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(54) **CHEMICAL INJECTION REGULATION MECHANISM**

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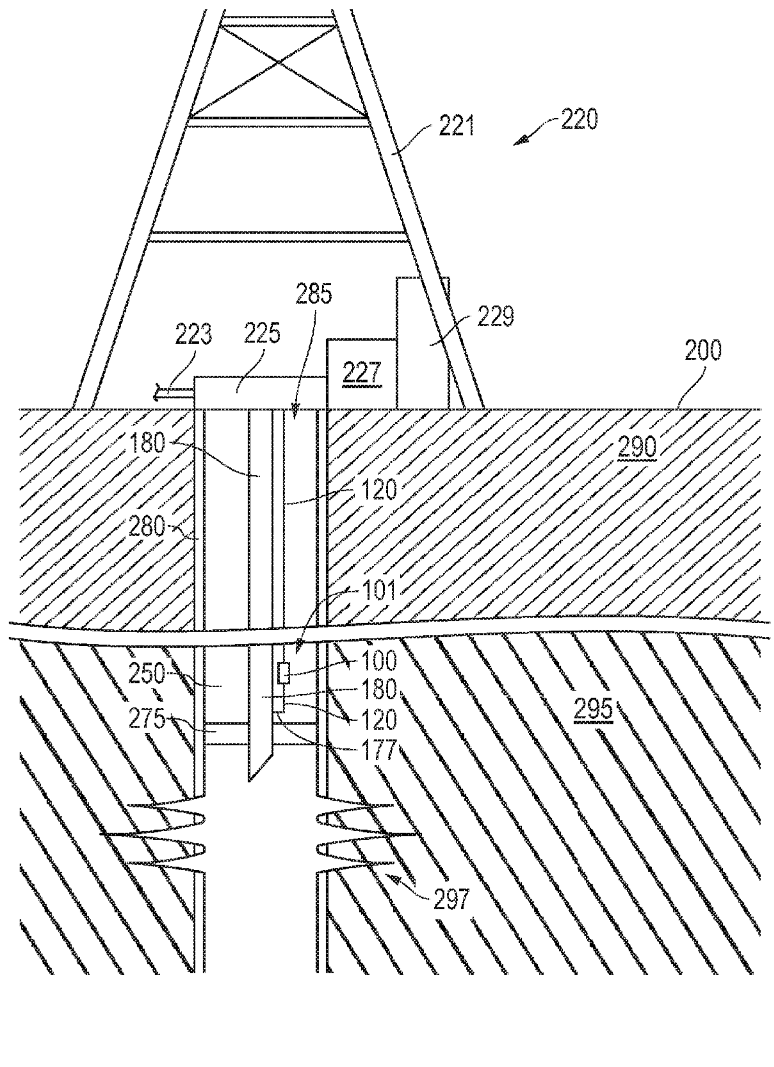
(57) **ABSTRACT**

A regulation mechanism configured to automatically close off fluid flow through a line based on flow rate exceeding a predetermined level. This mechanism may be particularly beneficial when employed in conjunction with downhole chemical injection systems that are directed at well locations prone to becoming low pressure in nature. That is, in a conventional system, once the inherent pressure at the downhole end of an injection line exceeds that of the adjacent downhole environment, the flow rate of the column of fluid in the line may naturally increase as chemical is unintentionally emptied into the well. However, use of embodiments of the flow-based regulation mechanism detailed herein may near-automatically prevent such undesirable emptying of chemical into a low pressure well.



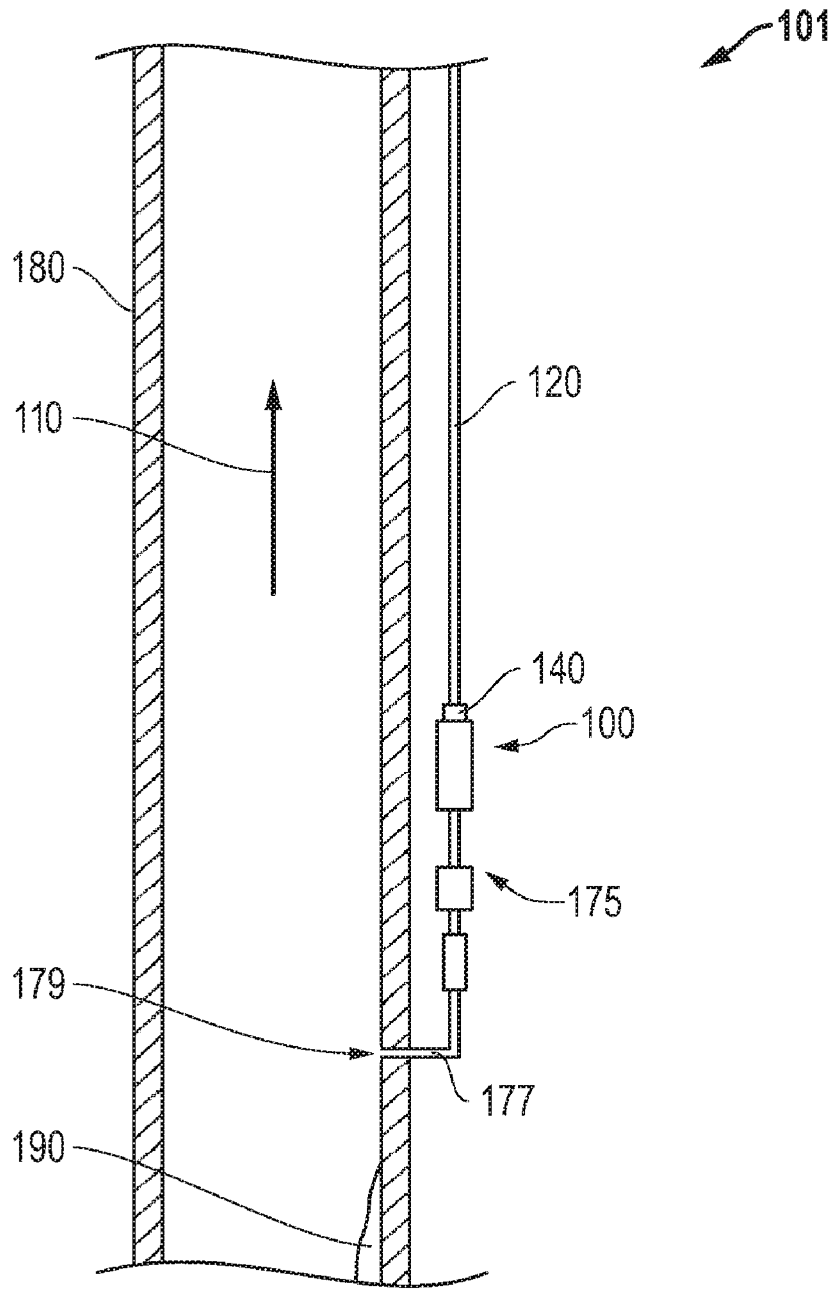


FIG. 1

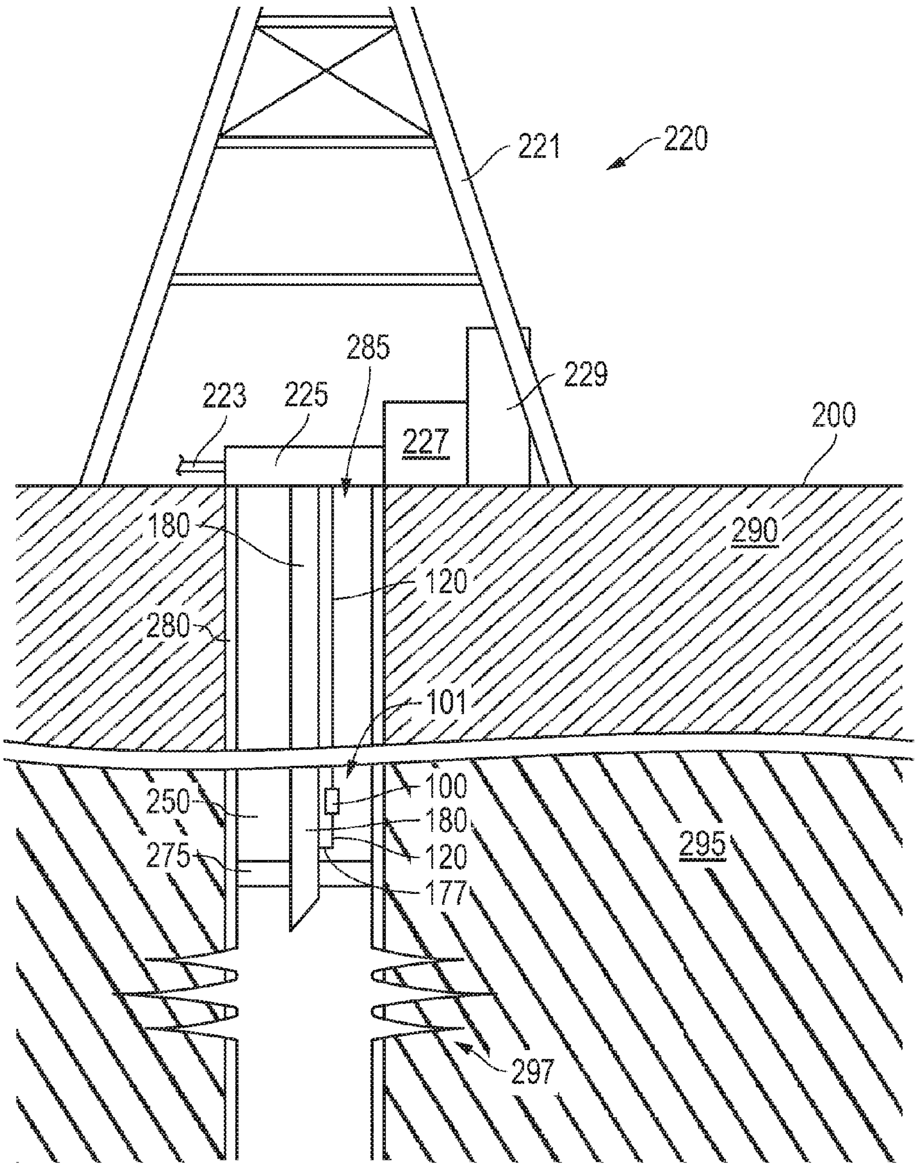

221
220
285
229
223
225
227
200
180
290
120
280
101
100
250
180
295
275
120
177
297

FIG. 2

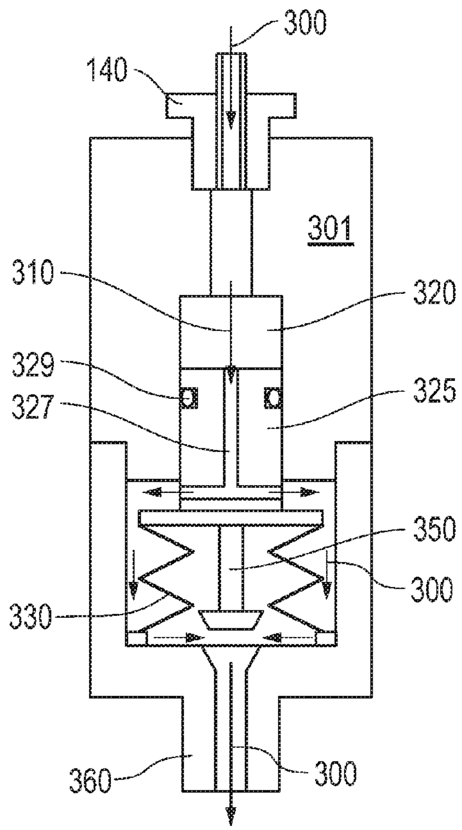

300
140
100
301
310
320
329
325
327
350
300
330
360
300

FIG. 3A

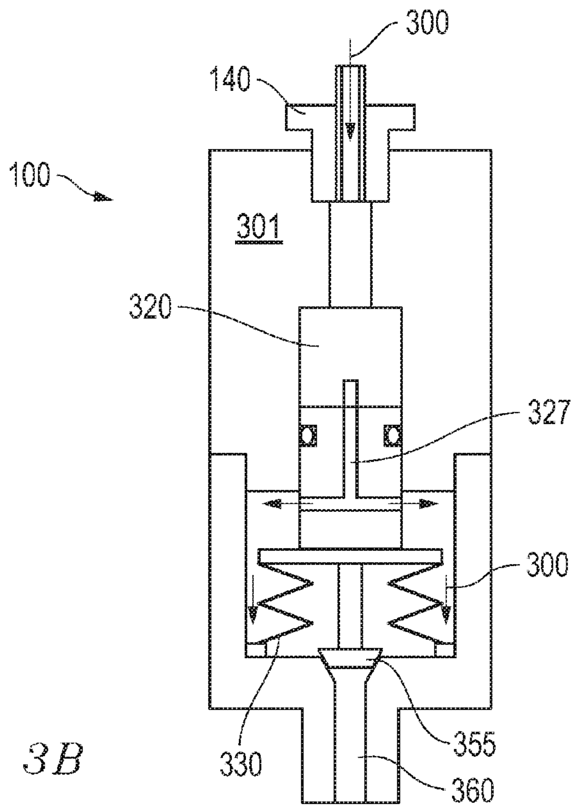

300
140
100
301
320
327
300
330
355
360

FIG. 3B

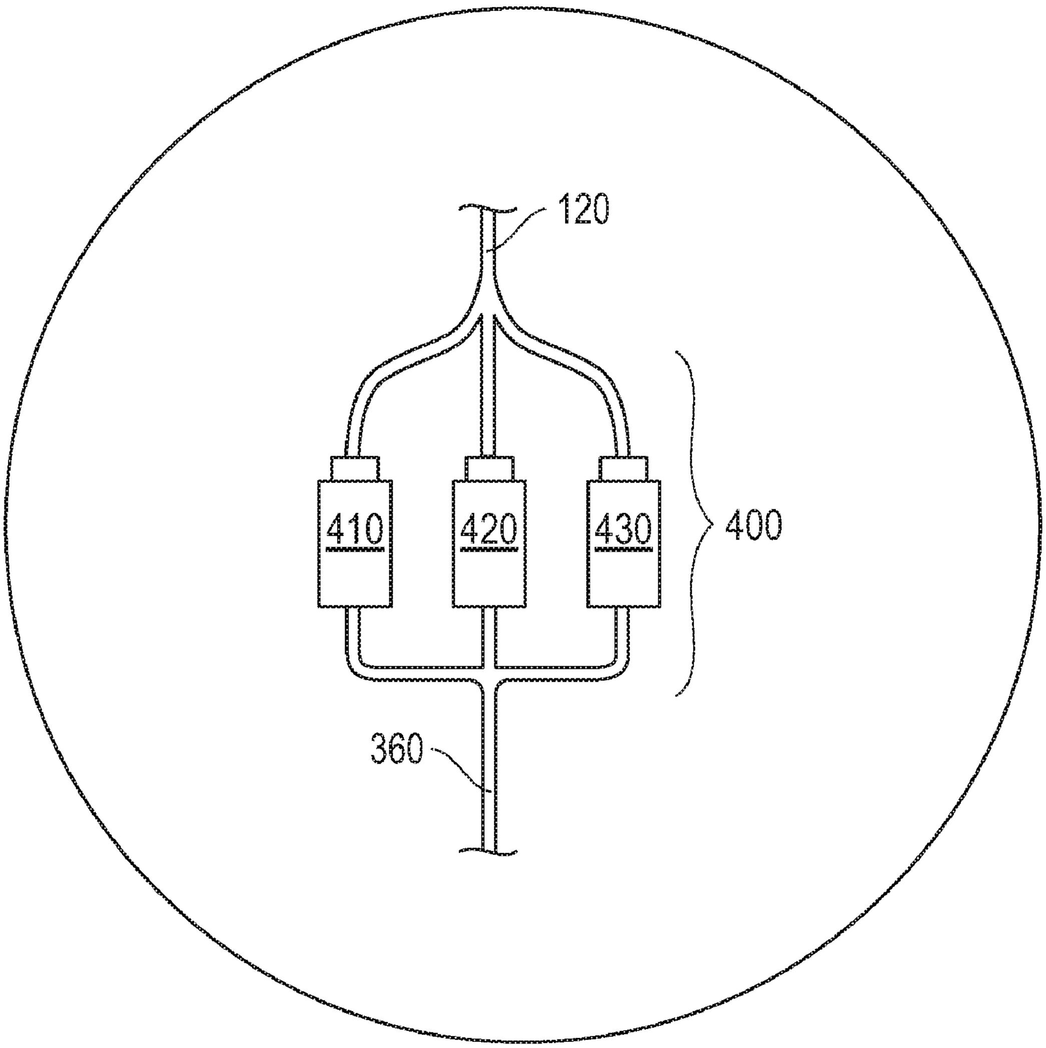


FIG. 4

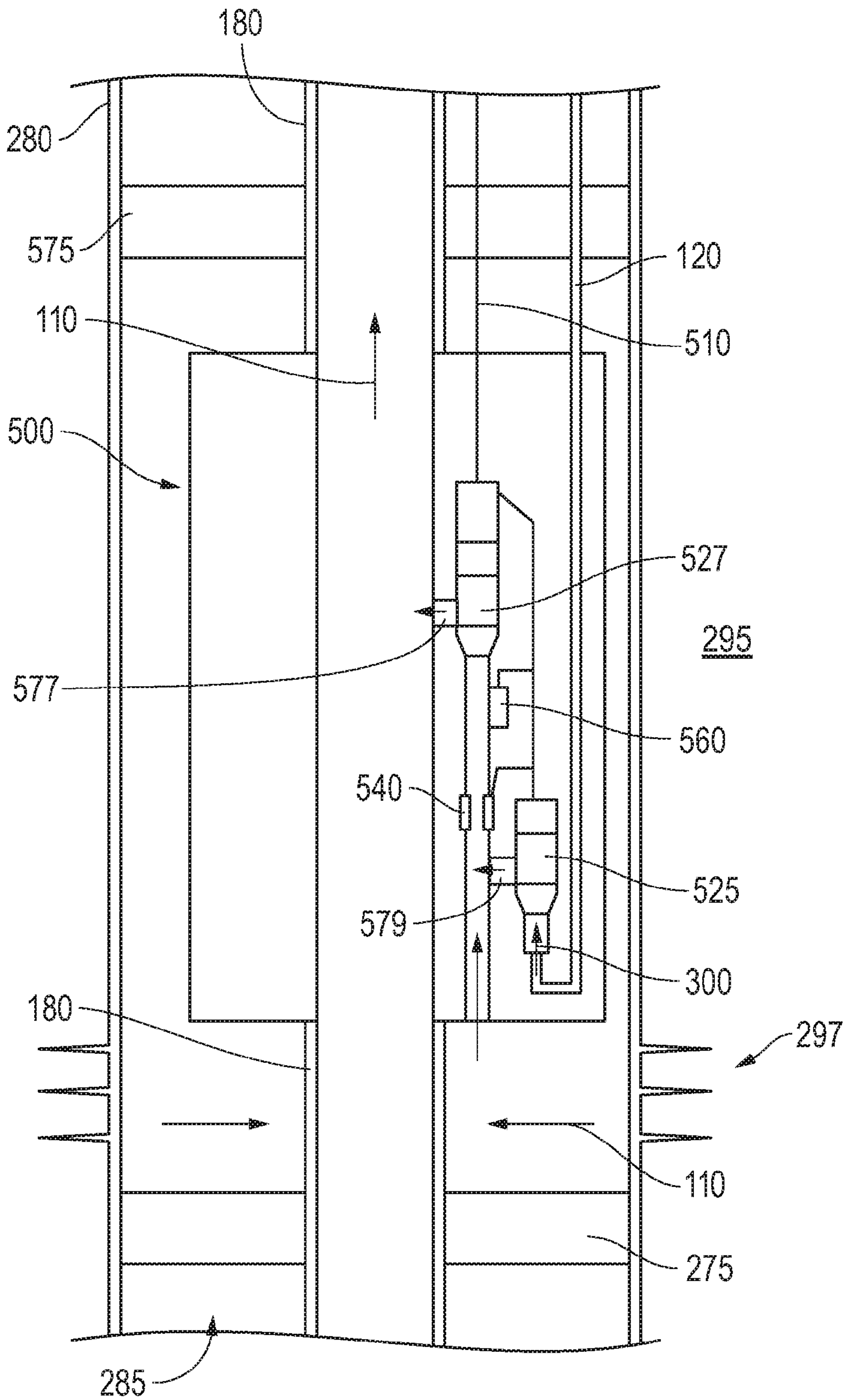

180
280
575
120
110
510
500
527
295
577
560
540
525
579
300
180
297
110
275
285

FIG. 5

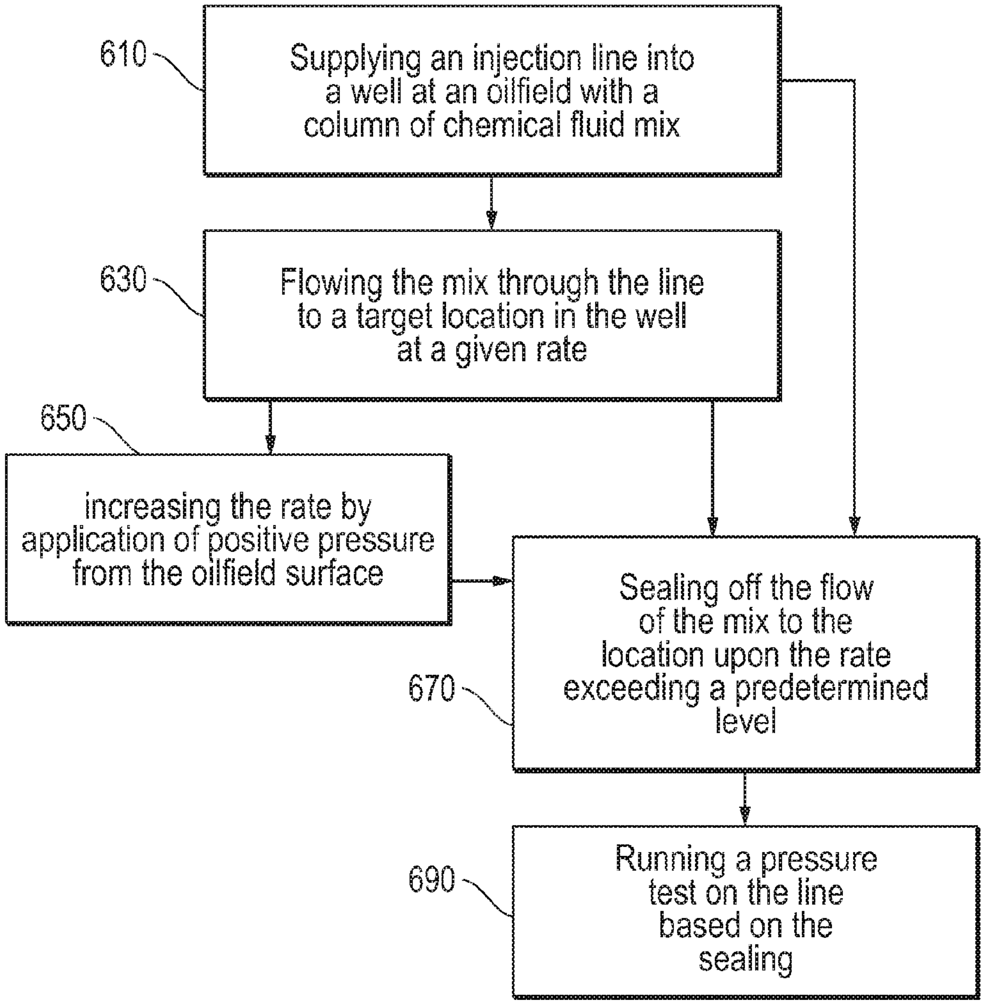

610
Supplying an injection line into a well at an oilfield with a column of chemical fluid mix
630
Flowing the mix through the line to a target location in the well at a given rate
650
increasing the rate by application of positive pressure from the oilfield surface
Sealing off the flow of the mix to the location upon the rate exceeding a predetermined level
670
690
Running a pressure test on the line based on the sealing

FIG. 6

CHEMICAL INJECTION REGULATION MECHANISM

[0001] PRIORITY CLAIM/CROSS REFERENCE TO RELATED APPLICATION(S)

[0002] This Patent Document claims priority under 35 U.S.C. §119 to U.S. Provisional App. Ser. No. 61/438,995, filed on Feb. 3, 2011, and entitled, "Chemical Injection U-Tube Prevention System" incorporated herein by reference in its entirety.

BACKGROUND

[0003] Exploring, drilling and completing hydrocarbon wells are generally complicated, time consuming and ultimately very expensive endeavors. As a result, over the years increased attention has been paid to monitoring and maintaining the health of such wells. Significant premiums are placed on maximizing the total hydrocarbon recovery, recovery rate, and extending the overall life of the well as much as possible. Thus, logging applications for monitoring of well conditions play a significant role in the life of the well. Similarly, significant importance is placed on well intervention applications, such as clean-out techniques which may be utilized to remove debris from the well so as to ensure unobstructed hydrocarbon recovery.

[0004] In addition to interventional applications, the well is often outfitted with chemical injection equipment to enhance ongoing recovery efforts without the requirement of intervention. For example, most of the well may be defined by a smooth steel casing that is configured for the rapid uphole transfer of hydrocarbons and other fluids from a formation. However, a buildup of irregular occlusive scale, wax and other debris may occur at the inner surface of the casing or tubing and other architecture restricting flow there-through. Such debris may even form over perforations in the casing, screen, or slotted pipe thereby also hampering hydrocarbon flow into the main borehole of the well from the surrounding formation.

[0005] In order to address scale buildup as noted above, a variety of conventional interventional techniques are available. However, in order to avoid running time consuming interventional applications that may involve the delivery of footspace eating clean-out equipment, a circulating chemical injection system is often employed. This is particularly the case where the likelihood of buildup is accounted for up front, as is often the case in deep water wells. Regardless, with such systems in place, a metered amount of chemical mixture, such as a hydrochloric acid mix, may be near continuously circulated downhole to help prevent such buildup.

[0006] The noted chemical injection equipment includes an injection line that may be run from surface and directed at different downhole points of interest such as within production tubing, at a production screen or into formation fluid prior to entering the noted tubing. Regardless, the need to halt production or run expensive interventions in order to address undesirable buildup may be largely eliminated.

[0007] Unfortunately, regulating the delivery of the chemical injection mixture to the points of interest may come with pressure related challenges over the life of the well. For example, a given downhole point of interest within the well may display a fairly high pressure at the outset of operations. In some cases, well pressures may exceed 10,000 PSI. Therefore, the chemical injection line may be pressurized from surface so as to ensure that a proper chemical injection delivery rate is maintained. Indeed, a series of check valves may also be incorporated into the line to help avoid potentially caustic production uphole through the line.

[0008] While utilizing check valves and pressurizing the line may initially ensure chemical injection delivery and avoid production through the line, pressures within the well may change over time. For example, pressurizing the line may overcome a well pressure of 10,000 PSI. However, when the pressure within the well drops over time as is often the case, the line may begin to leak chemical mixture into the well even without the application of positive pressure from surface. That is to say, depending on the depth of the line, the inherent fluid pressure therein may begin to exceed well pressure.

[0009] Aside from the expense of lost chemical mixture into the well, leakage as a result of low well pressure may have a variety of negative consequences. For example, an exceeded rate or ratio of active chemical directed at the target location may act as a corrosive and damage the downhole tubing, screen or other equipment at the location. Once more, simply halting production by sealing off the line at surface may also be undesirable. For example, such action may result in forming a vacuum within the line that can lead to boiling of the chemical mixture. Thus, irreparable damage to the line, the production tubing and/or the casing may result.

[0010] Such low pressure wells often lead to catastrophic circumstances that require a full chemical injection system change-out, major workover or even a complete loss of the well at a cost of between several hundred thousand to perhaps millions of dollars, not to mention lost production time. Indeed, rather than take such measures, these low pressure wells may be kept on-line only so long as artificial lift and other such production aids remain viable, after which time the well may be abandoned due to failure to effectively address buildup issues.

SUMMARY

[0011] A chemical injection regulation mechanism is provided which includes inlet and outlet lines. A regulation device is coupled to the lines for regulating chemical flow therebetween based on a fluid flow directed thereat. For example, a method of regulating fluid flow between the lines is provided. The method includes directing a fluid downhole through the inlet line at a given rate and guiding the fluid to a regulator of the device having a pressure based on the given rate. The fluid may then be released through the outlet line and into a well where the pressure is below a predetermined level.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is a side view of a downhole assembly employing an embodiment of a chemical injection regulation mechanism.

[0013] FIG. **2** is an overview of an oilfield with a well accommodating the assembly of FIG. **1** with the regulation mechanism incorporated therein.

[0014] FIG. **3**A is an enlarged sectional view of the regulation mechanism of FIGS. **1** and **2** in an open position to allow chemical flow therethrough.

[0015] FIG. **3**B is an enlarged sectional view of the mechanism of FIG. **3**A in a closed position to seal off chemical flow to the well.

[0016] FIG. **4** is an alternate embodiment of a chemical injection regulation mechanism employing multiple regulators in tandem for flexibility in flow control.

[0017] FIG. **5** is another alternate embodiment of a regulation mechanism incorporated into a downhole assembly and utilizing electric line control.

[0018] FIG. **6** is a flow-chart summarizing an embodiment of employing a chemical injection regulation mechanism is disclosed.

DETAILED DESCRIPTION

[0019] Embodiments are described with reference to certain configurations of completions hardware that make use of chemical injection assemblies. In particular, completions are depicted and described which utilize a chemical injection assembly to help prevent scale and other buildup in an adjacent production tubular. However, whether on shore or offshore, a variety of different completion architectures may benefit from utilization of regulated chemical injection as detailed herein. For example, chemical injection directed at a well annulus, casing, production screen or a variety of other locations may benefit from a regulation mechanism as detailed herein.

[0020] Referring now to FIG. **1**, a side view of a downhole assembly **101** is shown. The assembly **101** utilizes an embodiment of a chemical injection regulation mechanism **100** to help manage the flow of chemical injection fluid into adjacent production tubing **180**. However, in other embodiments, such a chemical injection application may be directed at a variety of different completion hardware target locations. Regardless, as detailed further below, the regulation mechanism **100** may be particularly adept at preventing the undesirable drainage of a column of the injection fluid from a chemical injection line **120**.

[0021] More specifically, a chemical injection mixture and application protocol at the depicted location of FIG. **1** may be directed by an operator positioned a significant distance away at an oilfield **200** of FIG. **2**. As detailed below, this results in a pressure exerted by the column of fluid in the line **120** which, depending on downhole conditions, may exceed pressure within the tubing **180**. Thus, the regulation mechanism **100** may be of significant benefit in deterring chemical fluid leakage into the depicted tubing **180**.

[0022] In the embodiment shown, the assembly **101** is configured to support production in an uphole direction (see arrow **110**). At the same time, the assembly **101** is outfitted with the chemical injection features such as the referenced line **120**. Thus, an ongoing metered amount of chemical injection fluid may be delivered to the tubing **180** so as to help minimize scale **190** or other production inhibiting buildup.

[0023] With added reference to FIG. **2**, and by way of example only, early in the life of the well **285**, downhole pressures may be quite dramatic, perhaps exceeding 10,000 PSI. Therefore, the assembly **101** may be outfitted with one way check valves **175** to ensure that production does not enter the tubing port **177** of the chemical injection system. These valves **175** may be located near the port **177** to protect as much of the line **120**, regulation mechanism **100**, and other chemical injection hardware from exposure to downhole fluids as possible. Additionally, in order to achieve chemical injection into the tubing **180** through the port **177**, a pump unit **227** may be utilized to drive up pressure and deliver a metered rate of injection.

[0024] However, in other situations, for example, later in the life of the well, downhole pressures may drop dramatically, perhaps well under 500 PSI. Nevertheless, artificial lift and other measures may be taken to help ensure continued production viability of the well **285**.

[0025] Continuing with reference to FIGS. **1** and **2** and with such possible low pressure conditions of the well **285** in mind, the role of the regulation mechanism **100** is again considered. The mechanism **100** is shown with a coupling **140** for securing to the chemical injection line **120** which originates at the surface of the oilfield **200** as alluded to above. As a practical matter, this means that the noted column of fluid in the line **120** may span a distance of several thousand feet in vertical height. Thus, with a conventional line diameter of between 0.25 inches and 1.25, the fluid pressure at the coupling **140** and mechanism **100** may be far in excess of about 500 PSI (depending on the fluid type).

[0026] By the same token, however, the tubing pressure at the location **179** adjacent the depicted tubing port **177** may be well under 500 PSI as in the example above. Indeed, this is often the case for wells that are offshore, substantially depleted, of extended life, or some combination thereof Whatever the case, as noted above, the disposal of the regulation mechanism **100** between the noted location **179** and the line **120** may be utilized to help avoid the undesirable chemical injection leakage into the tubing **180**.

[0027] Referring directly now to FIG. **2**, an overview of an oilfield **200** is shown which accommodates the assembly **101** of FIG. **1** within a well **285**. More specifically, the assembly **101** is isolated with a packer **275** adjacent a perforated production region **297**. So, for example, the interior of the production tubing **180** is exposed to the region **297** for production but isolated from the remaining annulus **250** of the well **285**. Once more, as detailed above, debris such as scale and other buildup in the tubing **180** are kept at a minimum by the use of a chemical injection system that incorporates a regulation mechanism **100**, among other features.

[0028] In the embodiment shown, the noted injection system is directed at delivery through a port **177** and into the tubing **180** as described above. The location of the delivery is such that uphole fluid flow via production may be utilized to distribute chemical injection mix through the tubing **180** keeping buildup therein at a minimum. However, depending on the nature of operations, such chemical injection may be directed at hardware directly adjacent the production region **297**, within the annulus **250**, or anywhere downhole that may be of operational benefit. Once more, there may be circumstances where downhole pressure (e.g. in the tubing **180**) is of a level that's below the line-based injection fluid pressure at the downhole end of the line **120** (near the injection point). Nevertheless, the regulation mechanism **100** may help prevent uncontrolled injection fluid drainage, thereby avoiding any potential catastrophic results from such leakage.

[0029] Continuing with reference to FIG. **2**, the well **285** is outfitted with a casing **280** and traverses various formation layers **290**, **295** in reaching the noted production region **297**. Thus, the chemical injection line **120** of the assembly **101** may traverse several thousand feet from surface before reaching the regulation mechanism **100**. As such, the significance of the mechanism **100** in holding back a column of injection fluid mixture may be appreciated, for example, where the corresponding downhole pressure is of a negligible level.

[0030] Additionally, a host of equipment **220** is positioned at the oilfield **200** for running production, chemical injection, and other operations. In the embodiment shown, this includes a conventional well head **225** with production line **223** emerging therefrom along with a rig **221** for supporting a host of potential interventional tools. Further, pump **227** and control **229** units are also positioned adjacent the well head **225** for directing operations. For example, at the outset of operations, the pump unit **227** may be supplied by chemical tanks and utilized to circulate a tailored chemical fluid mixture down through the injection line **120**.

[0031] The pump unit **227** may be configured to effect a pressure and rate sufficient for overcoming any high pressure downhole conditions. By the same token, changes to this rate, the ratio of constituents of the fluid mixture, or responsiveness to changing downhole pressures may be accounted for and directed by the control unit **229**. As described above, this may even include directing the pump unit **227** to halt positive pressure applied to the line **120** when downhole pressure becomes sufficiently low. In fact, at this time, the effectiveness of the regulation mechanism **100** in preventing chemical loss from the line **120** may be appreciated as noted above and detailed further below.

[0032] Continuing with reference to FIG. **2**, another advantage of utilizing the regulation mechanism **100** relates to testing of the injection system as a whole. That is, upon outfitting hardware within the well **285** as shown, a series of functional tests may be performed. For example, this may include testing seals and other features of the chemical line **120**. With the regulation mechanism **100** incorporated into the line **120**, such tests may now be performed at reasonably low pressures and without significant loss of chemical fluid. That is, flow rate and pressure may be introduced into the line **120** in order to close off the mechanism **100** as described and test fluid sealing thereof

[0033] Referring now to FIGS. **3**A and **3**B, enlarged sectional views depicting internal features of the regulation mechanism **100** of FIGS. **1** and **2** are shown. More specifically, FIG. **3**A is a view of the mechanism **100** in an open position to allow chemical flow therethrough, whereas **3**B depicts the mechanism **100** closed to seal off the chemical flow.

[0034] With particular reference to FIG. **3**A, the mechanism **100** is depicted with the coupling **140** at one end for securing to the chemical line **120** and an outlet **360** leading to check valves **175** and other injection features (see FIGS. **1** and **2**). However, between this coupling **140** and outlet **360**, the flow rate of the noted chemical fluid mix **300** may determine whether or not the regulation mechanism **100** is left open or is closed.

[0035] By way of a specific example, and continuing with reference to FIG. **3**A, the fluid mix **300** may be directed to the regulation mechanism **100** at a rate of about 0.1 gallons per minute. With added reference to FIG. **2**, this may be achieved by operation of the pump **227** and control **229** units which may direct and monitor flow on an ongoing basis as well as account for factors such as the length and dimensions of the line **120**. Regardless, in the embodiment shown, and by way of example only, a flow rate of 0.1 gal./min. may translate into about a 150 lbs. of force applied to a valve **325** of within the mechanism **100**. Thus, where a biasing device **330**, in this case, a spring, is rated at about 200 lbs., such a flow of the fluid **300** would fail to overcome the spring. As such, the valve **325** would remain open and allow the fluid **300** to continue to flow through the regulation mechanism **100**.

[0036] However, with added reference to FIG. **3**B (and FIG. **2**), circumstances may dictate that the valve **325** be closed so as to stop the flow of chemical mix **300**. For example, as well noted above, low pressure conditions in the well **280** may constitute such circumstances. Indeed, where this is the case, the column of chemical mix **300** in the line **120** may naturally begin to flow at a greater rate due to a reduced pressure differential. For example, the flow rate may be increased, whether naturally or as directed by surface equipment **220**. For exemplary purposes only, consider that a rate increase to 0.2 gallons per minute might raise the forces exerted on the valve **325** to a predetermined 300 lbs., thereby overcoming the biasing device **330** and closing off flow through the mechanism **100**. More specifically, the valve **325** is equipped with a piston **350** and sealing head **355** which extends toward an exit channel **365** of the outlet **360**. Thus, when the force of the spring is overcome by the forces imparted on the valve **325**, the mechanism **100** is closed and flow from the line **120** is halted.

[0037] Continuing with reference to FIGS. **3**A and **3**B, with some added reference to FIG. **2**, the manner by which forces imparted on the valve **325** and device **330** as a result of changing flow rate is described in greater detail. Namely, in the embodiment depicted, the valve **325** is a shuttle valve disposed in a chamber **320** defined by a body **301** of the mechanism **100** and outfitted with a seal ring **329** and flow restrictor **327**. Thus, the flow of fluid **300** into this chamber **320** from the line **120** translates into a force on the valve **325** that is enhanced primarily based on the dimensions of the restrictor **327**. That is, the smaller the restrictor **327**, the greater the magnification of the force. Regardless, with the restrictor **327** inherently of smaller dimension than the chamber **320** and the line **120**, some degree of force amplification results.

[0038] The particular degree of force amplification may be tailored to the particular operational parameters in which the regulation mechanism **100** is to be utilized. So, for example, in certain embodiments a wide range and high rate of chemical injection delivery protocols may be utilized. Therefore, the amount of flow rate increase necessary to close off the regulation mechanism and injection may be greater than in applications where tighter tolerances or more precision is to be displayed in chemical injection delivery. Such design choices may be implemented through the use of flow restrictors **327** of varying sizes as noted above or through dimensional variations in the body of the valve **325** itself. Indeed, for added variability a manifold **400** of differently tailored regulator mechanisms may be utilized simultaneously (see FIG. **4**).

[0039] In the embodiment shown, the diameter of the body of the piston head **355** is notably less than that of the spring and interfacing support structure. Thus, the effective diameter of the seal is limited in a manner that may allow for an equilibrium to develop between the pressure in the chamber **320** and pressure surrounding the spring. Therefore, to ensure that the valve **325** remains closed, continuous flow of fluid **300** may be maintained. Of course, in other embodiments, the effective diameter of the seal may be increased by enlarging the piston head **355** to a degree that continuous flow of fluid **300** may not be necessary.

[0040] Referring now to FIG. **4**, an alternate embodiment of a manifold **400** of chemical injection regulation mechanisms **410**, **420**, **430** operating in tandem to provide for flexibility in flow control. That is, each regulator **410**, **420**, **430** may be set to close off at a different flow rate threshold as determined by spring, restrictor and other internal component factors as noted above. For example, in one embodiment, a first regulator **430** may be configured for sealing upon exposure to a flow rate of 0.3 gallons per minute, a second regulator **420** for sealing upon exposure to 0.2 gallons per minute and a third regulator **410** to close off at 0.1 gallons per minute. Thus, as flow is introduced into the line **120** and driven up, the regulators **430**, **420**, **410** would be sequentially closed off

[0041] As a practical matter, the sequential closing off of the regulators **430**, **420**, **410** as described above provides a system in which an overall wider range of flow rates and pressures may be utilized to achieve injection before completely shutting down an injection application. For example, such a manifold **400** may be configured to govern a metered rate of injection where flow rate from the line **120** ranges up to about 0.3 gallons per minute and imparts up to several thousand PSI on any of the individual regulators **430**, **420**, **410**.

[0042] Referring now to FIG. **5**, another alternate embodiment of a regulation mechanism **500** is shown. In this embodiment, the mechanism **500** operates to regulate a flow of chemical injection fluid **300** with the aid of a control line **510**, most likely of an electric variety, although other signaling platforms may be utilized. Regardless, in the embodiment shown, the mechanism **500** regulates or meters the delivery of the injection fluid **300** by way of a valve **525**, in this case shifted open or closed via signaling over the noted line **510**. That is, in this embodiment, electric signaling may be utilized in place of flow control for regulating the chemical injection application. Regardless, this technique helps avoid undesired release of injection fluid **300** in circumstances where downhole pressures are substantially low.

[0043] In the embodiment of FIG. **5**, the valve **525** may be directed to release the chemical injection fluid **300** through a port **579** as shown. However, this ported release may again be directed at a variety of locations. This may include directing the fluid **300** to flow upstream with production fluid **110** before release into the tubing **180** so as to help prevent buildup at a port **577** thereat. Indeed, in the embodiment shown, the fluid **300** is actually routed toward a flow control valve **527** that more directly meters the release of fluid **300** into the production tubing **180**. For example, in one embodiment, this valve **527** may be further guided by input from a viscosity **560**, flow **540** or other sensor for tighter precision over the chemical injection release into the tubing **180** via a release port **577**.

[0044] Continuing with reference to FIG. **5**, a regulation mechanism **500** may be utilized at a variety of site specific locations. For example, in the embodiment of FIG. **5**, the mechanism **500** is utilized to guide and regulate chemical injection at a specific isolated zone of a downhole assembly. That is, the mechanism **500** is disposed in a region of the well **285** that is cased **280** and isolated by packers, **275**, **575** in a manner targeting production from the specific production region **297**. Indeed, a variety of different such production zones may be a part of the overall well architecture, each with its own discrete hardware and independently operating regulation mechanism **500** tailored to the production and conditions thereat. Thus, a more site specific and overall tailored injection profile for the entire well **285** may be developed.

[0045] Referring now to FIG. **6**, a flow-chart summarizing an embodiment of employing a chemical injection regulation mechanism is disclosed. Namely, an injection line leading through a well may be supplied with a chemical fluid mixture as indicated at **610**. Thus, a column of fluid with its own column-based pressure at its downhole end is provided. Thus, the mix may be flowed through the line to a downhole target location as indicated at **630**. Where downhole pressure is less than the column-based pressure, the potential exists for this to be achieved without the use of surface pumps or the like. Alternatively, as noted at **650**, positive pressure may also be utilized as needed.

[0046] Regardless, once the flow is begun, the system is equipped with a regulation mechanism that provides for the sealing off of the flow when desired by exceeding the rate to above a predetermined level (see **670**). Thus, undesirable leakage of chemical flow may be avoided. As referenced above, this sealing may take place sole based on the flow resulting from a column-based pressure differential (see **610** proceeding directly to **670**) or by intentionally pumping at a higher rate from surface. Additionally, as indicated at **690**, the presence of the mechanism allows for early stage seal testing of the injection line and/or periodic testing during the life of the well without significant risk of such chemical fluid losses.

[0047] Embodiments described hereinabove include a chemical injection regulation mechanism that may be utilized to avoid expenses associated with the loss of chemical injection fluid into a well as a result of low downhole pressures. Once more, more dramatic consequences related to chemical fluid leakage and/or corresponding vacuum induced line closure may also be avoided. Such regulation is achieved in a manner which avoids any undesired downtime in injection capacity and even allows for early stage testing of chemical injection line sealing capacity.

[0048] The preceding description has been presented with reference to presently preferred embodiments. Persons skilled in the art and technology to which these embodiments pertain will appreciate that alterations and changes in the described structures and methods of operation may be practiced without meaningfully departing from the principle, and scope of these embodiments. Regardless, the foregoing description should not be read as pertaining only to the precise structures described and shown in the accompanying drawings, but rather should be read as consistent with and as support for the following claims, which are to have their fullest and fairest scope.

We claim:

1. A chemical injection regulation mechanism comprising:

a valve disposed in a chamber for exposure to a column of injection fluid; and

a biasing device coupled to said valve and configured to allow sealing of the chamber upon a flow rate of the fluid thereinto reaching a predetermined level.

2. The mechanism of claim **1** wherein said biasing device is a spring configured to collapse upon exposure to forces determined based on the flow rate reaching the predetermined level.

3. The mechanism of claim **1** wherein said valve includes a piston with a sealing head at the end thereof to provide the sealing in response to the reaching of the predetermined level.

4. The mechanism of claim **1** wherein said valve is a shuttle valve with a flow restrictor therethrough.

5. The mechanism of claim **4** wherein the predetermined level is based at least in part on dimensions of the chamber, the valve and the flow restrictor.

6. The mechanism of claim **1** wherein said biasing device is coupled to an electrical control line to direct the sealing.

7. The mechanism of claim **1** wherein said valve is a first valve for the exposure to the injection fluid, the mechanism further comprising a second valve in fluid communication with said first valve for flow control release of the injection fluid from the mechanism.

8. The mechanism of claim **7** wherein the flow control release is governed at least in part by input from an adjacent sensor configured to provide data of a variety selected from a group consisting of flow related data and viscosity related data.

9. A valve assembly comprising:

an inlet line for accommodating a column of fluid;

a fluid flow regulation mechanism disposed in a chamber for exposure to the column of fluid; and

an outlet line to receive a flow of the fluid when pressure on the mechanism from the column is below a predetermined level.

10. The assembly of claim **9** wherein the fluid is a chemical injection fluid and the assembly is configured for disposal in a well, the assembly further comprising downhole hardware in fluid communication with said outlet for obtaining the flow to minimize occlusive buildup.

11. The assembly of claim **10** wherein said hardware is selected from a group consisting of well casing, a production screen, and production tubing.

12. The assembly of claim **10** wherein the well is selected from a group consisting of an offshore well and a substantially depleted well.

13. The assembly of claim **10** configured for disposal in an isolated zone within the well.

14. A chemical injection manifold assembly comprising:

a first regulation mechanism with a valve disposed in a chamber for regulating flow therethrough from a column of fluid in communication therewith, the regulating to allow the flow therethrough when a rate thereof is below a first predetermined level; and

a second regulation mechanism with another valve disposed in another chamber for regulating flow therethrough from the column of fluid in communication therewith, the regulating to allow the flow therethrough when a rate thereof is below a second predetermined level different from the first predetermined level.

15. The assembly of claim **14** wherein the first predetermined level is substantially different from the second predetermined level to ensure sequential closure of the mechanisms as the rate is increased.

16. A method of regulating injection into a well, the method comprising:

supplying an injection line into the well with a column of fluid mix;

flowing the fluid through a regulation mechanism to a target location in the well at below a predetermined rate; and

sealing off said flowing with the mechanism upon the fluid reaching a flow rate that exceeds the predetermined rate.

17. The method of claim **16** wherein the reaching of the flow rate exceeding the predetermined rate is aided by application of positive pressure delivered by equipment positioned at an oilfield surface adjacent the well.

18. The method of claim **16** further comprising running a pressure test on the injection line supported by said sealing.

19. The method of claim **16** wherein said sealing further comprises maintaining a continuous flow of fluid through the line.

20. The method of claim **16** wherein said sealing comprises shifting a valve of the mechanism to a closed position, said shifting including overcoming a biasing force of the valve with a force determined based on the flow rate as the predetermined rate is exceeded.

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