

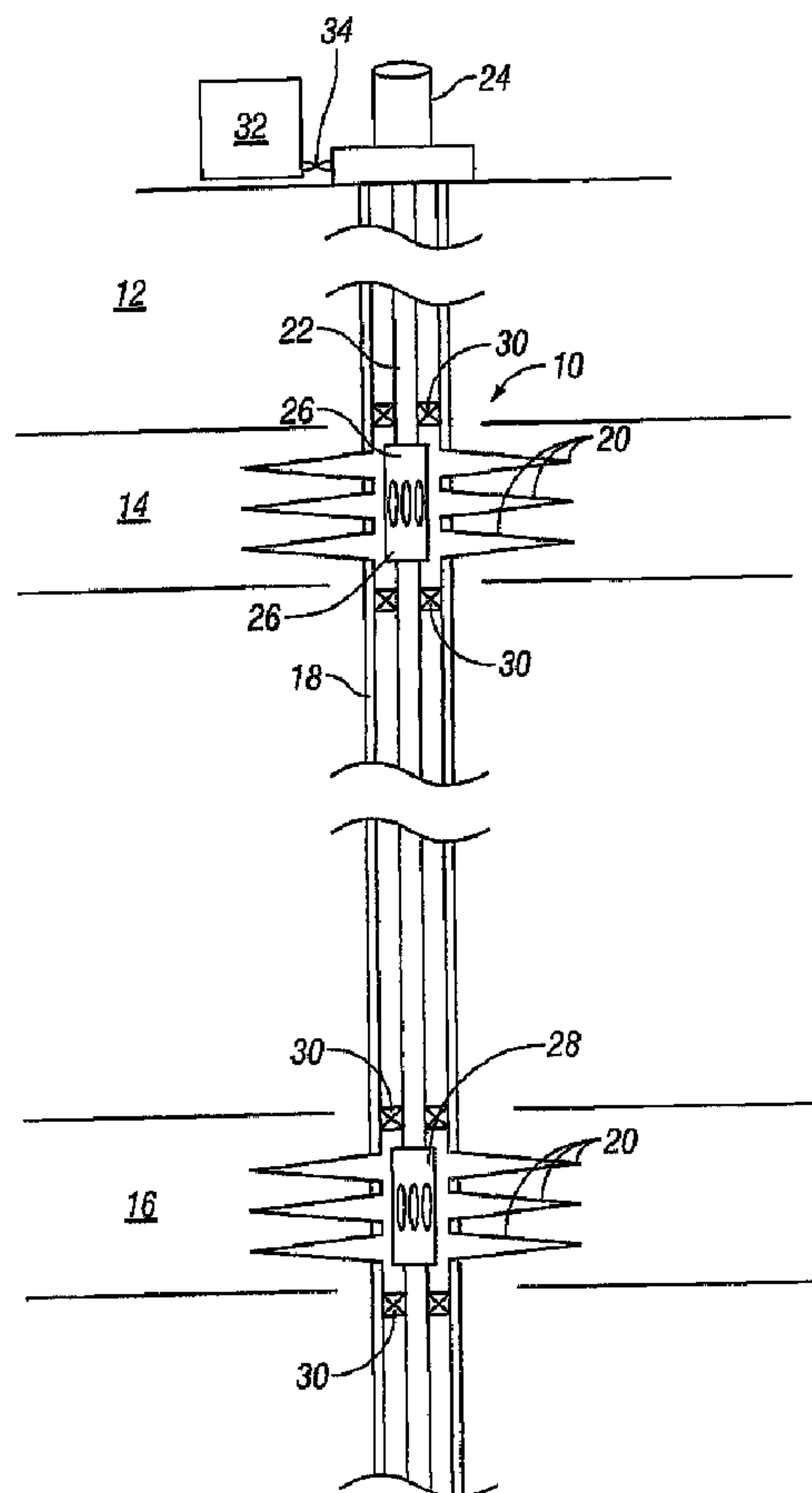


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(54) Titre : SURVEILLANCE DE PRESSION DE LIGNES DE COMMANDES POUR RETROACTION DE POSITION D'OUTIL

(54) Title: PRESSURE MONITORING OF CONTROL LINES FOR TOOL POSITION FEEDBACK



(57) Abrégé(suite)/Abstract(continued):

fluid to flow into the wellbore. A sensor in the wellbore, and associated with the fluid line, provides an indication of a position of the valve member. A method of determining a state of a flow control tool within a wellbore comprises supplying fluid under pressure to the flow control tool to move a flow control member of the tool into the state. Pressure of the supplied fluid is detected downhole. The state of the flow control device is determined from the detected pressure of the supplied fluid.

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**PRESSURE MONITORING OF CONTROL LINES
FOR TOOL POSITION FEEDBACK**

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention relates generally to the hydraulic control of downhole tools and, particularly to methods and devices for determining the state of such hydraulically-actuated tools.

2. Description of the Related Art

[0002] Production of hydrocarbons from a downhole well requires subsurface production equipment to control the flow of hydrocarbon fluid into the production tubing. Typical flow control equipment might include a sliding sleeve valve assembly or other valve assembly wherein a sleeve is moved between open and closed positions in order to selectively admit production fluid into the production tubing. The valve assembly is controlled from the surface using hydraulic control lines or other methods.

[0003] In a simple system, a sleeve valve would be moveable between just two positions or states: fully opened and fully closed. More complex systems are provided where a well penetrates multiple hydrocarbon zones, and it is desired to produce from some or all of the zones. In such a case, it is desirable to be able to measure and control the amount of flow from each of the zones. In this instance, it is often desirable to use flow control devices that may be opened in discrete increments, or states, in order to admit varying amounts of flow from a particular zone. Several "intelligent" hydraulic devices are known that retain information about the state of the device. Examples of such devices include those marketed under the brand names HCM-A In-Force™ Variable Choking Valve and the In-Force™ Single Line Switch, both of which are available commercially from Baker Oil Tools of Houston, Texas. These devices incorporate a sliding sleeve that is actuated by a pair of

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stored signatures and the sleeve position determined based on the comparison. In another embodiment, the pressure profile for each movement is stored in memory 205 and a measured profile is compared to those in memory to determine the sleeve position. Alternatively, manual controls 200 may be operator controlled to operate the hydraulic system.

[0024] While described herein as a system having dual hydraulic control lines and a balanced piston, it will be appreciated by one skilled in the art that the present system is intended to encompass a single hydraulic line system utilizing a piston having a spring return capability.

[0025] Those of skill in the art will recognize that numerous modifications and changes may be made to the exemplary designs and embodiments described herein and that the invention is limited only by the claims that follow and any equivalents thereof.

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CLAIMS

What is claimed is:

1. A flow control device for use in a wellbore to allow flow of formation fluid into the wellbore, comprising:
 - a valve member adapted to move when disposed in the wellbore;
 - a fluid line supplying a working fluid under pressure to move the valve member to allow the fluid to flow into the wellbore; and
 - a sensor in the wellbore and associated with the fluid line to provide an indication of a position of the valve member.
2. The flow control device of claim 1 wherein the valve member is adapted to move into a plurality of positions.
3. The flow control device of claim 1 wherein the sensor is located proximate the valve member, and wherein the sensor is chosen from the group consisting of: (i) a pressure sensor, and (ii) a flow sensor.
4. The flow control device of claim 1 further comprising a controller that receives signals from the sensor and determines the position of the valve member based on the received signals.
5. The flow control device of claim 4 wherein the controller has an associated pressure profile relating the position of the valve member.

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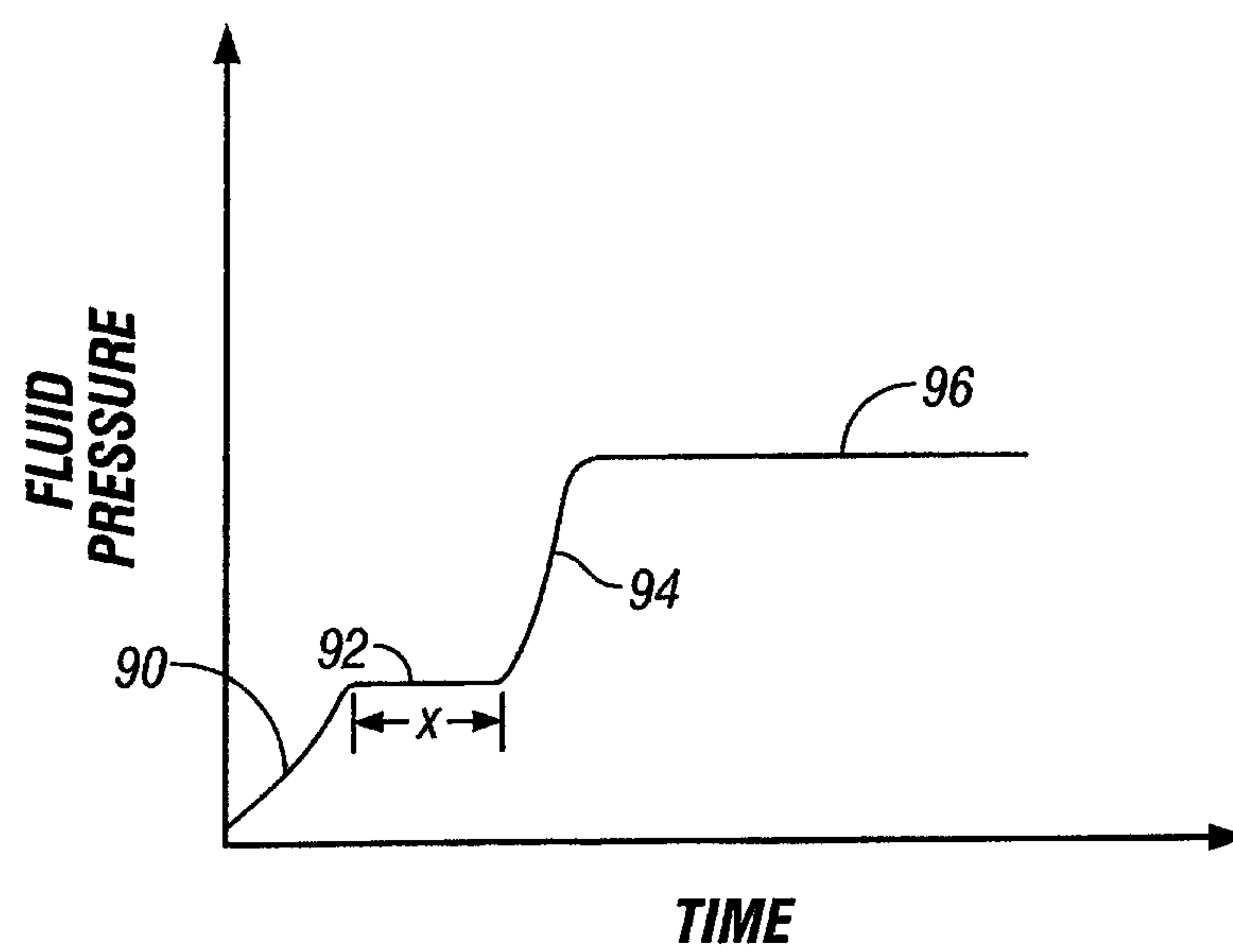


FIG. 4

