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Mott

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[54] **OPERATOR APPARATUS**

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[73] Assignee: **Hydril Company,** Houston, Tex.

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[52] **U.S. Cl.** ..... **166/224 A,** 166/72, 251/58, 251/63.6

[51] **Int. Cl.** **E21b 43/12**

[58] **Field of Search** ..... 166/72, 224, 224 A; 251/58, 57, 62, 63.5, 63.6

[56] **References Cited**

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3,078,923	2/1963	Tausch	166/224 S
3,696,868	10/1972	Taylor, Jr.	166/224 S
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Primary Examiner—James A. Leppink

[57] **ABSTRACT**

A full bore opening valve operator apparatus adapted for mounting with a flow tubing to releasably receive a flow controlling valve means movable through the bore of the tubing for operably securing with the apparatus for remotely-controlled operation of the valve means by either a first or second control means to control the flow through the bore.

26 Claims, 5 Drawing Figures

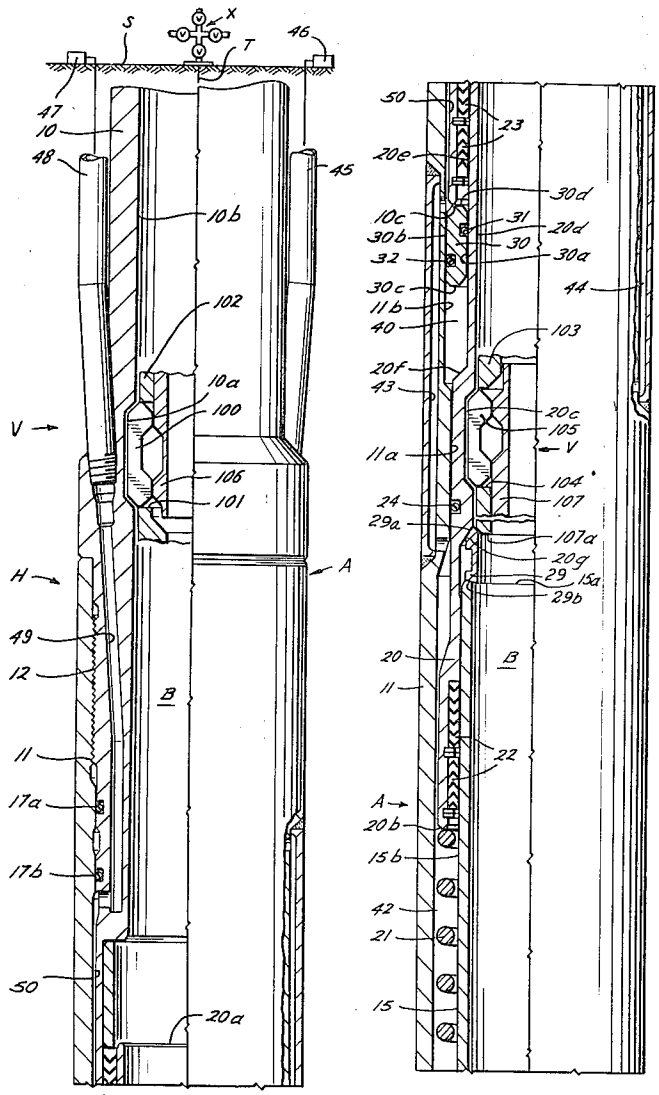

Fig. 1A

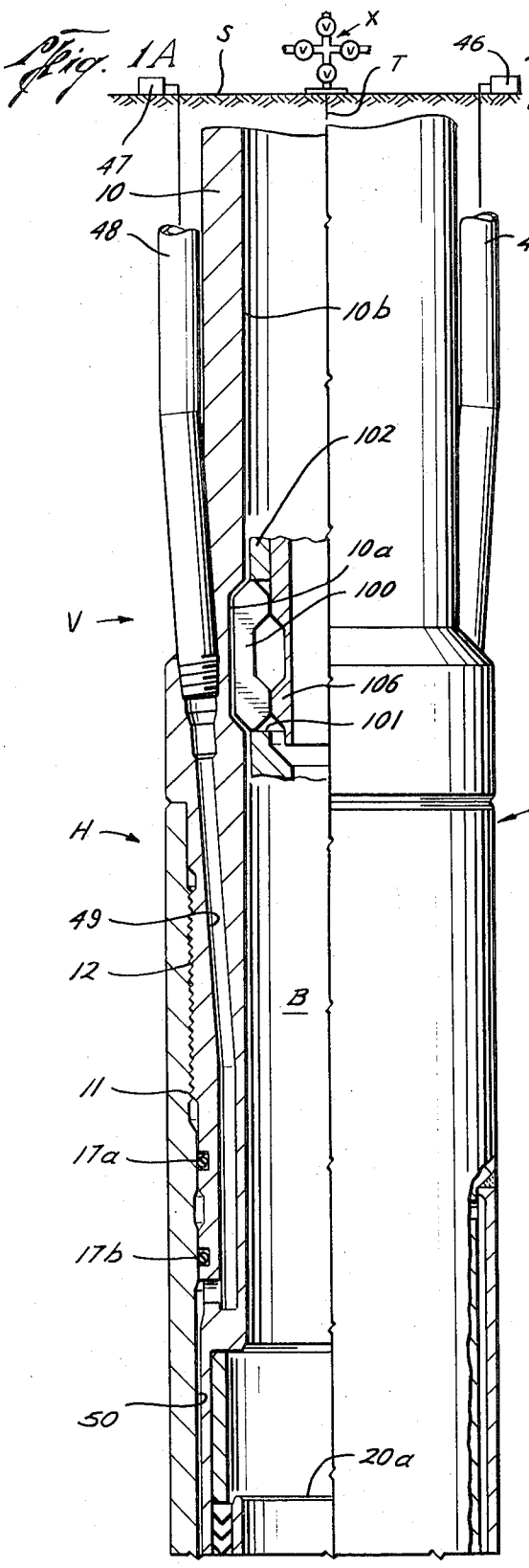
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Fig. 1B

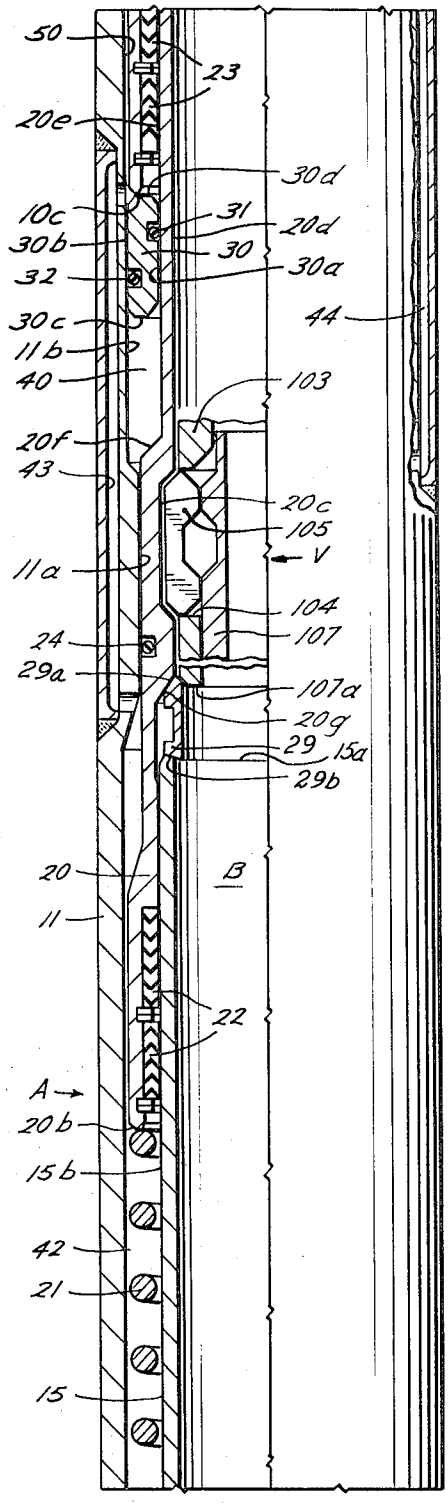
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Fig. 1C

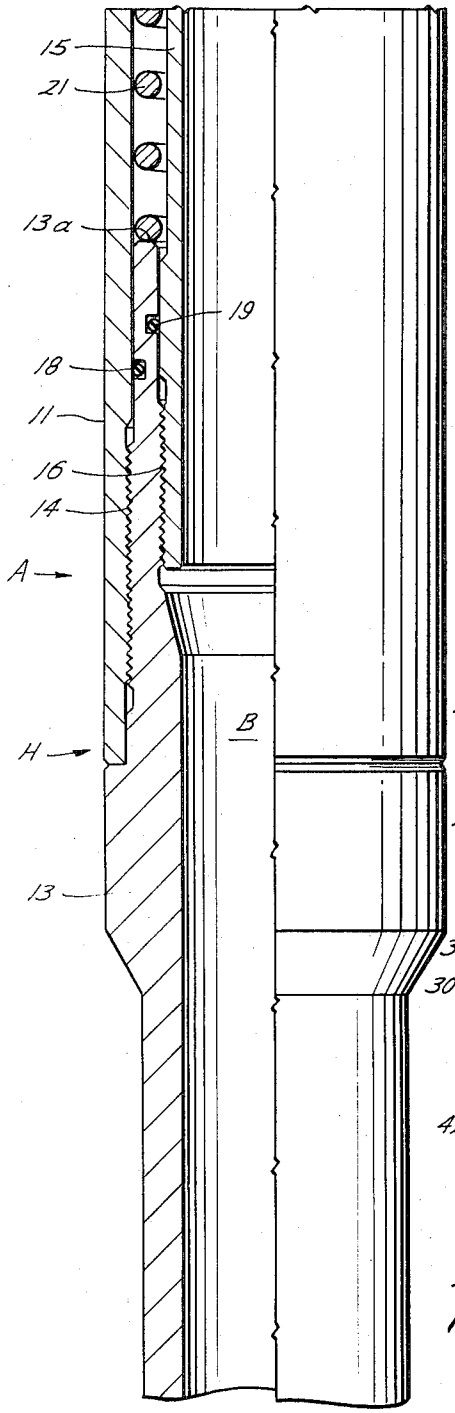

Fig. 2

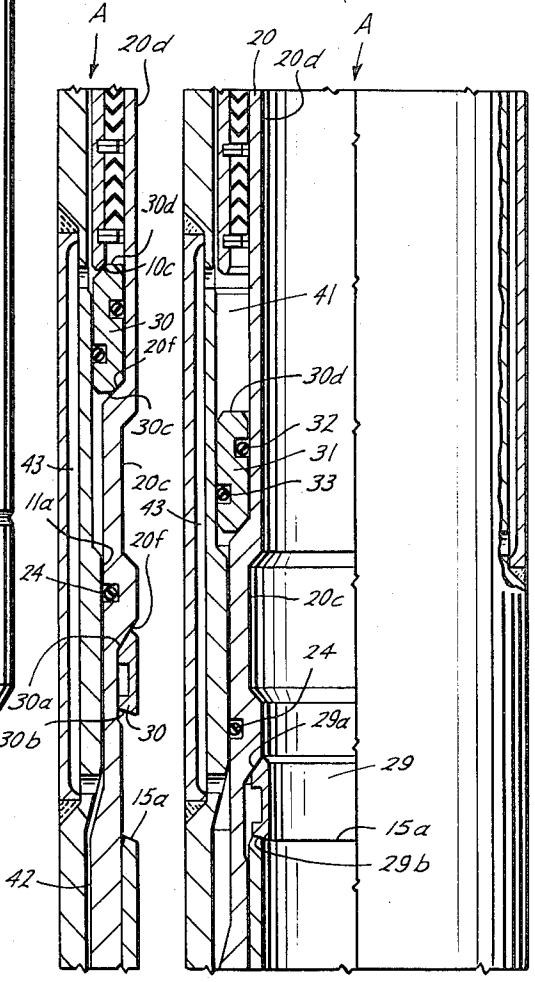

Fig. 3

OPERATOR APPARATUS

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is related to the following co-pending applications: Ser. No. 131,661, entitled "Retrievable Safety Valve" now U.S. Pat. No. 3,763,933; Ser. No. 131,629 entitled "Subsurface Well Apparatus and Method" now U.S. Pat. No. 3,762,471; and Ser. No. 131,628, also entitled "Subsurface Well Apparatus and Method" now U.S. Pat. No. 3,744,564.

BACKGROUND OF THE INVENTION

This invention relates generally to the field of tubing operator apparatus and more particularly to a remote-controlled tubing operator apparatus for effecting remote-controlled operation of a through-the-bore movable flow controlling valve means at a subsurface location in a well.

Wire-line or through-the-bore retrievable safety valve means for controlling flow in a well tubing at a subsurface location and which are operated from a remote location such as disclosed in U.S. Pat. Nos. 3,667,505; 3,078,923; 3,696,868 and Re. 26,149, are known. These valves were operated by control fluid pressure communicated from the surface into the valve means by small control fluid conduits which were run in the well when the production tubing was set. Frequently, these safety valve systems were rendered inoperative by foreign matter plugging the small control fluid conduits which were exposed to well fluid when running or retrieving the safety valve or by various failures of the conduits to communicate the control fluid pressure required to operate the valve. The control line plugging problem was especially critical in two control line balanced safety valves, such as disclosed in U.S. Pat. Nos. 3,077,669 or 3,411,576, which could be rendered inoperative by the plugging or failure of either control fluid line. The necessity to pull the production tubing to repair the control system was particularly undesirable due to the cost involved in performing that operation and the risk of damage to the producing formation that could result in lost hydrocarbon production.

while the inventions disclosed in my related co-pending applications identified hereinabove have served to reduce the opportunity for plugging of the small condiuts, a conduit failure would still limit the capability of those valves to control undesired flow.

SUMMARY OF THE INVENTION

A full bore opening valve operator apparatus preferably adapted for mounting in a well production tubing at a subsurface location to releasably receive a flow controlling valve means movable through the bore of the tubing to the apparatus and which is operably secured therein for remote controlled operation by either a first or second control means to control the flow. The apparatus includes a landing member also remotely controlled by either the first or second control means to locate the valve means for operably securing therein for controlling flow through the bore of the tubing.

An object of the present invention is to provide a new and improved operator apparatus.

A further object of the present invention is to provide a new and improved operator apparatus for locating a flow control means therewith.

Yet still another object of the present invention is to provide a new and improved operator apparatus for operating a flow control means associated therewith.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. 1A, 1B and 1C are side views arranged in alphabetical sequence from top to bottom and partially in section, illustrating the operator apparatus of the present invention mounted with the well tubing and with the flow control valve means received therein operated open by a first control means;

FIG. 2 is a side view, similar to FIG. 1B, illustrating the operator apparatus operated by a second control means; and

FIG. 3 is a side view, similar to FIG. 2, with the operator apparatus illustrated prior to operation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The operator apparatus of the present invention is generally designated A in the FIGS. and is preferably mounted with or made up in a flow conduit or well production tubing, designated at T, a subsurface location below the well head apparatus or christmas tree, generally designated X, for effecting operation of a flow control means for shutting-in or controlling flow in the well at the subsurface location. Of course, the operator apparatus A may be mounted with any flow conduit for effecting operation of the flow control means to control the flow of fluids through the conduit and the present invention should not in any manner be considered limited to use in wells.

In FIG. 1A, the christmas tree X is illustrated located immediately adjacent ground surface S, but the tree X may be located above the surface S, for example, on a structure such as an offshore platform (not illustrated) that will locate the tree X a considerable distance from the ground S as is well known. With such an arrangement the operator apparatus A could be mounted in the tubing T above the surface S, but subsurface location is preferred for numerous well-known reasons. A packer (not illustrated) may be employed below the apparatus A to direct the flow of produced hydrocarbons through the bore of the production tubing T as is well known in the art.

The operator apparatus A includes a tubular member or flow housing H having a longitudinally extending bore B formed therethrough which is aligned with and in communication with the bore (not illustrated) of the production tubing to provide a flow passage for well fluids and the like through the housing H as is well known. The housing H preferably includes an upper threaded box connection (not illustrated) and a lower threaded pin connection (not illustrated to enable the housing H to be made up in the production tubing as is well known in the art. For ease of assembly, the housing H is formed of an upper sleeve member **10** secured to an intermediate sleeve member or section **11** by suitable means such as threaded engagement at **12** (FIG. 1A) and as illustrated in FIG. 1C, the sleeve member **11** is secured to a lower sleeve member or section **13** by suitable means such as threaded engagement at **14.** The housing H further includes an inner sleeve **15** mounted with the sleeve **13** by suitable means, such as threaded engagement at **16,** and which extends upwardly in concentric spaced relationship with sleeve **11** to an upwardly facing annular shoulder **15***a* (FIG. 1B).

A pair of O-rings, **17***a* and **17***b* block leakage of fluid by the threaded engagement at **12** while O-rings **18** and **19** block leakage of fluid by the threaded engagement **14** and **16** (FIG. 1C), respectively. Suitable anti-rotation pins (not illustrated) may be utilized to prevent inadvertent disengagement of the threads **12, 14** and **16** as is well known in the art.

The operator apparatus A includes a tubular operator member or means **20** movably mounted with the sleeve **11** and which operator member **20** is adapted to co-act with a received flow control means to control flow through the bore B in response to movement of the operator **20.** The tubular operator member **20** extends downwardly from an upwardly facing annular shoulder **20***a* (FIG. 1A) to a downwardly facing annular shoulder **20***b* located in the annular area between the spaced housing sleeves **11** and **15.** The operator **20** is longitudinally movable in the bore B to and from an upper or first position (FIG. 3) for blocking flow through the bore B with the flow control valve means and a second or lower position (FIGS. 1A, 1B and 2) for operating the flow control means to enable flow or production of well fluids through the bore B of the housing H.

The operator assembly A of the present invention is designed and arranged to receive, locate, secure, operate and release the flow control valve means of the type disclosed in my co-pending applications, identified hereinabove as related copending applications, and to which specific reference is hereby made for incorporating the disclosure of those applications herein. Those applications set forth in detail the method and apparatus used in running the flow control valve means through the bore of the tubing T to the subsurface location of the operator apparatus A where it is to be secured and utilized to control flow in the bore B of the housing H and in retrieving the flow control valve means from the housing H when desired.

Briefly to assist in understanding the present invention, the flow control valve means which is partially illustrated in FIGS. 1A and 1B, and generally designated V, moves through the bore of the tubing T into the aligned bore B of the housing H where the valve means is received for securing against movement by a plurality of latch dogs **100** located in a plurality of circumferentially spaced window openings **101** formed in a tubular valve frame or body **102** (FIG. 1A) of the flow control valve means. The latch dogs **100** move radially outwardly into an annular recess **10***a* formed in the inner surface **10***b* of the sleeve **10** for securing the valve means frame **102** with the housing H. As illustrated in FIG. 1B, the flow control valve means V includes a tubular operator member **103** having a plurality of circumferentially spaced windows or openings **104** formed therein having a corresponding plurality of latch dogs **105** positioned therein which move radially outwardly into an annular recess **20***c* formed in the inner surface **20***d* for operably securing the flow control valve means operator **103** with the operator **20** of the apparatus A. The flow control valve means V further includes latch sleeves **106** and **107** for holding or locking the radially expanded latch dogs **100** and **105,** respectively, for securing the valve means V in the operator apparatus A and for co-acting with the operator member **20** for controlling flow of fluid through the bore B. The flow control valve means V further includes a rotatable ball bore closure means (not illustrated) which is moved to the closed position to block flow when the flow control valve means operator **103** is longitudinally moved toward latch dogs **100** by the operator **20** moving to the upper position (FIG. 3) and which rotates to the open position to enable flow when the operator **103** is moved in a direction away from the latch dog **100** when the operator **20** moves to the lower position (FIGS. 1B and 2).

The lower sleeve **13** of the housing H provides an upwardly facing annular shoulder **13***a* (FIG. 1C) between the sleeves **11** and **15** which mounts a spring or urging means **21** which engages the annular shoulder **20***b* of the operator **20** at an upper end for urging the operator sleeve **20** to the upper position (FIG. 3). Thus, the spring means **21** urges the operator **20** to move upwardly for blocking flow through the bore B with the flow control valve means operably secured with the apparatus A.

The operator **20** mounts an annular sealing element or chevron packing adjacent the lower annular shoulder **20***b* for effecting a sliding annular seal with an outer surface **15***b* of the sleeve **15** to block leakage of fluid therebetween. The sleeve **11** mounts an annular sealing element or chevron packing **23** adjacent the upper shoulder **20***a* for effecting an annular sliding seal between the sleeve **11** and an outer surface **20***e* of the operator **20** to block leakage of fluid therebetween. The outer surface **20***e* is formed to provide an upwardly facing tapered annular shoulder **20***f* below the seal of the chevron packing **23.** The operator **20** mounts an O-ring **24** in an annular recess formed in the surface **20***e* below the shoulder **20***f* for effecting a sliding annular seal between the operator **20** and a sealing surface **11***a* of the sleeve **11** to block leakage of fluid therebetween.

The operator apparatus A may also include a movable landing member or element **29** for locating the received flow control valve means V in the bore B for operably securing therein to control the flow of fluid through the bore B. The landing member **29** is preferably an expansible ring member having a gapped opening to enable contraction thereof and which is positioned adjacent a downwardly facing tapered annular shoulder **20***g* formed by the inner surface **20***d* of the operator **20.** As illustrated in FIG. **3,** when the operator **20** is in the upper position, the landing ring or member **29** is in a first or radially expanded position for providing a full bore opening B through the housing H to enable the running of well tools and others through the bore flow control means through the apparatus A as desired. The landing member **29** includes an upwardly facing tapered annular shoulder **29***a* adjacent the shoulder **20***g* and a downwardly facing tapered annular shoulder **29***b* for engaging the upwardly facing tapered annular shoulder **15***a* when the operator **20** moves to the lower position for moving or forcing the landing ring **29** inwardly to a radially contracted or second position to constrict the bore B and provide a landing stop to locate or position the flow control valve means V for securing with the housing H to co-act with the operator **20.**

The operator apparatus A includes a first control means and a second control means which are independently operable to overcome the upwardly urging of the spring **21** to move the operator **20** to the lower position for effecting operation of the flow control valve means or to move the landing member **29** to the second position for providing a landing stop for the flow con-

trol valve means. Should either the first or the second control means be rendered inoperative for any reason, the remaining operative control means will continue to function to operate the apparatus A independently of the inoperative control means. The housing H further includes a movable piston ring 30 (FIG. 1B) movably disposed between the sleeve 11 and the operator 20 below the packing 23. The piston 30 includes an inner surface 30*a* mounting an O-ring 31 therein for effecting a sliding annular seal between the piston 30 and the outer surface 20*e* of the operator 20 to block leakage of fluid therebetween. The sleeve 11 includes a second inner sealing surface 11*b* which effects a sliding seal with an O-ring 32 mounted in an annular recess in an outer surface 30*b* of the piston 30. The piston 30 includes a beveled downwardly facing annular shoulder surface 30*c* and an upwardly facing beveled annular shoulder 30*d* which engages a downwardly facing annular shoulder 10*c* provided by the sleeve 10 to provide an upper limit stop to the piston 30 in the first or upper position as illustrated in FIG. 3. The annular shoulder 20*f* of the operator 20 engages the downwardly facing shoulder 30*c* of the piston 30 for providing an upper limit stop to the operator 20. When the piston 30 moves to the lower position (FIG. 2) the engagement of the shoulder 30*c* with the shoulder 20*f* moves the operator 20 to the lower position also.

The first control means includes a first or normal operating expansible chamber 40 which is formed between the sleeve 11 and the operator 20 below the piston 30, and above the seal of the O-ring 24. As illustrated in FIG. 1B, fluid pressure in the chamber 40 will urge upwardly on the downwardly facing annular shoulder surface 30*c* of the piston 30 between the seals effected by the O-rings 32 and 31 for moving the piston 30 upwardly. Fluid pressure in the chamber 40 will also urge downwardly on the annular shoulder 20*f* on the pressure responsive effective surface area between the seals effected by the O-ring 31 and 24 for moving the operator 20 to the lower position for enabling flow.

The sleeve 11 and the operator 20 are also arranged to form a second expansible chamber 41 (FIG. 2) above the piston 30 which is included in the second control means. Fluid pressure in the second expansible chamber 41 will urge downwardly upon the upwardly facing annular shoulder 30*d* between the seals effected by the O-rings 31 and 32 for urging piston 30 to move downwardly to the lower position.

The operator 20 and the housing H also arrange to form a third expansible chamber 42 defined by the seals effected by the O-ring 24 and the chevron packing 22. Fluid pressure in the expansible chamber 42 urges upwardly on the downwardly facing annular shoulder 20*b* over a net pressure responsive effective surface area between the seals effected by the chevron packing 22 and the O-ring 24. The operator 20 is spaced from the sleeve 11 when the operator 20 is in the upper position (FIG. 3) to enable communication between the second expansible chamber 41 and the third chamber 42 through a flow channel 43 formed in the sleeve 11. With expansible chambers 41 and 42 in communication by the flow channel 43, the control fluid pressure is the same in both the chambers 41 and 42, but as the upwardly facing net pressure responsive surface area 30*d* of the piston 30 is greater than the downwardly facing net pressure responsive surface area of the shoulder 20*b*, a net downward force for moving the operator 20 to the lower position results from increased control fluid pressure in the chambers 41 and 42. Thus, the second expansible chamber 41 includes the third expansible chamber 42.

In addition to the first expansible chamber 40 arranged in the housing H for urging movement of the operator 20 to the second position, the first control means includes a first control fluid passage 44 communicating the chamber 40 with a first control fluid conduit 45 (FIG. 1A) which communicates with a source of control fluid pressure 46 at a location spaced from the housing H to provide remote controlled operation of the operator apparatus A.

The second control means includes a second source of control fluid 47 spaced from the housing H which communicates with the second expansible chamber 41 and the chamber 42 through a second control fluid conduit 48 and flow passages 49 and 50 formed in the sleeves 10 and 11, respectively. Such sources of control fluid pressure are well known in the art and may be manual, automatic or a combination thereof for remote control operation of the apparatus A. The source of the control fluid pressure 46 and 47 are illustrated positioned on the surface S adjacent the tree X, but they may be positioned at a location spaced from either or both the surface S or the tree X. While the disclosed first and second control means utilize control fluid pressure to operate the apparatus A, other suitable means such as, but not limited to, insulated electric conductors, may be used to remotely control operation of the apparatus A and flow through the bore B.

In the use and operation of the present invention, the housing H is made up in a production tubing for positioning at the desired subsurface location. Control fluid conduits 45 and 48 are connected and the apparatus A lowered in the well until it is positioned at the desired subsurface location. The sources of contol fluid pressure 46 and 47 are then connected to the fluid conduits 45 and 48, respectively, for effecting desired operation of the apparatus A.

Preferably control fluid pressure in the chamber 40 is then increased by operation of the source 46 with the increased control fluid pressure communicated through the conduit 45 and the flow passage 44 into the chamber 40. The control fluid pressure in the chamber 40 urges downwardly upon the upwardly facing annular shoulder 20*f* to move the operator 20 from the upper position (FIG. 3) to the lower position (FIG. 1B) which moves the landing ring 29 inwardly where it will engage a lower annular shoulder 107*a* of the lower latch 107 of the flow control valve means V. The flow control valve means V moves through the bore of the production tubing T to the apparatus A where it is secured against movement in the bore B by the latch dogs 100 and operably secured with the operator 20 by the latch dogs 105 for effecting operation of the flow control valve means as set forth in greater detail in my copending applications identified hereinabove.

Should it become desirable to operate the apparatus with other than the first control means which may be occasioned by the plugging or rupturing of the conduit 45, the second control means may be employed to move the landing member 29 inwardly to provide a landing stop for the flow control valve means. The control fluid pressure in the chambers 41 and 42 is increased to move the operator 20 to the lower position (FIG. 2) by operation of the source 47 in the well

known manner. Thus, it is apparent that the landing member **29** is operable to the second position by either the first or the second control means and such operation is independent of the other control means.

To enable flow through the bore B of the housing H by the flow control valve means, the operator member **20** is moved to the lower position by increasing the control fluid pressure in the expansible chamber **40** by the first control means or by increasing fluid pressure in the chambers **41** and **42** with the second source of control fluid **47.** When the control fluid pressure in the chambers **40** and **41** and **42** is reduced, the spring **21** moves the operator **20** to the upper position for effecting closure of the flow control valve means V to block flow of fluid through the bore B in the housing H at the subsurface location. Such an arrangement provides for fail-safe operation in that loss of control fluid pressure will shut-in the well.

For normal operation of the apparatus A the use of the first control source **46** is preferred in that downward movement of the operator **20** by increased pressure in the chamber **40** enables egress of fluid from the chamber **42** below the operator **20** through the flow passage **43** and the conduit **48** back to the second source **47** at the surface as the operator **20** moves down. The arrangement of the chambers **40, 41** and **42** is thus to enable the static hydraulic head of the control fluid in the conduits **45** and **48** to be substantially balanced on the operator **20,** as is well known in the art, for enabling the location of the operator apparatus A at greater well depths with the spring **20** operable to close the valve without overcoming the static head. This arrangement also reduces the effect of the well pressure in the bore B urging upwardly on the pressure responsive net effective surface area of the shoulder **20***g* between the seals effected by the chevron packing **22** and **23** to substantially provide a well pressure balanced operator **20** to reduce the magnitude of the control fluid pressure required to move the operator downwardly to operate the flow control valve means.

The flow control valve means may be retrieved and replaced whenever desired without the need to kill the well and pull the production tubing T.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape and materials as well as in the details of the illustrated construction may be made without departing from the spirit of the invention.

What is claimed is:

1. An apparatus adapted for connecting in a well tubing at a subsurface location in a well to receive a flow control valve means movable through the bore of the tubing to the apparatus, including:

a housing having a bore therethrough and adapted for connecting in the well tubing with said bore communicating with the bore of the tubing;

an operator member mounted with said housing and movable to and from a first position and a second position relative to said housing for a received flow control valve means to effect opening and closing operation of the flow control valve means for blocking flow through the bore of the tubing when said operator is in the first position and for enabling flow through the bore of the tubing when said operator is in the second position;

first control means associated with said operator member independently of the well tubing for moving said operator to the second position for enabling flow through the bore of the tubing in response to a signal carried by said first control means; and

second control means associated with said operator member independently of the well tubing for moving said operator to the second position for enabling flow through the bore of the tubing in response to a signal carried by said second control means wherein either said first or said second control means moves said operator to operate the flow control valve means to enable flow through said bore.

2. The structure as set forth in claim **1,** including:

said operator member is moveable to the first position for co-acting with the received flow control valve means to block flow of fluid through the bore of the tubing in response to an urging on said operator member by means mounted with said housing.

3. The structure as set forth in claim **1,** wherein:

said operator member moves longitudinally in said bore when operating the flow control means.

4. The structure as set forth in claim **1,** wherein:

said operator member is a tubular member having an inner surface defining a longitudinally extending bore therethrough.

5. The structure as set forth in claim **4,** wherein:

said inner surface of said tubular operator member having an inside diameter substantially the same as the inside diameter of the bore of the tubing wherein a full opening apparatus is provided.

6. The structure as set forth in claim **4,** including:

a recess formed in said inner surface of said tubular operator member to receive a portion of the flow control valve means to effect operation thereof.

7. The structure as set forth in claim **1,** including:

spring means with said housing for urging said operator member to move to the first position for blocking flow of fluid with the received flow control means.

8. The structure as set forth in claim **2,** wherein:

said first control means includes a first expansible chamber arranged in said housing for urging movement of said operator member to the second position in response to control fluid pressurein said first expansible chamber.

9. The structure as set forth in claim **8,** including:

a first control fluid conduit communicating said first expansible chamber with a source of control fluid pressure spaced from said housing wherein the flow through the bore is remotely controlled.

10. The structure as set forth in claim **8,** wherein:

said control means includes a second expansible chamber arranged in said housing for urging movement of said operator member to the second position in response to the control fluid pressure in said second expansible chamber.

11. The structure as set forth in claim **10,** including:

a first control fluid conduit communicating said first expansible chamber with a first source of control fluid pressure spaced from said housing; and

a second control fluid conduit communicating said second expansible chamber with a second source of control fluid pressure spaced from said housing wherein the flow through the bore is remotely-

controlled by either said first or said second control means.

12. The structure as set forth in claim 1, including:
means for locating the flow control means in said bore for controlling flow of fluid in the bore of the tubing.

13. The structure as set forth in claim 12, wherein:
said means for locating the flow control means includes a landing member disposed in said bore and movable to and from a first position and a second position for providing a landing stop to locate the flow control means for co-acting with said operator member to control the flow of fluid.

14. The structure as set forth in claim 13, wherein:
said landing member in moving to the second position constricts said bore of said housing for engaging the flow control means.

15. The structure as set forth in claim 13, wherein:
said landing member in said first position is located in said bore to enable passage of the flow control means or other movable through-the-bore tools and the like through said bore of said housing.

16. The structure as set forth in claim 13, wherein:
said landing member in said first position located in said bore to provide a cross-sectional flow area in said bore adjacent said landing member substantially equal to the cross-sectional flow area of the bore of the tubing wherein said bore is full opening adjacent said landing member.

17. The structure as set forth in claim 13, including:
said landing member movable from the first position to the second position by said first control means or said second control means wherein either said first or said second control means locates the means for controlling flow with said operator.

18. An apparatus adapted for connecting in a well tubing to receive and operate open and closed a flow control valve means moveable through the bore of a tubing to the apparatus, including:
housing having a bore therethrough adapted for connecting with the well tubing with said bore communicating with the bore of the well tubing;
a landing member with said housing and disposed in said bore and moveable to and from a first position enabling passage of the flow control valve means through said bore of said housing and a second landing position for providing a landing stop for engaging the flow control valve means to operably locate the flow control valve means with said housing;
first control means associated with said landing member independently of the well tubing for moving said landing member to the second landing position in response to a signal carried by said first control means; and
second control means associated with said landing member for moving said landing member to the second landing position in response to a signal carried by said second control means wherein either said first or said second control means controls the position of said landing member.

19. The structure as set forth in claim 18, wherein:
said landing member in moving to the second position constricts said bore of said housing for engaging the flow control means.

20. The structure as set forth in claim 18, wherein:
said landing member in said first position is located in said bore to enable passage of the flow control means or other through-the-bore tools and the like through said bore of said housing.

21. The structure as set forth in claim 18, wherein:
said landing member in said first position is located in said bore to provide a cross-sectional flow area in said bore adjacent said landing member substantially equal to the cross-sectional flow area of the bore of the tubing wherein said bore is full opening adjacent said landing member.

22. A well tool apparatus adapted for connecting in a well tubing below a well head to operably receive a flow control valve means moveable through the bore of the tubing, including:
a housing having a bore therethrough adapted for mounting with the well tubing with said bore communicating with the bore of the well tubing to receive the flow control valve means;
a landing stop mounted with said housing and moveable relative to said housing into said bore for engaging the flow control valve means to operably position the flow control valve means in said bore of said housing;
first control means communicating with said housing independently of the well tubing for selective operation to move said landing stop into said bore of said housing for locating the flow control valve means in said bore; and
second control means communicating with said housing independently of the well tubing for selective operation to move said landing stop into said bore of said housing for locating the flow control valve means in said bore wherein selective operation of either of said first or said second control means locates the flow control valve means in said bore with said landing stop.

23. The structure as set forth in claim 22, wherein:
said first and said second control means are actuated from adjacent the well head for locating the flow control means in said housing.

24. A well tool apparatus adapted for mounting in a well tubing below a well head to operably receive a flow control valve means moveable through the bore of the tubing, including:
a housing having a bore therethrough adapted for mounting with the well tubing with said bore communicating with the bore of the well tubing to receive the flow control means therein;
an operator member mounted with said housing and moveable relative thereto to and from a first position to operate the received flow control valve means for blocking flow of fluid through said bore and a second position for operating said flow control valve means for enabling flow through said bore;
first control means operably associated with said operator member independently of the well tubing for selectively moving said operator to the second position for enabling flow through said bore; and
second control means operably associated with said operator member independently of the well tubing for selectively moving said operator to the second position for enabling flow through said bore wherein either said first or said second control means is selectively operable to control flow through said bore.

25. The structure as set forth in claim **24,** wherein:
said first control means is actuated from adjacent the well head for controlling the flow through said bore.

26. The structure as set forth in claim **25,** wherein:
said second control means is actuated from adjacent the well head for controlling the flow through said bore.

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