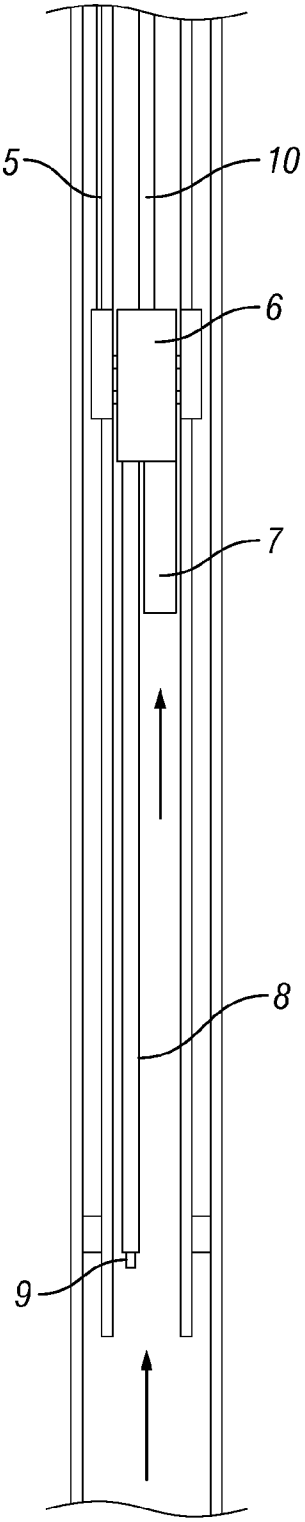


FIG. 2

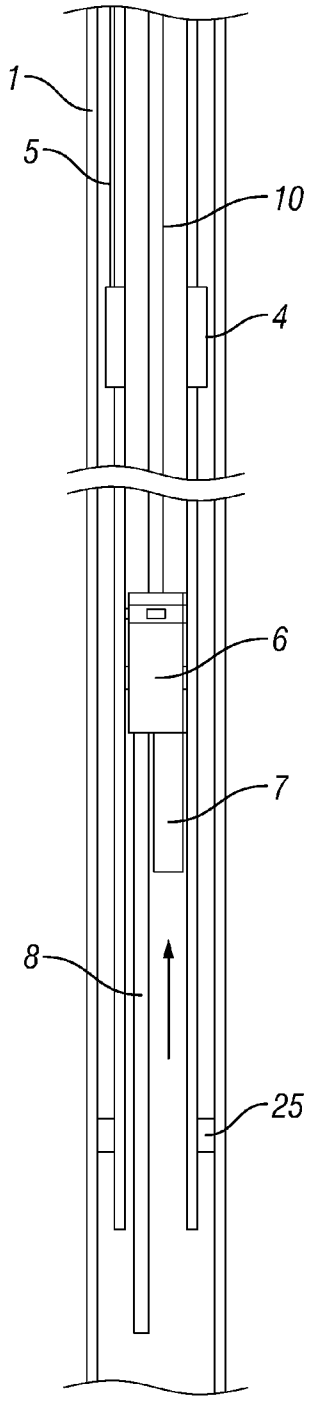


FIG. 2A

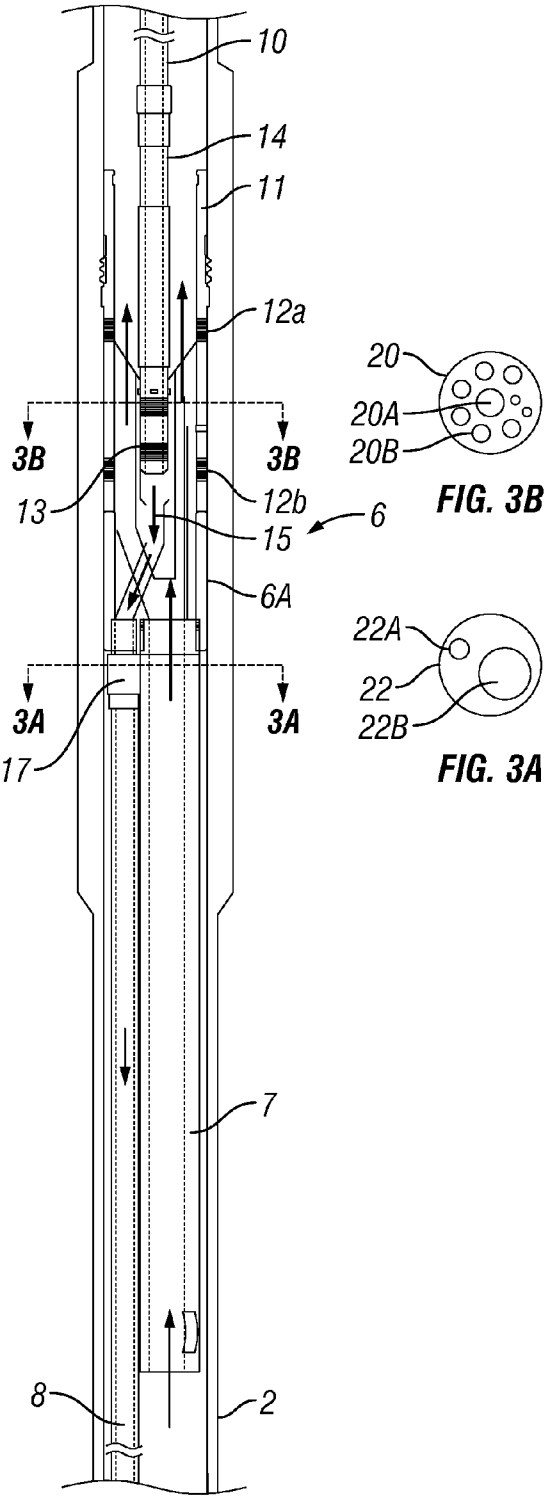


FIG. 3B

FIG. 3A

FIG. 3

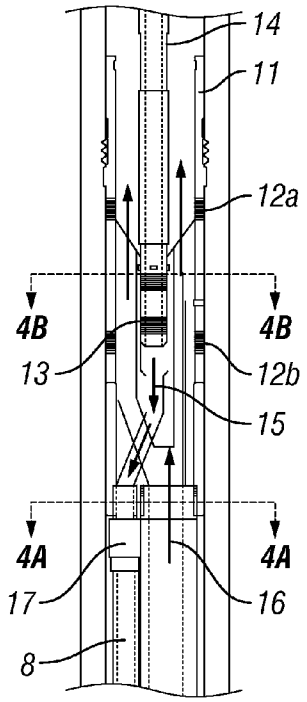


FIG. 4

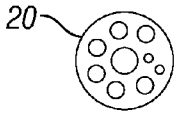


FIG. 4B

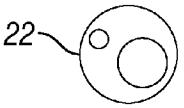


FIG. 4A

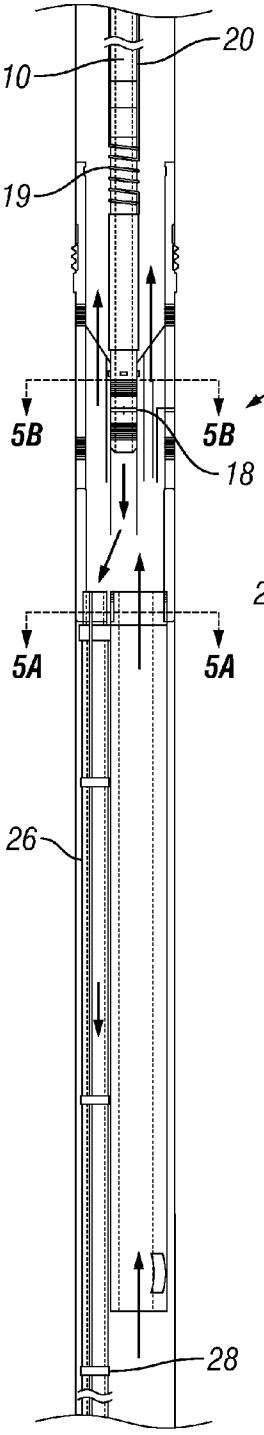


FIG. 5

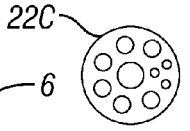


FIG. 5B

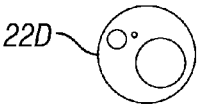


FIG. 5A

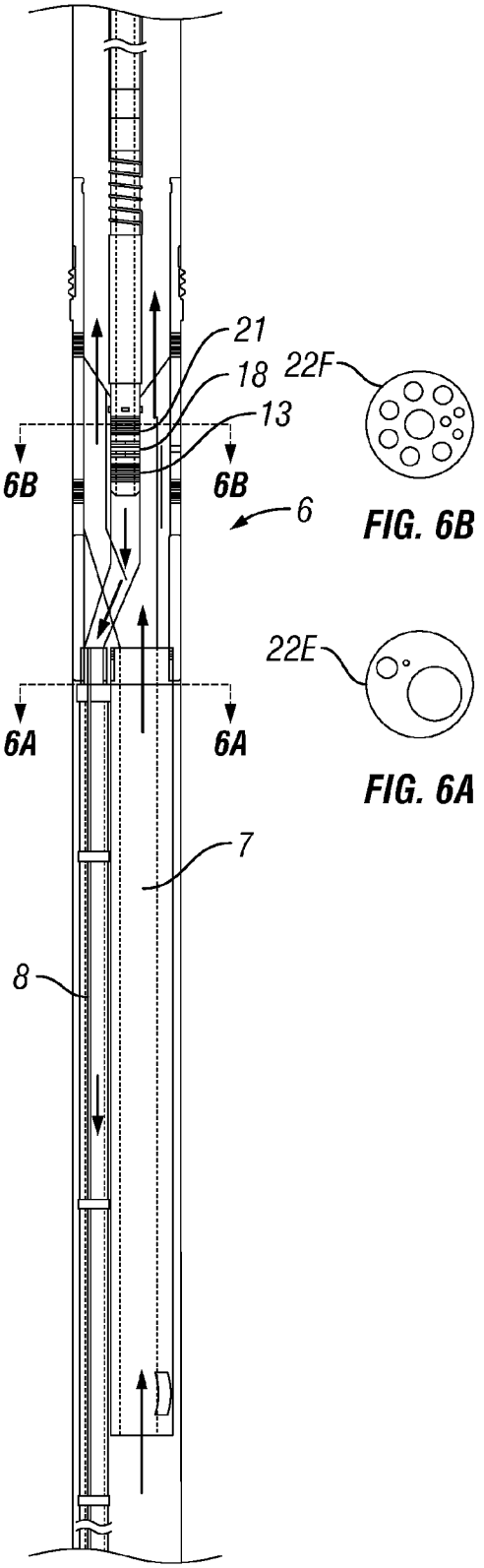


FIG. 6B

FIG. 6A

FIG. 6

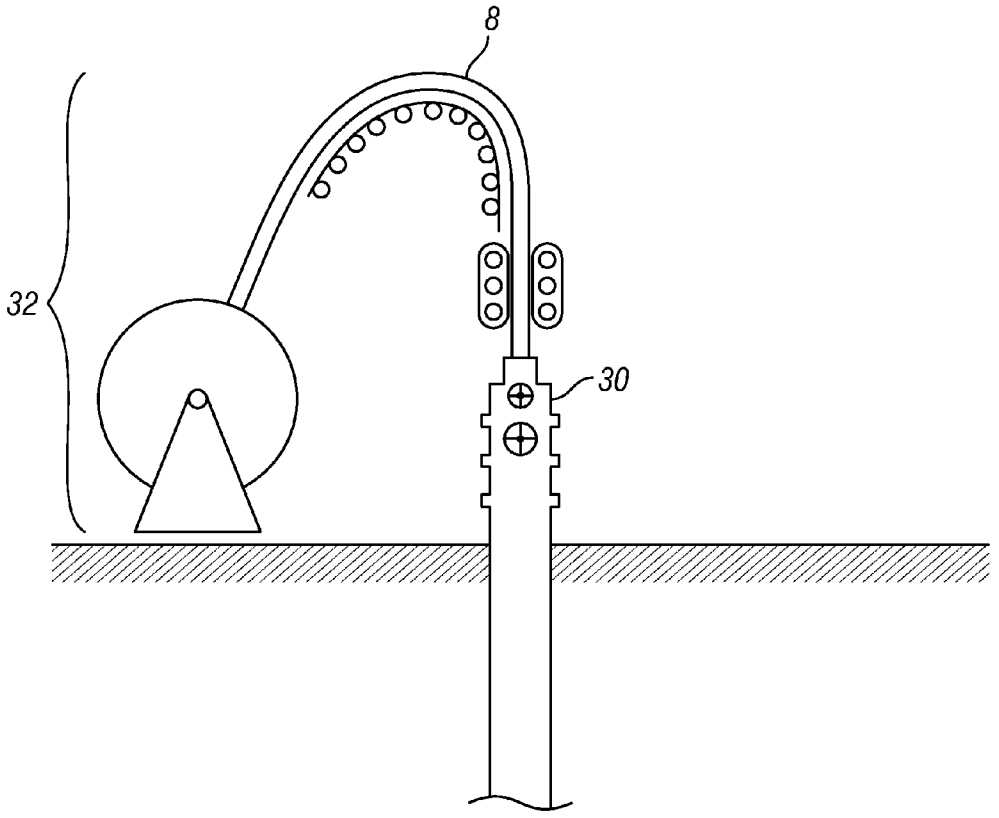


FIG. 7A

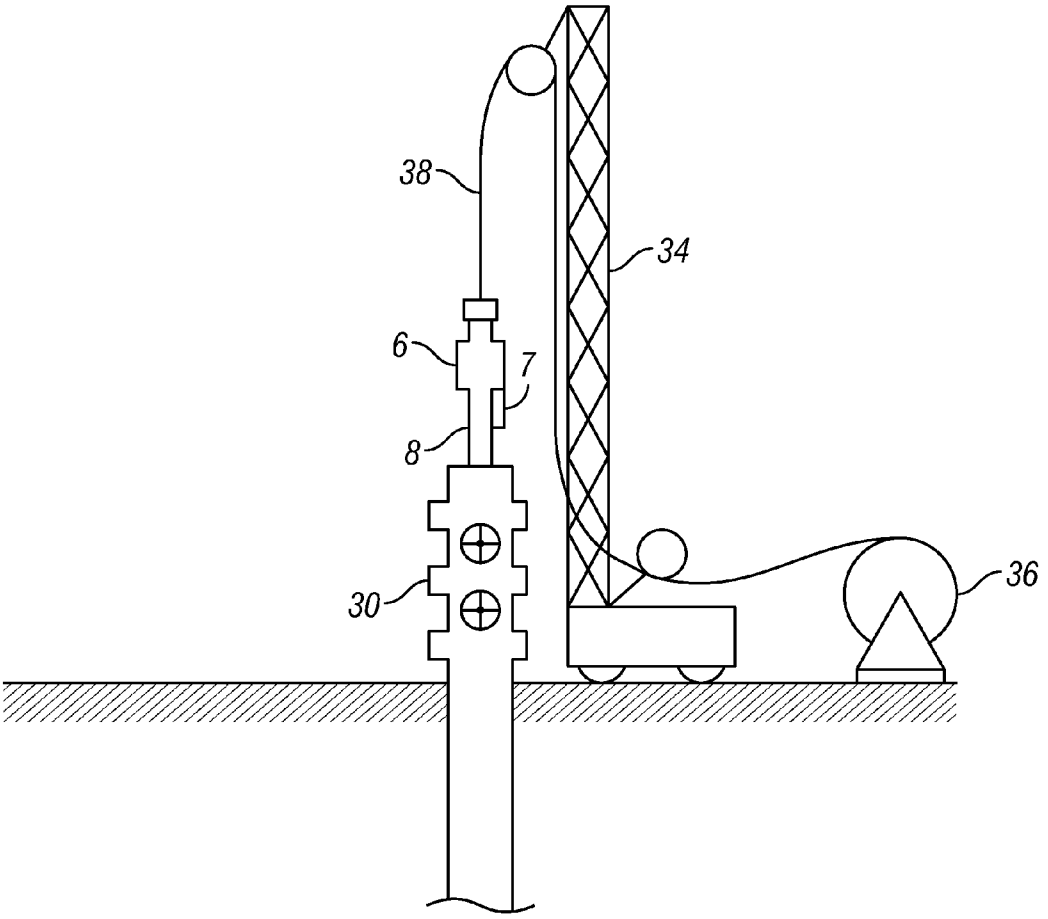


FIG. 7B

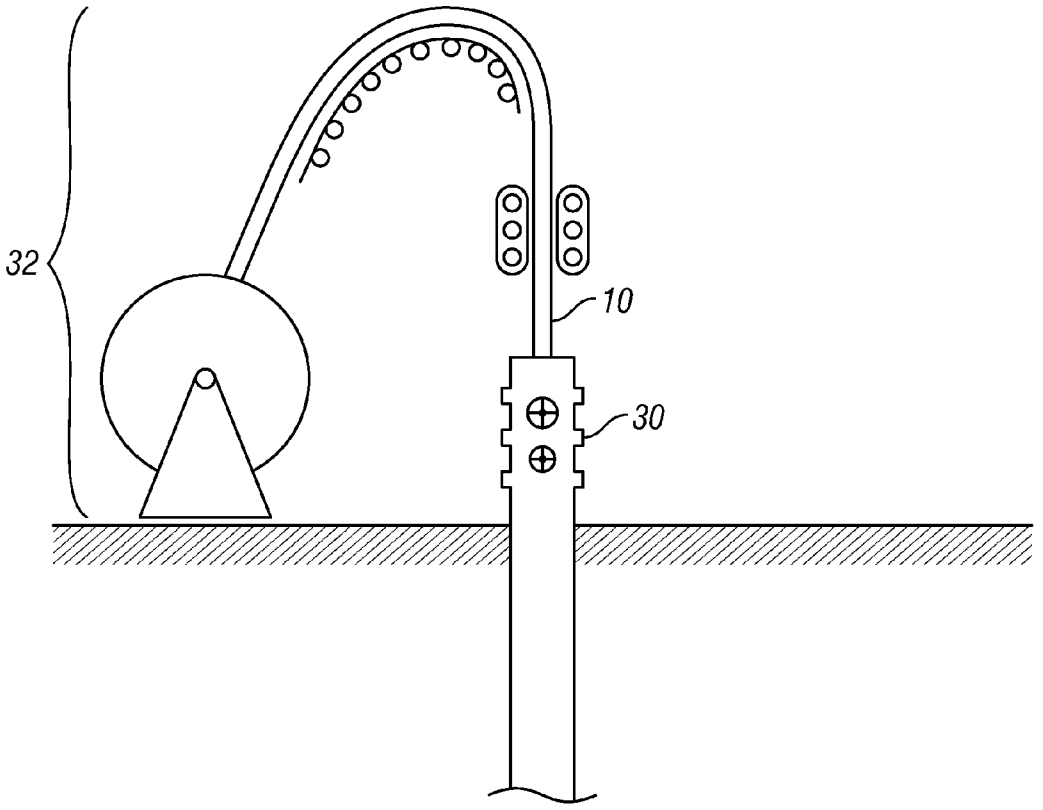


FIG. 7C

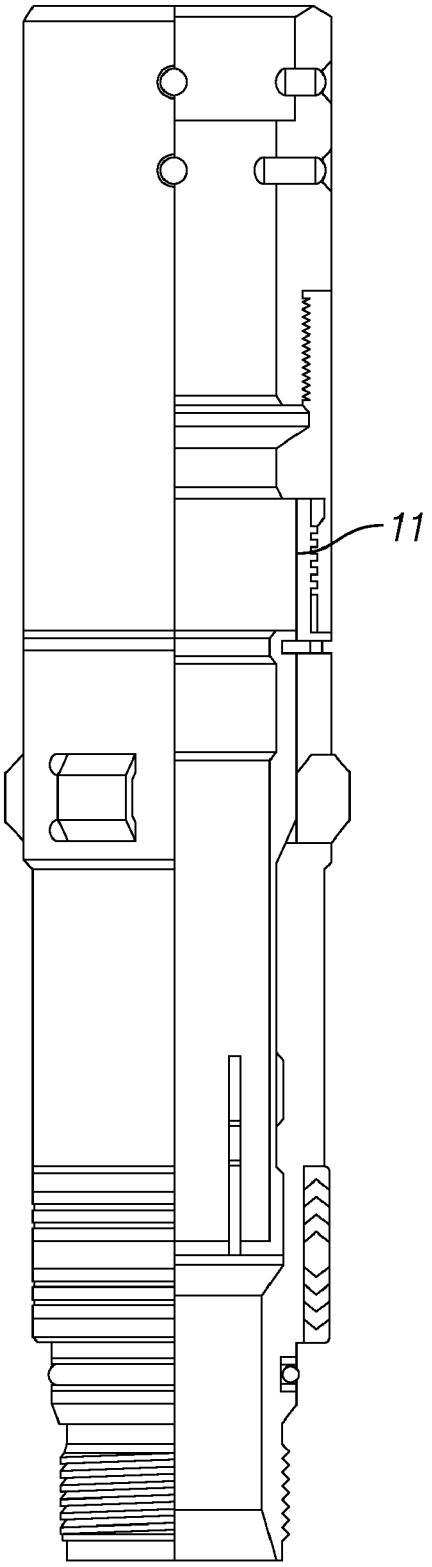


FIG. 8

RETROFIT WELLBORE FLUID INJECTION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not applicable.

Statement regarding federally sponsored research or development

[0002] Not applicable.

BACKGROUND OF THE INVENTION

[0003] 1. Field of the Invention

[0004] The invention relates generally to the field of artificial lift and safety valves for hydrocarbon producing wells. More specifically, the invention relates to fluid injection devices that can be retrofit into an existing subsurface safety valve landing nipple.

[0005] 2. Background Art

[0006] Oil wells that produce for an extended period of time typically will require artificial lift to be able to continue to produce oil when natural reservoir pressure is no longer sufficient to lift the oil to the Earth's surface. One such artificial lift technique is to inject gas into the produced fluid, so-called "gas lift", which assists the lifting of the produced fluids by lowering their effective density. By lowering the effective density of the produced fluid, less hydrostatic pressure is exerted against the producing formation, thereby enabling pressure remaining in the reservoir to move the produced fluid to the surface.

[0007] If a well equipped with a downhole safety valve (DHSV) is to be equipped with a gas lift system, typically the well completion system needs to be completely removed from the well and replaced because it is generally impracticable to hang off a gas lift system through the DHSV while maintaining the operation of the DHSV.

[0008] The foregoing may also apply to chemical injection into certain wellbores, for example, chemicals used to dewater gas producing wells. See, for example, U.S. Patent Application Publication No. 2009/0266537 filed by Hansen et al.

[0009] There is a need for systems to enable retrofit fluid injection into a completed wellbore without the need to remove an existing completion system.

SUMMARY OF THE INVENTION

[0010] A fluid injection system for a wellbore according to one aspect of the invention includes an adapter configured to be retained in a safety valve landing nipple. The landing nipple is disposed in a production tubing inserted in the wellbore. The adapter includes a first sealed fluid passage between a part of the tubing disposed above the adapter and a first fluid injection line disposed in a part of the tubing below the adapter. The adapter includes a second sealed fluid passage between a part of the tubing below the adapter and a second fluid injection line disposed inside the tubing above the adapter. The second fluid injection line extends to a wellhead at an upper end of the wellbore.

[0011] A method for installing a gas injection system in a wellbore according to another aspect of the invention includes extending a first fluid injection tubing into a production tubing into the wellbore. An adapter is coupled to an upper end of the first injection tubing. The adapter is configured to be retained in a safety valve landing nipple. The landing nipple is disposed in a production tubing inserted in the wellbore. The adapter includes a first sealed fluid passage between a part of the production tubing disposed above the adapter and a first fluid injection tubing, and a second sealed fluid passage between a part of the production tubing below the adapter and a second fluid injection tubing disposed inside the production tubing above the adapter. The second fluid injection line extends to a wellhead at an upper end of the wellbore. The adapter is lowered into the wellbore and engaged with the safety valve landing nipple. A second fluid injection tubing is extended into the production tubing and is a engaged with the adapter.

[0012] Other aspects and advantages of the invention will be apparent from the following description and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. **1** illustrates a typical wellbore equipped with production casing and tubing with a packer and a downhole safety valve landing nipple.

[0014] FIG. **2** illustrates a insert retrofit fluid injection adapter system installed in a typical well completion as illustrated in FIG. **1**, where the fluid injection adapter system is landed in the existing safety valve or alternatively in a special nipple profile for a standard wireline safety valve. Also illustrated is a jointed or coiled tubing string suspended below the fluid injection adapter system, where a gas lift valve is incorporated in the lower end of a fluid injection tubing string.

[0015] FIG. **2**A shows the adapter system of FIG. **2** disposed below a safety valve in the tubing which either has had the valve insert removed or the safety valve has been locked open.

[0016] FIG. **3** illustrates the fluid injection adapter system in more detail.

[0017] FIGS. **3**A and **3**B show cross sections of the fluid injection adapter system of FIG. **3**.

[0018] FIG. **4** shows the system of FIG. **3**, but includes fluid flow paths between a stinger system suspended from the wellhead and a tubing suspended below the valve adapter system. Also shown is how wellbore production fluids are routed via a standard wireline valve connected to the lower side of the fluid injection valve adapter to the production tubing area outside the stinger system. Wireline replacement of the fluid injection valve in the lower end of the tubing below the fluid injection valve adapter system can be possible where the downward facing arrows are placed.

[0019] FIGS. **4**A and **4**B show cross sections of the adapter system of FIG. **4**.

[0020] FIG. **5** illustrates how an electrical ring type coupler can be incorporated in the stinger and fluid injection valve adapter, where the ring type coupler enables communication with a sensor below the adapter for monitoring of pressure, temperature, etc.

[0021] FIGS. **5**A and **5**B show cross sections of the example system of FIG. **5** at similar longitudinal positions as the cross sections of FIGS. **4**A and **4**B.

[0022] FIG. **6** shows the system of FIG. **5** with the additional option of introducing one or more additional electrical couplers as well as one or several hydraulic couplers into the stinger and the fluid injection valve adapter system.

[0023] FIGS. **6**A and **6**B show cross sections of the system of FIG. **6** at similar longitudinal positions as the cross sections of FIGS. **4**A and **4**B.

[0024] FIGS. **7**A, **7**B and **7**C illustrate one technique for installing a system according to the invention in a wellbore.

[0025] FIG. **8** shows an example of a wireline lock used in the example of FIG. **2**A

DETAILED DESCRIPTION

[0026] FIG. **1** illustrates part of a typical wellbore completed with a production casing (**1**) and a production tubing (**2**). The production tubing (**2**) is disposed inside the casing (**1**) and an annular space between the casing (**1**) and the production tubing (**2**) may be sealed using an annular seal such as a packer (**25**). The production tubing (**2**) may be hydraulically closed from below by operation of a downhole safety valve (not shown). The downhole safety valve (not shown) in the present example is a retrievable type and may be conveyed through the tubing (**2**) by wireline, slickline, coiled tubing or similar conveyance into a landing nipple (**4**) that is assembled in the production tubing (**2**) at the time the wellbore is completed. The safety valve (not shown) is typically operated by an actuator (not shown) which can be connected to a control line (**5**), for example, a, hydraulic line or an electric power cable extending from a wellhead (see FIGS. **7**A, **7**B, **7**C) to the landing nipple (**4**). One example of a wireline deployable and retrievable downhole safety valve is described in U.S. Pat. No. 3,971,438 issued to Crowe. The safety valve may also be incorporated as part of the production tubing, as typically referred to as a tubing retrievable downhole safety valve, where the production tubing will need to be retrieved to surface to repair or replace the safety valve. Such tubing mounted valves typically incorporates the ability to be locked open by e.g. a wireline intervention, where after a wireline retrievable valve can be mounted into a nipple profile. This type of safety valve is are operated from the wellhead (FIGS. **7**A. **7**B. **7**C) by the control line(s) (**5**) used to operate the tubing mounted valve.

[0027] The illustration in FIG. **1** shows the wellbore with the safety valve removed from the landing nipple (**4**), or, alternatively the tubing mounted safety valve locked open, so that a fluid injection valve adapter system according to the various aspects of the invention may be inserted into the landing nipple (**4**) without the need to remove the tubing (**2**) from the wellbore. When the safety valve (not shown) is removed from the landing nipple (**4**), or the tubing mounted safety valve is locked open by well intervention, the control line (**5**) remains in place and may be used to operate parts of the fluid injection adapter system as will be further explained below.

[0028] FIG. **2** shows an example fluid injection valve adapter system (**6**) landed into the safety valve landing nipple (**4**). The fluid injection valve adapter system (**6**) includes devices (explained below) to enable hydraulic connection of a fluid injection line (**10**) that extends from the wellhead (see FIGS. **7**A, **7**B, **7**C) to a fluid injection tubing (**8**) disposed below the adapter (**6**). The adapter (**6**) also enables hydraulic connection of the casing (**1**) and tubing (**2**) below the adapter (**6**) to the portion of the tubing (**2**) above the adapter (**6**) so that produced fluid from formations generally below the bottom of the tubing (**2**) can move to the surface.

[0029] The fluid injection valve adapter (**6**) may include a wireline deployed safety valve (**7**) of any type known in the art, for example, the one described in the Crowe '438 patent referenced above. The fluid injection valve adapter (**6**) may include internal connections (explained below) to enable operation of the safety valve (**7**) using the existing control line (**5**) that is coupled to the landing nipple (**4**). The safety valve (**7**) may be mounted alongside a fluid injection pipe string (**8**), which may be a jointed pipe string or a continuous length of tubing that may be deployed by a coiled tubing deployment unit, as will be explained below with reference to FIGS. **7**A, **7**B and **7**C. Also, an additional safety valve (**7**A) may be mounted on the fluid injection pipe string (**8**).

[0030] The fluid injection string (**8**) is used to transport fluid, for example, gas, down to a gas lift valve (**9**) mounted in the lower end of the fluid injection string (**8**). A plurality of individual gas lift valves can be installed at predetermined positions along the fluid injection string (**8**) if, for example, so-called side pocket mandrels are used. Non-limiting examples of gas lift valves and systems including side pocket mandrels are described in U.S. Pat. No. 5,066,198 issued to Decker.

[0031] The fluid injection valve adapter system (**6**) may deployed into the tubing (**2**), and is then landed in the safety valve landing nipple (**4**). The foregoing deployment operation can be performed using an armored electrical cable ("wireline"), a wellbore intervention rod, coiled tubing or any other conveyance device known in the art. After the fluid injection adapter system (**6**) is landed in the landing nipple (**4**), the fluid injection line (**10**) can be deployed through the wellhead until the fluid injection line (**10**) lands into the fluid injection valve adapter system (**6**). A hang-off system (not shown) can be used in the wellhead (not shown) to enable gas injection, chemical injection, electrical coupling to downhole tools, etc. through the fluid injection line (**10**).

[0032] It should also be noted that a safety valve can be mounted between the fluid injection valve adapter (**6**) and the fluid injection string (**8**). Alternatively such a safety valve can be mounted onto the tubing string extending below the wireline deployed safety valve (**7**) to control wellbore fluid production. Such a safety valve can be connected to the same hydraulic supply as the production safety valve (**7**), either via the control line (**5**) mounted externally on the tubing (**2**) or via a control line incorporated from surface onto the fluid injection line (**10**) retrofitted into the existing tubing (**2**). Such a control line can be strapped externally on the fluid injection line (**10**), using clamping devices commonly known to the industry. Examples of such control lines will be shown in and explained with reference to FIGS. **5** and **6**. An example of an adapter system set in the wellbore below the existing safety valve is shown in FIG. **2**A. In such examples, the safety valve (**7**) would typically be operated by control lines (See FIG. **6**) associated with the fluid injection line (**10**).

[0033] FIG. **3** shows a cut away view of the fluid injection valve adapter system (**6**) mounted in the safety valve landing nipple (**4**). The fluid injection valve adapter system (**6**) may include a mandrel (**6**A) having internal fluid passages as will be further explained. An industry standard wireline lock (**11**), as for example the DB-6 series type sold by Schlumberger Technology Corporation, Sugar Land, Tex. 77479, USA, as illustrated in FIG. **8**, can be used to secure the mandrel (**6**A) in place in the landing nipple (**4**). Below the wireline lock (**11**) two sets of seal systems (**12***a* and **12***b*) are used to seal the ends of the mandrel (**6**A) inside the landing nipple (**4**) so that hydraulic fluid can be routed from the control line (**5**) to the safety valve (**7**).

[0034] A stinger system incorporating a seal stem (**13**), and if required, a latching anchor system (not shown separately), can be coupled to a telescoping travel joint (**14**) coupled between the fluid injection line (**10**) and the seal stem (**13**). The telescoping travel joint (**14**) is used to take up any depth misalignment and temperature expansions and contractions

of the fluid injection line (**10**) above the fluid injection adapter system (**6**). The seal stem (**13**) seals the fluid injection line in a passage in the adapter system (**6**) so that fluid (**15**) pumped through the injection line (**10**) is constrained to flow into the fluid injection string (**8**) from the fluid injection line (**10**). Fluid (**15**), for example gas, can be injected through the fluid injection line (**10**) as shown by downward arrows and move into the fluid injection string (**8**), while fluid production to the surface can simultaneously take place through the existing production tubing (**2**) as shown by upward arrows. The fluid injection string (**8**) can also be used as an injection tubing for chemical treatments, for example in gas well dewatering using a foaming agent.

[0035] FIG. **3**A shows a cross section of a lower part fluid injection adapter system (**6** in FIG. **3**). An opening (**22**A) for the fluid injection string (**8** in FIG. **3**) and an opening (**22**B) for the safety valve (**7** in FIG. **3**) in the mandrel (**6**A in FIG. **3**) are shown. FIG. **3**B shows a cross section of an upper part of the adapter system (**6** in FIG. **3**). The mandrel therein may include an opening **20**A for sealing engagement with the seal stem (**13** in FIG. **3**) and openings **20**B for produced fluid to move into the annular space between the fluid injection line (**10** in FIG. **3**) and the tubing (**2** in FIG. **3**).

[0036] In some cases the existing safety valve landing nipple (**4**) may not have sufficient weight supporting capacity to support the hanging weight of the fluid injection valve adapter system (**6**). In such cases, a slip-type gripping system (not shown) or similar device can be incorporated in the fluid injection adapter system (**6**) to assist in supporting the weight thereof.

[0037] FIG. **4** illustrates in more detail how fluid (**15**) pumped down the injection line (**10**) and produced reservoir fluids (**16**) from below the adapter system (**6**) can be routed through the fluid injection valve adapter system (**6**). In the present example, an optional backpressure valve (**17**) can be included in the fluid injection string (**8**). The backpressure valve (**17**) is configured to close if gas or fluids are returned up the fluid injection string (**8**) as a result of higher pressure at the lower end of the fluid injection string than the pressure of the fluid (**15**) being injected through the fluid injection line (**10**). The backpressure valve (**17**) can be a mechanical type check valve type, or it can be hydraulically or electrically operated using devices explained below with reference to FIGS. **5** and **6**. This valve (**17**) can also be placed further down on the fluid injection line (**8**) to a location below safety valve (**7**) in cases where size constrains requires such.

[0038] FIGS. **4**A and **4**B show, respectively, the same cross sections **22**, **20**, explained above with reference to FIGS. **3**A and **3**B.

[0039] FIG. **5** shows one or more electrical couplers (**18**) can be incorporated in the stinger system and the fluid injection valve adapter (**6**). The fluid injection line (**10**) may include an hydraulic line (**19**) to enable hydraulically flushing the coupler (**18**) by pumping dielectric fluid through the hydraulic line (**19**). Electrical connection to the surface may be made using with one or more upper electric cables (**20**) attached to the exterior of the fluid injection line (**10**). Flushing would typically be performed prior to and when landing the stinger system into the fluid injection adapter system (**6**). The electrical couplers (**18**) enable electrical connection from the upper cable(s) (**20**) to one or more corresponding lower electrical cables (**26**) attached to the exterior of the fluid injection string (**8**). The upper electrical cables (**20**) and lower electrical cables (**26**) can provide signal connection between sensors, one example of which is shown at (**28**), for example, pressure or temperature sensors, and the surface. The upper electrical cables (**20**) and lower electrical cables (**26**) may also be used to provide electrical power from the surface to any electrically operated device (not shown) disposed in the lower part of the wellbore. The foregoing features enable the introduction and operation of any electrically operated downhole sensors, tools, etc., which can be mounted within or externally to the fluid injection string (**8**) and disposed at the required wellbore depth. Such sensors or tools can be operated simultaneously to performing fluid injection. Alternatively, the fluid injection string (**8**) can be substituted entirely by the lower electrical cables (**26**) used to operate sensors, motors, valves, etc., at any required depth within the wellbore. It should be understood that the upper electrical cable (**20**) and the lower electrical cable can be substituted by or supplemented with fiber optic cables or lines and hydraulic lines to establish power and communication with any devices in the wellbore below the adapter (**6**).

[0040] FIGS. **5**A and **5**B show, respectively, cross sections **22**D, **22**C the lower and upper parts of the adapter system. The cross sections **22**D, **22**C in the present example include openings for the upper electrical cables (**20** in FIG. **5**) and the lower electrical cables (**26** in FIG. **5**).

[0041] FIG. **6** illustrates one or more hydraulic couplers (**21**) in the seal stem (**13**) and the mandrel (**6**A in FIG. **3**) in addition to the electrical couplers (**18**) explained above with reference to FIG. **5**. In the present example, it is possible to perform wireline intervention through the fluid injection line (**10**), fluid injection adapter system (**6**) and the fluid injection string (**8**), so that, for example, a gas lift valve (**9**) or similar device can be replaced without having to retrieve the entire valve adapter system (**6**) to the surface. Such valve or device replacement may be required due to valve failure, requirements to change the gas injection valve (**9**) to a valve with different operating pressure, etc. An example wireline deployment unit is shown in FIG. **7**B, and such unit may be used for the foregoing intervention.

[0042] Also, several gas lift valves, chemical injection valves, etc., can be placed at various places along the fluid injection string (**8**) suspended below the valve adapter system (**6**) as explained above with reference to FIG. **2**.

[0043] FIGS. **6**A and **6**B, show, respectively, cross sections **22**F, **22**E of the lower and upper parts of the example fluid injection adapter system using hydraulic and electrical lines as explained with reference to FIG. **6**.

[0044] In a particular implementation of the adapter system shown in FIG. **6**, because the seal stem **13** includes both electrical contacts (**18**) and fluid pressure seals (**21**), it is possible to configure the upper fluid injection line (**11**) as an "umbilical" electrical and/or hydraulic cable. In such examples, the fluid injection line (**10**) may be supplemented or substituted by electrical cables, fiber optic lines and/or hydraulic control lines. Using the seal assemblies and contacts, for example as shown in FIGS. **6** at **13**, **18**, and **21**, respectively, electrical, optical and or hydraulic signals may be communicated from the surface (e.g., wellhead **30** in FIGS. **7**A, **7**B, **7**C) to instruments and/or sensors that may be deployed below the adapter (**6**). In one example, the lower fluid injection string (**8**) may be substituted by a second umbilical cable, including electrical cable, fiber optic lines and/or hydraulic lines. Such lines and cables can establish control and communication between sensors or other devices (pumps, etc.) disposed below the adapter.

[0045] A system according to the invention can also provide for placing a safety valve deeper in the wellbore than the existing safety valve landing nipple (**4** in FIG. **2**). Such a deeper location can be required due to faulty safety valve landing nipple (**4** in FIG. **2**), a need to mount a insert valve system closer to the downhole packer (**25** in FIG. **1**), etc. This deeper location can be a nipple profile, or within the tubing string where a slips arrangement would be required to lock the system in place. Such a safety valve may be operated from the surface by hydraulic or electric power via one or several cables and/or control line(s) explained with reference to FIGS. **5** and **6**.

[0046] FIGS. **7**A, **7**B and **7**C show one technique for installing a system as explained above in a wellbore. FIG. **7**A shows a coiled tubing deployment unit (**32**) of any type known in the art disposed proximate the wellhead (**30**). The fluid injection string (**8**) may be coiled tubing, as explained with reference to FIG. **2**. The fluid injection string (**8**) is inserted to a selected depth in the wellbore through the wellhead (**30**), the depth being selected so that the upper end of the fluid injection string (**8**) will be at a depth such that the adapter system (**6** in FIG. **2**) can be seated in the landing nipple (**4** in FIG. **1**). Once the selected depth has been reached, the fluid injection string (**8**) can be hung in the wellhead **30**, with the upper end of the injection string (**8**) disposed above the wellhead (**30**) to enable connection of the adapter system (**6** in FIG. **2**).

[0047] In FIG. **7**B, a wireline deployment unit (**36**) of any type known in the art, which extends and retracted armored electrical cable (**38**) and a supporting mast unit (**34**) may be deployed proximate the wellhead (**30**). The adapter system (**6**) may be coupled to the upper end of the fluid injection string (**8**). The end of the cable (**38**) may be connected to the adapter system (**6**). After such connection, the adapter system (**6**) is lowered by the cable (**38**) into the wellbore until the adapter system (**6**) seats in the landing nipple, as explained with reference to FIG. **2**.

[0048] In FIG. **7**C, the coiled tubing deployment unit (**32**) may be used to extend the fluid injection line into the wellbore until the stinger system (**13** in FIG. **3**) seats in the adapter system (**6** in FIG. **2**) as explained above with reference to FIG. **3**. In examples using hydraulic lines and/or electrical cables as explained with reference to FIGS. **5** and **6**, surface connections to such lines and/or cables may be made to suitable devices (not shown) externally to the wellhead **30** after the fluid injection line **10** is fully extended into the wellbore.

[0049] While the invention has been described with respect to a limited number of embodiments, those skilled in the art, having benefit of this disclosure, will appreciate that other embodiments can be devised which do not depart from the scope of the invention as disclosed herein. Accordingly, the scope of the invention should be limited only by the attached claims.

What is claimed is:

1. A fluid injection system for a wellbore, comprising:

an adapter configured to be retained in in a production tubing inserted in the wellbore, the adapter including a first sealed fluid passage between a part of the tubing disposed above the adapter and a first fluid injection line disposed in a part of the tubing below the adapter, the adapter including a second sealed fluid passage between a part of the tubing below the adapter and a second fluid injection line disposed inside the tubing above the adapter, the second fluid injection line extending to a wellhead at an upper end of the wellbore.

2. The adapter of claim **1** wherein the adapter is configured to be retained in a safety valve landing nipple.

3. The fluid injection system of claim **1** further comprising at least one gas lift valve disposed in the first fluid injection line.

4. The fluid injection system of claim **1** further comprising a safety valve disposed in the second sealed passage below the adapter.

5. The fluid injection system of claim **4** further comprising an hydraulic connector configured to establish hydraulic connection between the safety valve and an hydraulic control line coupled to the landing nipple.

6. The fluid injection system of claim **4** further comprising an electrical connector configured to establish electrical connection between the safety valve and an electrical control line coupled to the landing nipple.

7. The fluid injection system of claim **1** further comprising an electrical connector disposed on a lower end of the second fluid injection line, the electrical connector configured to make electrical connection between a first electrical cable disposed on the second fluid injection line through the adapter to a second electrical cable disposed on the first fluid injection line.

8. The system of claim **1** wherein the first sealed fluid passage comprises at least one of an electrical cable, a fiber optical cable and an hydraulic line extending from the wellhead to the adapter, the adapter including internal connections between the at least one of a electrical cable, fiber optic cable and hydraulic line in the first sealed fluid passage and at least one of an electrical cable, a fiber optic line and an hydraulic line extending to a device disposed below the adapter.

9. The system of claim **8** wherein the at least one of an electrical cable, a fiber optic line and an hydraulic line extending to a device disposed below the adapter replaces the first fluid injection line.

10. The fluid injection system of claim **8** further comprising at least one sensor disposed on the first fluid injection line.

11. The fluid injection system of claim **1** further comprising an hydraulic connector disposed on a lower end of the second fluid injection line, the hydraulic connector configured to make hydraulic connection between a first hydraulic line disposed on the second fluid injection line through the adapter to a second hydraulic line disposed on the first fluid injection line.

12. A method for installing a fluid injection system in a wellbore, comprising:

extending a first fluid injection tubing into a production tubing into the wellbore;

coupling an adapter to an upper end of the first injection tubing, the adapter configured to be retained in a safety valve landing nipple, the landing nipple disposed in a production tubing inserted in the wellbore, the adapter including a first sealed fluid passage between a part of the production tubing disposed above the adapter and a first fluid injection tubing, the adapter including a second sealed fluid passage between a part of the production tubing below the adapter and a second fluid injection tubing disposed inside the production tubing above the adapter, the second fluid injection line extending to a wellhead at an upper end of the wellbore;

lowering the adapter into the wellbore and engaging the adapter with the safety valve landing nipple;

extending a second fluid injection tubing into the production tubing; and

engaging a lower end of the second fluid injection tubing with the adapter.

13. The method of claim **9** further comprising pumping fluid into the second injection tubing.

14. The method of claim **10** wherein the fluid comprises gas.

15. The method of claim **11** further comprising opening a gas lift valve disposed at a selected position along the first fluid injection tubing.

16. The method of claim **9** further comprising extending an armored electrical cable into the second injection tubing, through the adapter and into the first injection tubing, engaging the armored electrical cable to a device disposed in the first injection tubing, and removing the device from the first injection tubing by withdrawing the armored electrical cable.

17. The method of claim **9** wherein the extending the first fluid injection tubing comprises extending a coiled tubing.

18. The method of claim **9** wherein the lowering the adapter comprises extending an armored electrical cable.

19. The method of claim **9** wherein the extending the second fluid injection tubing comprises extending a coiled tubing.

20. The method of claim **9** further comprising operating a safety valve disposed in the second fluid passage.

21. The method of claim **17** wherein the operating the safety valve comprises pumping hydraulic fluid into a control line coupled to the landing nipple.

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