June 2, 1953 L. E. BROWN ET AL 2,640,542

SIDEWALL SAMPLE TAKING DEVICE

Filed Sept. 11, 1947 3 Sheets-Sheet 1

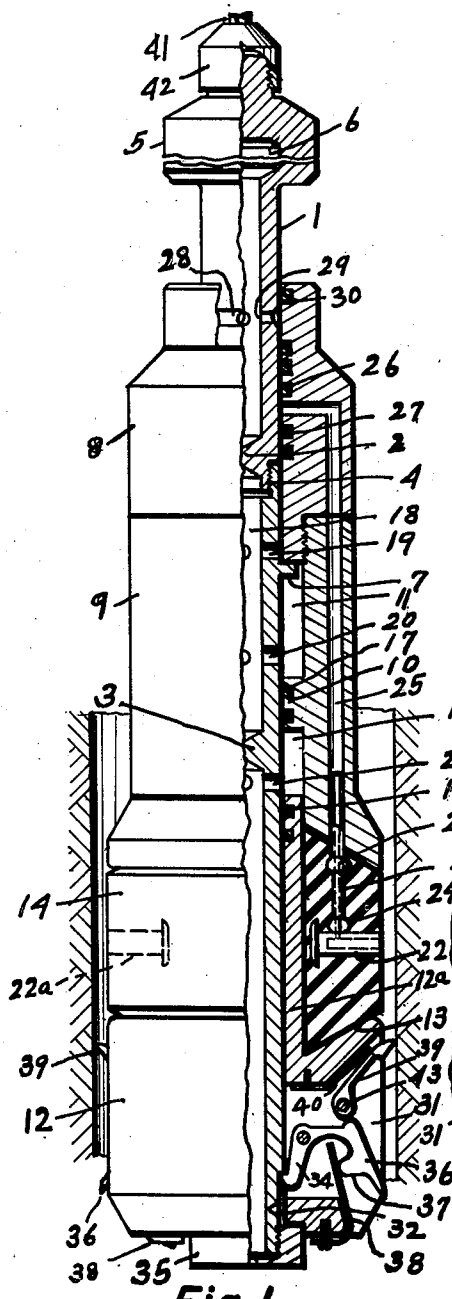


Fig. 1

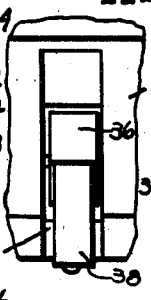


Fig. 2

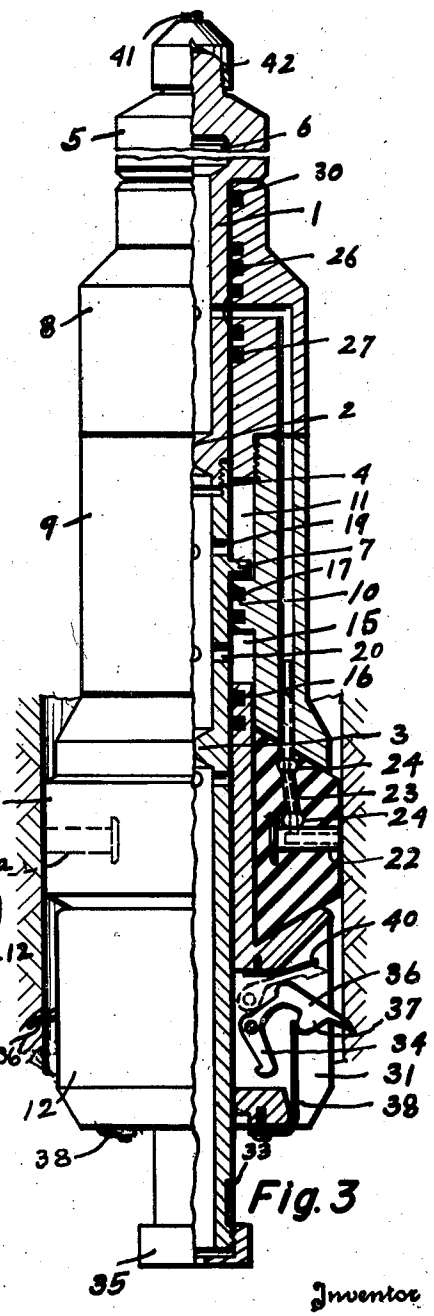


Fig. 3

Inventor
Luther E. Brown
Ollin W. Williams

By E. V. Hardway
attorney.

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SIDEWALL SAMPLE TAKING DEVICE

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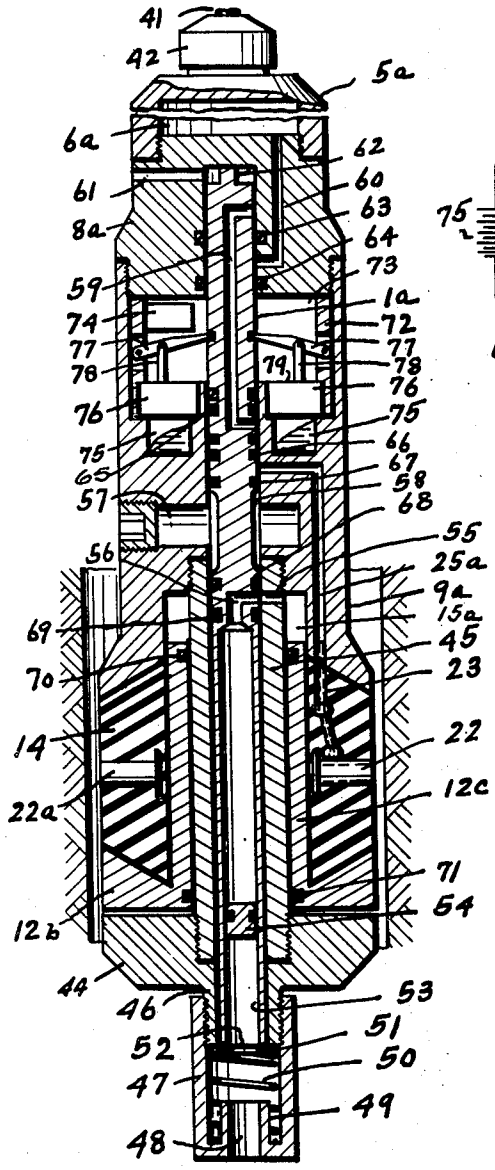


Fig.4

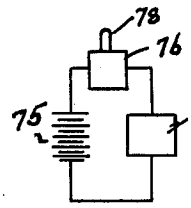


Fig.5

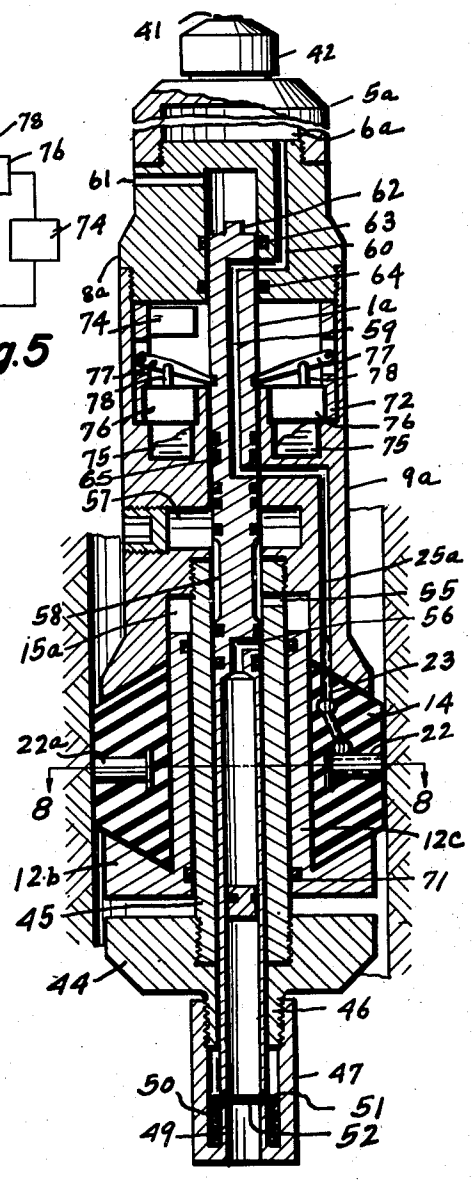


Fig.6

Inventor
Luther E. Brown
Ollin W. Williams

By

E. V. Hardway
attorney

June 2, 1953 L. E. BROWN ET AL 2,640,542

SIDEWALL SAMPLE TAKING DEVICE

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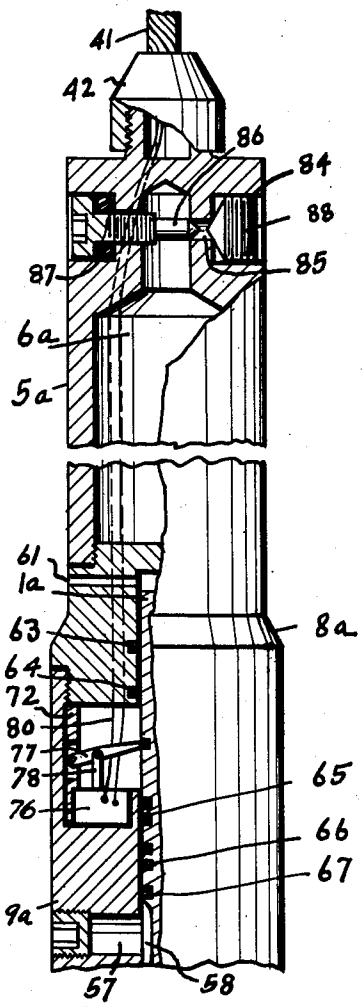


Fig.7

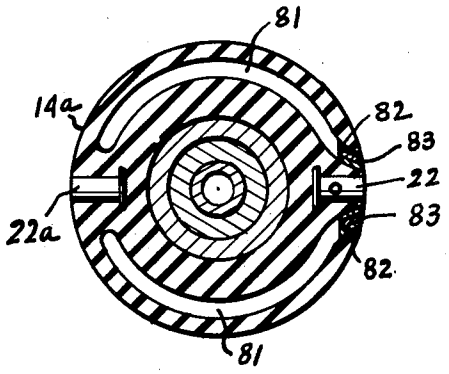


Fig.8

Inventor
Luther E. Brown
Ollin W. Williams

By E. V. Hardway
attorney.

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UNITED STATES PATENT OFFICE

2,640,542

SIDEWALL SAMPLE TAKING DEVICE

Luther E. Brown, Greggton, and Ollin W. Williams, Houston, Tex.

Application September 11, 1947, Serial No. 773,466

7 Claims. (Cl. 166—1)

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This invention relates to a sidewall sample taking device.

The invention embodies certain improvements over the types of testers disclosed in pending applications filed by applicants in the United States Patent Office on April 15, 1946, under Serial No. 662,142 and on August 26, 1946, under Serial No. 692,984.

An object of the invention is to provide equipment adapted to be lowered into a well bore by a wire line and by means of which a sample of the well fluid in the side wall of the bore may be taken and entrapped in a sample chamber in the device and withdrawn to the ground surface for inspection.

It is another object of the invention to provide sample taking equipment which may be maintained in inactive position while being lowered into the well bore and equipped with releasing means effective, when released, to allow the application of the pressure of the well liquid to an expansible packer whereby said packer will be expanded into contact with the walls of the bore to seal off an area of said walls and the sample chamber will be placed in communication with said walls to allow the fluid from the sealed off area to flow into said sample chamber. The various strata of the bore may thus be tested by a novel type of sample taking device, or well tester, and by a novel process.

A further feature resides in the provision of the sample taking device of such construction that the pressure of the well liquid on the outside of, and within, the device will be balanced while the tester is being lowered into, and withdrawn from, the well bore with means for reducing the pressure within the tester to the end that the outside pressure of the well liquid may operate to expand the packer and render the tester operative.

The tester herein described may be operated either mechanically or electrically to utilize the pressure of the well liquid to expand the packer and render the device operative or active to admit a sample from the bore walls into the sample taking chamber.

It is a further object of the present invention to provide means for applying acid to the sealed off area from which the sample is to be taken.

Other objects and advantages will be apparent from the following specification which is illustrated by the accompanying drawings, wherein:

Figure 1 is a side elevation, partly in section, of one embodiment of the invention shown in inactive position.

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Figure 2 is a fragmentary, side elevation thereof.

Figure 3 is a side elevation, partly in section, of the tester shown in active, or sample taking, position.

Figure 4 is a vertical, sectional view of another embodiment of the invention which includes electrically operable means for allowing the pressure within and without the device to become unbalanced.

Figure 5 is a wiring diagram.

Figure 6 is a longitudinal, sectional view of the embodiment shown in Figure 4 with the parts shown in active, or sample taking, position.

Figure 7 is a fragmentary, side view, partly in section, illustrating substantially the same form of the invention, as shown in Figures 4 and 6, but wherein the electrical current is supplied from the ground surface through the cable by means of which the tester is lowered into the well bore, and

Figure 8 is a cross-sectional view of a slightly modified embodiment of the invention shown in Figure 6 taken on the line 8—8 of Figure 6 and embodying means for acidizing the sealed off area from which the sample is to be taken.

Referring now more particularly to the drawings wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a central tubular stem which is provided with the upper and lower transverse partitions 2 and 3 which are spaced apart.

As illustrated this stem is formed of two sections which have the threaded connection 4.

The upper end of the stem 1 is enlarged externally forming a barrel 5 containing a sample chamber 6 which continues down through the upper section of the stem 1.

The stem is also provided with an external annular flange 7.

There is a tubular upper body which, in the present illustration, is formed of the upper and lower sections 8 and 9 connected together, preferably by threads.

The lower end of the section 9 of the body has a lower end face which is preferably downwardly and outwardly flared and the upper section 8 of the body is fitted closely about the stem 1 above the flange 7.

Intermediate the ends of the section 9 of the body said section is provided with an inwardly extended flange 10 which fits closely about said stem beneath the flange 7.

The flange 10 is spaced a distance beneath

the lower end of the upper section 8 of the body so that the stem will have a limited axial movement relative to the body. An internal low pressure chamber 11 is thus also provided.

Fitted about the lower portion of the stem 1 there is a lower body 12 whose upper end is formed with a face 13 which converges outwardly and upwardly relative to the lower end face of the upper body. Formed integrally with the lower body and upstanding therefrom and closely surrounding the stem 1 there is a sleeve 12a whose upper end fits up into the lower end of the upper body and between said outwardly converging faces and surrounding the sleeve 12a there is an expansible packer 14 of any selected length and formed of some suitable resilient material such as rubber or rubberized fabric.

The external surface of this packer 14 is substantially cylindrical in contour.

The upper end of the sleeve 12a is spaced beneath the flange 10 thus forming a high pressure chamber 15.

Between the upper end of the sleeve 12a and the stem 1 there is one, or more, seal rings, as 16, which are preferably countersunk into the inside wall of said sleeve 12a and between the inner wall of the flange 10 and the stem 1 there is one, or more, seal rings 17 preferably countersunk into said flange 10.

Between the partitions 2 and 3 the stem is provided with a low pressure chamber 18 which is provided with an upper outlet port 19 above the flange 7 and a lower inlet port 20 spaced beneath said flange 7; also the stem is provided with a port 21 located immediately beneath the partition 3. The stem constitutes a valve controlling the inlet and outlet of fluid to and from the chambers 11 and 15.

The packer 14 is provided with a radial tube 22 whose inner end is closed and provided with an enlarged head. This tube is embedded in the material of the packer with its outer end flush with the surface of the packer. Connected into this tube there is another tube 23 which is formed with universal joints, as 24, 24, embedded within the packer, and the upper end of the tube extends on up into a bore 25 in the lower section 9 and which bore continues on up through the upper body and at its upper end is turned inwardly through the upper section of the upper body. On opposite sides of the inwardly turned end of the bore 25 there are the upper and lower seal rings, as 26, 27, which form seals between the body section 8 and the stem 1 and which are preferably countersunk into said section 8 as shown.

Above the partition 2 the stem 1 is provided with an external annular groove 28 and leading inwardly from this groove through the stem into the sample chamber there are the ports, as 29. The tubes 22 and 23, and the bore 25, constitute an inlet channel leading from outside the packer into the sample receiving chamber through the groove 28 and ports 29 of the stem or valve 1 when the inturned upper end portion of the bore 25 is in registration with the groove 28.

Between the upper end of the body section 8 and the stem there is an annular seal ring 30 which is spaced above the upper seal ring 26 and which is preferably countersunk into the body section 8.

Extending through the lower body 12 and preferably oppositely disposed there are similar radial slots, as 31, 31, and in alignment with these respective slots there are the vertical side grooves

32 in the lower end of the stem 1, the upper ends of said grooves being undercut to form the shoulders, as 33, and pivotally mounted in each slot 31 there is a dog 34 engageable with the corresponding shoulder 33. These dogs are in such engagement to hold the stem 1 in its upper position, as indicated in Figure 1. It should be here noted that there is a perforated lower end cap 35 screwed onto the lower end of the stem 1 which engages the lower end of the lower body 12 to limit the range of upward movement of the stem 1.

There are the prongs 36 which are preferably formed integrally with the pivoted ends of the respective dogs 34 and which are directed downwardly and outwardly, as indicated in Figures 1 and 3 and the inner margin of each prong is provided with a projection 37.

There are the flat springs, as 38, whose lower ends are secured to the lower end of the lower body 12 and whose free ends are retracted up into the corresponding slots 31 and press outwardly against the corresponding projections 37 thus tending to force the sharp ends of the prongs 36 outwardly. These prongs, however, and the corresponding dogs 34 may be latched in their inner positions with the dogs 34 in engagement with the shoulders 33 by means of latches, as 39.

The inner end of each latch 39 is pivoted in the corresponding slot 31 and in contact with the corresponding prong 36 so as to hold said prong retracted as indicated in Figure 1. The free ends of the latches extend outwardly and upwardly and there are the flat springs, as 40, whose lower ends are secured to the lower body 12 within the corresponding slot 31 and whose other ends are free and press against the upper sides of the corresponding latches so as to hold the outer ends of the latches in contact with the walls of the bore as the tool is lowered into the well.

In use the device is assembled, as shown in Figure 1, with the stem in its upper position and with the dogs 34 in engagement with the shoulders 33 and with the cap 35 against the lower head. As so assembled the port 21 will be in communication with the high pressure chamber 15 and the ports 19 and 20, and the low pressure chamber 11, will be sealed off from said high pressure chamber; also the port 29 will be put out of registration with the bore 25 and will be sealed off from said bore by the seal 26 as well as from the outside pressure by the seal 30. It will thus be seen that the stem 1 is in effect a valve controlling the inlet and outlet of fluid to and from the pressure chambers 11 and 15, and also the inlet of sample fluid through the inlet channel from outside of the packer into the sample receiving chamber.

The device as so assembled may be lowered into the bore and the walls of the bore will hold the latches 39 in active position with their pivoted ends engaging the prongs 36 so as to hold said prongs retracted and to also hold the dogs 34 in engagement with the shoulders 33. As the device is lowered the well liquid will enter through the perforated cap 35 and will pass through the lower end of the stem 1 and out through the port 21 into the high pressure chamber 15. The well liquid, particularly in deep wells, is under high pressure but the pressure within the chamber 15 and on the outside of the tester will be equalized or balanced.

The tool may be let down into the well by

means of a flexible line, as 41, preferably a wire cable and which may be connected to the upper end of the barrel 5 in any approved manner, such as by a cable socket 42.

When a point has been reached where it is desired to make a test the device may be pulled upwardly causing the outer ends of the latches 39 to engage the walls of the well bore. These latches are pivoted on pins 43 which will easily shear and when the outer ends of the latches engage the formation and upward movement is taken the pins 43 will be sheared and the latches will be moved inwardly into the position indicated in dotted lines in Figure 3 so as to release the prongs 36 and thereupon the springs 38 will force the outer ends of said prongs outwardly into engagement with the wall formation and at the same time release the dogs 34 from the shoulders 33. The upper and lower bodies will be thereby anchored against substantial downward movement in the bore but when the pull on the cable 41 is released the weight of the stem 1 and barrel 5 will cause them to move downwardly to the position shown in Figure 3 and the lower end of the barrel will land on the upper end of the upper head. As said stem moves downwardly the ports 21 will move out of communication with the high pressure chamber 15 and below the seal 16 and the ports 20 will eventually come into communication with the chamber 15 and the ports 19 will come into communication with the chamber 11 so that the high pressure liquid in the chamber 15 may pass out through the ports 20 into the chamber 18 and thence through the ports 19 into the chamber 11 thus relieving the high pressure within the tool and unbalancing the pressures without and within the tool and thereupon the pressure of the liquid against the upper and lower bodies will move them toward each other thus compressing the packer 14 and expanding it into contact with an area of the walls of the bore. Meanwhile the port 29 will have come into registration with the inner end of the bore 25 so that any fluid in the sealed off formation may pass inwardly through the tube 22 and upwardly through the tube 23 and the bore 25 and on into the sample chamber 6.

The device should be allowed to remain in the position indicated a sufficient length of time to allow an ample sample to enter the sample chamber 6 and thereupon an upward pull may be exerted on the line 41 which will operate first to elevate the stem relative to said bodies to its initial position, as indicated in Figure 1, thus carrying the port 29 out of registration with the bore 25 and entrapping and sealing off the sample in the chamber 6; also the port 20 will be carried out of communication with the chamber 15 and the port 21 will be carried into communication with said chamber 15 so as to allow the pressure of the outside well liquid to again enter the high pressure chamber 15 to balance the pressure outside and inside of the tool and upon further upward movement of the stem 1 the flange 7 will engage the lower end of the upper section 8 of the upper body and the pressure on the packer 14 will be relieved so as to permit it to contract to its original position free of the walls of the bore and the tool may then be withdrawn to the ground surface for an inspection of the sample.

As indicated in dotted lines in Figures 1 and 3 there is a dummy tube 22a embedded in the walls of the packer 14 opposite the tube 22 and of the same external dimensions. This dummy is provided so that the packer, when an endwise compressive force is applied to it, will expand in the same manner on both sides.

Referring to the form shown in Figures 4 to 6, inclusive, the numerals 8a and 9a designate the upper and lower sections of the upper body and the numeral 12b designates the lower body. These upper and lower bodies have the outwardly converging, opposing, end faces as in Figure 1 with an expansible packer 14 between them.

Screwed onto the upper end of the upper body there is the sample receiving barrel 5a containing a sample receiving chamber 6a.

Beneath the lower body there is an annular lower end cap 44 which is connected to the lower section of the upper body by means of a tubular casing 45 whose upper end is screwed into the lower section of the upper body and whose lower end is screwed into the lower end cap 44 and this casing is surrounded by an upstanding sleeve 12c which is preferably formed integrally with the lower body 12b and which upstands therefrom and closely surrounds the casing 45 and is closely surrounded by the packer 14.

Depending from the lower end cap 44 there is a nipple 46 onto which there is threaded a cylinder 47. This cylinder has an inlet passageway 48 extending from its lower end upwardly therethrough and which is surrounded by a spring guide 49. This guide is surrounded by a coil spring 50 whose upper end supports an annular plate 51 having a central opening 52 therethrough.

In this form of the invention there is a stem 1a which works in an axial bore in the upper body and is fitted through the casing 45 and extends on down through the lower end cap 44 and nipple 46 with its lower end normally in contact with the plate 51.

The lower end of this stem 1a is formed into a cylinder 53 in which a piston 54 is mounted to float freely.

Within the lower section 9a of the upper body and surrounding the upper end of the casing 45 there is a high pressure chamber 15a whose lower end is formed by the upper end of the sleeve 12c. The upper end of the casing 45 has a port 55 leading outwardly therethrough communicating with chamber 15a and stem 1a has a duct 56 opening at one end into the upper end of the cylinder 53 and leading at its other end outwardly through the stem 1a which duct registers with the port 55 when the stem 1a is in its upper position.

The upper body also has a low pressure chamber 57 therein and above the duct 56 the stem 1a has the vertical side slots 58.

The packer 14 is equipped with the radial tube 22 and the opposing dummy tube 22a, as in Figure 1, and the tube 23 is connected into the tube 22 and is of similar construction to the tube 23 shown in Figure 1 with its upper end projecting up into the bore 25a which leads upwardly through the body section 9a and whose upper end is inwardly turned.

The upper end of the stem 1a is formed with a by-pass bore 59 whose upper and lower ends extend radially outwardly through said stem walls. The upper section 8a of the upper body is formed with a bore 60 whose lower end is inwardly turned and whose upper end extends up through said section and enters the sample chamber 6a.

The upper end of the section 8a of the upper body has a radial relief duct 61 leading inwardly from the exterior of the section therethrough to

the axial bore of the section functioning as the bearing for the stem 1a and the upper end of said stem has a reduced stop 62 extending upwardly therefrom which comes into contact with the upper end of the stem bearing bore and prevents the closing of the duct 61 as illustrated in Figure 4.

Around the stem bearing in the upper section 8a of the upper head and countersunk into said section above and beneath the overturned lower end of the bore 60 there are the upper and lower seal rings 63, 64 and around the stem 1a and countersunk therein above and beneath the outwardly turned lower end of the bore 59 are the annular seals 65 and 66.

Also around the stem 1a and countersunk therein above and beneath the vertical slots 58 there are the seals 67 and 68.

This latter seal 68 is above the duct 56 and beneath said duct and around and countersunk into the stem 1a there is a seal 69.

The high pressure chamber 15a is sealed against the escape of pressure by means of the upper and lower seals 70 and 71 around the casing 45 and countersunk into the sleeve 12c.

When the tool is assembled and ready to be lowered into the well bore by means of the wire line 41 the stem 1a will be held in its upper position by means of the spring 50. When in this position the upper end of the bore 59 will be above the lower end of the bore 60 and the lower end of the bore 59 will be above the upper end of the bore 25a. In other words these bores will be sealed against the passage of fluid through them. Also the low pressure chamber 57 will be sealed off both above and below the slots 58 and the duct 56 will be in communication with the high pressure chamber 15a. This chamber 15a and the cylinder 53 above its piston may be filled with any suitable liquid such as a light oil or the like and when the tool is lowered into a well filled with liquid the pressure of the well liquid against the piston 54 will create a corresponding pressure in the high pressure chamber 15a so that the pressure in this last mentioned chamber will be the same as the pressure of the liquid surrounding the tool so that the outside and inside pressures will be balanced.

When the tool has been lowered to the location where a test is to be made the stem 1a will be moved downwardly, in a manner to be hereinafter stated, moving the duct 56 out of communication with the high pressure chamber 15a and moving one of the slots 58 into communication with said high pressure chamber and this slot will also be in communication with the low pressure chamber 57 so that the high pressure in the chamber 15a will be relieved and the pressure of the liquid against the upper and lower ends of the upper and lower bodies, respectively, will cause said bodies to move slightly toward each other placing the packer 14 under sufficient compression to expand it into contact with the walls of the well bore, as shown in Figure 6, to seal off an area to be tested and the respective lower and upper ends of the bore 59 will register with the overturned ends of the respective bores 60 and 25a so that a channel will be open from the tube 22 into the sample chamber 6a and fluid from the sealed off area may flow into said sample chamber.

The stem 1a may be moved downwardly, as above described, by electrically operable mechanism enclosed within a casing 72 which is fitted within a chamber 73 in the upper head. This mechanism embodies a time clock 74 of any conventional construction which is wired in circuit with batteries 75, 75 and when the time clock 74 closes the switch to complete a circuit through the batteries the solenoids 76, 76 associated with said batteries, will be energized.

There are the arms 77, 77 whose outer ends are pivoted to the casing 72 and whose inner ends project into notches in the stem 1a. There are the solenoid cores 78, 78 which are pivotally connected, at their upper ends, to the arms 77 and whose lower ends are associated with the solenoid windings. When the magnets 76 are energized the cores 78 will be pulled downwardly thus actuating the arms 77 to force the stem 1a downwardly.

The timing device, or clock, 74 may be set when the device is lowered into the well and it is regulated so as to give sufficient time to allow the tester to be lowered the required distance before the time clock closes the switch to energize the solenoids.

After the packer has been expanded, as above explained and as shown in Figure 6, it should be allowed to remain for a time in that position so as to allow the inflow of a sufficient sample and the time clock is so regulated that it will not break the circuit to the magnets 76 until this time is elapsed, whereupon said circuit will be broken and the spring 50 will then operate to elevate the stem 1a to its upper or original position thus closing the bore 60 and entrapping a sample in the sample chamber 6a. Any fluid above the stem 1a in its bearing will be expelled through the duct 61 as the stem moves upwardly.

Upon upward movement of the stem the duct 56 will register with the port 55 and high pressure will be re-established in the high pressure chamber 15a thus equalizing the pressures inside and outside of the tester. This will allow the upper and lower heads to move apart and the packer 14 to contract to free the walls of the well bore and the tool may then be readily removed from the bore for an inspection of the sample.

From the above it will be noted that the stem 1, or 1a, forms valve means through which the pressures of the well liquid may be controlled and through which the inlet into the sample chamber may also be controlled.

In the form shown in Figure 7 the magnets 76 are energized from a source at the ground surface through electrical conductors, as 80, which are enclosed within the cable 41. The control of the current is effected by means of any selected type of switch at the ground surface which is under the control of the operator. In other respects the form shown in Figure 7 is the same as that shown in Figure 4.

Under certain conditions of the wall formation the fluid in said formation will not readily flow and it may be neecssary to acidize the formation to make it more porous to promote the flow of the fluid from it into the tester.

In order to make provision for acidizing the sealed off area around the tube 22, the packer 14a, as shown in Figure 8, may be provided with enclosed pockets, or cavities, 81, 81 to contain an acid. These pockets are provided with outlet nozzles, as 82, 82, formed of a suitable metal or other rigid material which will not be affected by said acid. These nozzles are provided so that when the packer 14a is placed under compression the pockets, or cavities, 81 will not be closed. The nozzles 82 are temporarily closed by means of plugs 83 which are formed of a suitable metal.

or material, which will be quickly eaten out by the acid to permit the discharge of the acid. By the time the tester has been lowered into the bore hole to the desired location and operated to expand the packer 14a these plugs 83, 83 will have been destroyed by the acid and when the packer is expanded an area of the formation will not only have been sealed off but the endwise compression on the packer will force the acid from the pockets 81 out through the nozzles 82 into the formation around the inlet tube 22 so that the formation will be acidized and broken up and rendered porous to facilitate the inflow of the fluid from the sealed off area into the sample chamber.

In order to make provision for testing the pressure of the sample that has been entrapped in the chamber 6 or 6a the upper end of the corresponding barrel is provided with an internally threaded socket 84 and leading inwardly from this socket into the sample chamber there is a port 85. Opposite the port 85 and threaded through the wall of the barrel there is a valve 86 whose inner end is tapered to fit and to close the port 85 when said valve is screwed inwardly. Around the outer end of this valve there is a seal ring 87 to prevent leakage. Normally the socket 84 is closed by a plug 88. When it is desired to test the contents of the sample chamber to ascertain its pressure the plug 88 may be removed and the hose of a pressure gauge may have its outer end fitting screwed into the socket 84 and the valve 86 may then be screwed outwardly to open the port 85 to allow the pressure fluid to actuate the gauge to ascertain the amount of pressure.

Otherwise than hereinbefore explained the form shown in Figures 7 and 8 is the same as that shown in Figures 4 and 6.

The drawings and description are illustrative merely while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole comprising, a stem, body members on the stem and movable longitudinally relative to each other, a sleeve on one of said members adaped to be telescopingly received in the other of said members, a cylindrical packer between said members and surrounding the sleeve, said packer being expansible by endwise compressive forces, said stem being movable longitudinally through said members and packer, a sample receiving chamber on the tool, said members being shaped to form with said stem a high pressure and a low pressure chamber, the inner walls of said pressure chambers being formed by the outer wall of the stem, said pressure chambers controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said low pressure chamber being within an uppermost of said body members, said packer and said other of said members having an inlet channel leading from outside the packer, said stem having a port communicating with said sample receiving chamber and positioned to move out of communication with said inlet channel upon movement of the stem to one position and to move into communication with said inlet channel upon movement of the stem to another position, said stem also having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly, when the stem is in said one position and said stem having other ports arranged to communicate the high pressure chamber with the low pressure chamber when the stem is in said other position.

2. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole comprising, a stem, body members on the stem and movable longitudinally relative to each other, a sleeve on one of said members telescoping into the other of said members, a cylindrical packer between said members and surrounding the sleeve, said packer being expansible by endwise compressive forces, said stem being movable longitudinally through said members and packer, a sample receiving chamber on the tool, said other of said members being shaped to form with said stem a high pressure chamber and a low pressure chamber, the inner walls of said pressure chambers being formed by the outer wall of the stem, said pressure chambers controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said low pressure chamber being within an uppermost of said body members, said packer and said other of said members having an inlet channel leading from outside the packer, said stem having a port communicating with said sample receiving chamber and positioned to move out of communication with said inlet channel upon movement of said stem to one position and into communication with said inlet channel upon movement of said stem to another position, said stem also having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly, when the stem is in said one position and other ports arranged to communicate the high pressure chamber with the low pressure chamber when the stem is in said other position, and a flexible line for lowering the tool into and withdrawing it from the bore hole.

3. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole which contains liquid and comprising, a stem, body members on the stem and movable longitudinally relative to each other, a cylindrical packer between said members, said packer being expansible by endwise compressive forces, said stem being movable longitudinally through said members, a sample receiving chamber on the tool, said members being shaped to form with said stem a high pressure chamber and a low pressure chamber, the inner walls of said pressure chambers being formed by the outer wall of the stem, said pressure chambers controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said low pressure chamber being within an uppermost of said body members, said packer and one of said members having an inlet channel leading from outside said packer, said stem having a port communicating with said sample receiving chamber and positioned to move out of communication with said inlet channel upon movement of the stem to one position and to move into communication with said inlet channel upon movement of the stem to another position, said stem also having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly to admit said liquid into the high pressure chamber to balance the liquid pressures outside and inside of the tool, when the stem is in said one position and other ports arranged to communicate the high pressure chamber with the

low pressure chamber when the stem is in said other position, to lower the pressure in said high pressure chamber to allow the outside pressure to expand the packer to seal off an area of the stratum to be tested, said high pressure chamber being closed to said well bore when said stem is in said other position.

4. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole which contains well liquid and comprising, a stem, body members on the stem and movable longitudinally relative to each other, a cylindrical packer between said members, said packer being expansible by endwise compressive forces, said stem being movable longitudinally through said members and packer, a sample receiving chamber on the tool, said parts being shaped to form with said stem a high pressure chamber and a low pressure chamber, the inner walls of said pressure chambers being formed by the outer wall of said stem, said pressure chambers controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said low pressure chamber being within an uppermost of said body members, said packer and one of said parts having an inlet channel leading from outside said packer, said stem having a port communicating with said sample receiving chamber and positioned to be out of communication with said inlet channel when said stem is in one position and in communication with said inlet channel when the stem is in another position, said stem also having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly, when the stem is in said one position and other ports arranged to communicate the high pressure chamber with the low pressure chamber, when the stem is in said other position, to allow the outside liquid pressure to expand the packer to seal off an area of the stratum to be tested, said high pressure chamber being closed to said well bore when said stem is in said other position, and a flexible line for lowering the tool into and withdrawing it from the bore hole.

5. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole which contains well liquid and comprising body members coaxially connected for longitudinal movement relative to each other, a cylindrical packer between said members, said packer being expansible by endwise compressive forces, said members having coaxial bores, valve means movable in said members, a sample receiving chamber on the tool, said members being shaped to form with said valve means a high pressure chamber and a low pressure chamber, the inner walls of said pressure chambers being formed by said valve means, said pressure chambers controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said low pressure chamber being within an uppermost of said body members, said packer and one of said parts being provided with an inlet channel leading from without the tool, said valve means having a port communicating with said sample receiving chamber and positioned to be out of communication with said inlet channel in one position of said valve means and in communication with said inlet channel in another position of said valve means, said valve means also having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly to admit said liquid into the high pressure chamber to balance the liquid pressures outside and inside of the tool, when the valve means is in said one position, and other ports arranged to communicate the high pressure chamber with the low pressure chamber, when the valve means is in said other position, to lower the pressure in said high pressure chamber to allow the outside pressure to expand the packer to seal off an area of the stratum to be tested, said high pressure chamber being closed to said well bore when said stem is in said other position.

6. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole which contains well liquid and comprising body members coaxially connected for longitudinal movement relative to each other, a cylindrical packer between said members, said packer being expansible by endwise compressive forces, said members having coaxial bores, valve means movable in said bores, a sample receiving chamber on the tool, said members being shaped to form with said valve means a high pressure and a low pressure chamber, the inner walls of said pressure chambers being formed by said valve means, said pressure chambers controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said low pressure chamber being within an uppermost of said body members, there being an inlet channel leading through said packer and through one of said members from outside said packer, said valve means having a port communicating with said sample receiving chamber and positioned to be out of communication with said inlet channel in one position of said valve means and in communication with said inlet channel in another position of said valve means, said valve means also having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly, when the valve means is in said one position, and other ports arranged to communicate the high pressure chamber with the low pressure chamber, when the valve means is in said other position, to allow the outside liquid pressure to expand the packer to seal off an area of the stratum to be tested, said high pressure chamber being closed to said well bore when said stem is in said other position and a flexible line for lowering the tool into and withdrawing it from the bore hole.

7. A testing tool for recovering the fluid content of an earth stratum from the side wall of a bore hole which contains well liquid and comprising coaxially arranged body members connected together for longitudinal movement relative to each other, a cylindrical packer between said members, said packer being expansible by endwise compressive forces, valve means movable in said members and packer, electrically operable means for controlling the valve means, a sample receiving chamber on the tool, said members being shaped to form with said valve means a high pressure chamber said high pressure chamber controlling movement of said body members towards each other to expand said packer, said high pressure chamber being between said body members, said packer and one of said members having an inlet controllable by the valve means and leading through the packer wall and said one of said members into the sample receiving chamber, said valve means having a port arranged to communicate the high pressure chamber with the well bore outside of the assembly to admit said liquid

into the high pressure chamber to balance the pressure outside and inside of the tool, when the valve means is in one position and to relieve the pressure in said high pressure chamber when the valve means is in another position, to allow the outside liquid pressure to expand the packer to seal off an area of the stratum and to also open said inlet, said high pressure chamber being closed to said well bore when said stem is in said other position, and a flexible line for positioning the tool in the bore hole.

LUTHER E. BROWN.
OLLIN W. WILLIAMS.

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