June 27, 1939. F. F. WALTERMIRE 2,164,195

CASING TESTER

Filed July 22, 1938

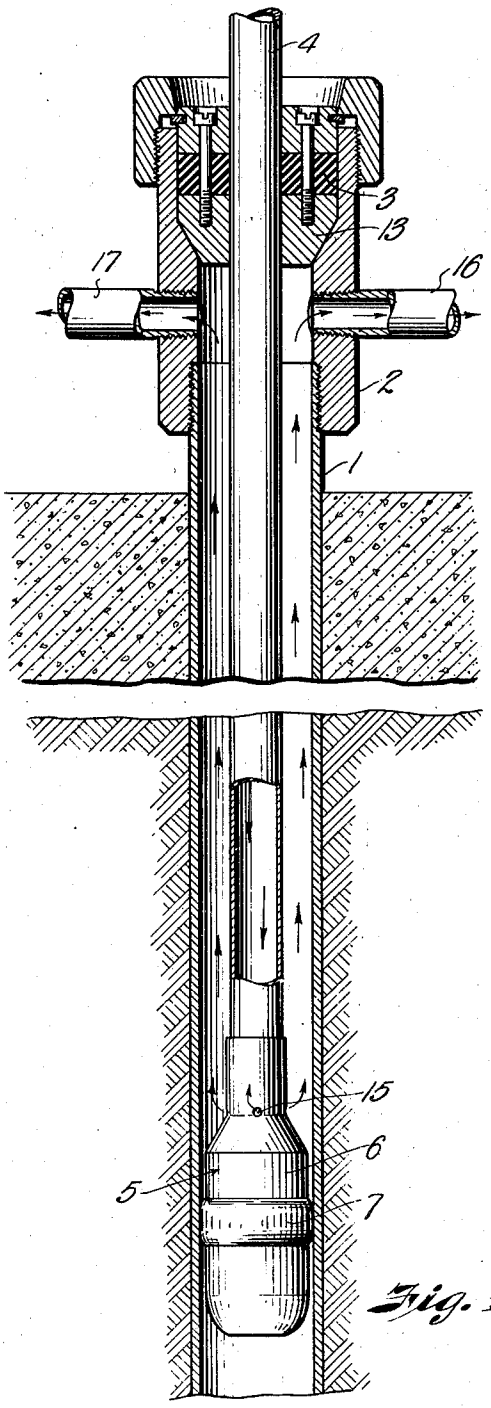


Fig. 1.

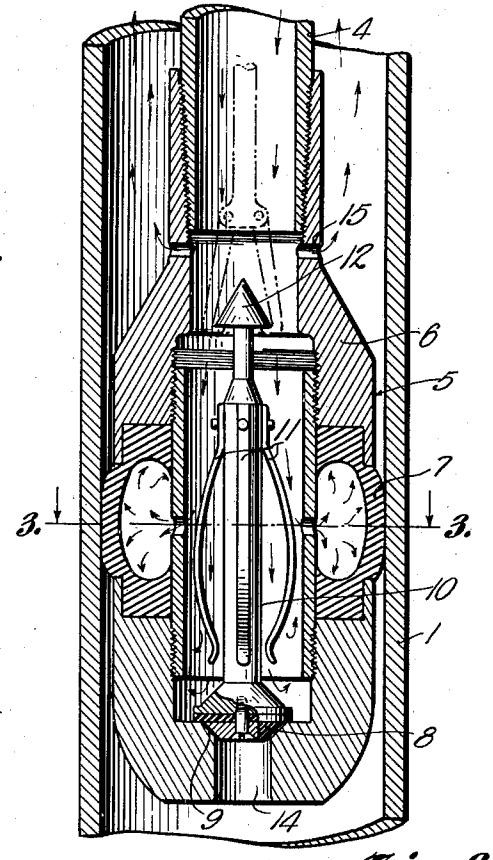


Fig. 2.

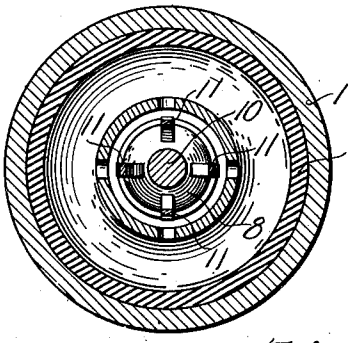


Fig. 3.

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Patented June 27, 1939 2,164,195

UNITED STATES PATENT OFFICE

2,164,195

CASING TESTER

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Application July 22, 1938, Serial No. 220,706

4 Claims. (Cl. 137—77)

My invention relates to a casing tester. In the drilling of oil wells in which casing is placed, the rotation of the drill pipe may wear through or puncture the casing. A leak may occur in the casing due to a faulty joint, faulty cementing, or by accident during the removal of tools. A leaky casing will result in the loss of valuable gas pressure and oil. The loss of gas under high pressures could cause the well to crater.

One object of my invention is to provide an apparatus for testing oil well casing.

Another object of my invention is to provide a means for determining that an oil well casing is tight and free from leaks in order to preclude blowouts, and damage or danger from the leakage of gas.

In the accompanying drawing which forms part of the instant specification and which is to be read in conjunction therewith, and in which like reference numerals are used to indicate like parts in the various views,

Fig. 1 is a sectional view of a well fitted with a casing tester of my invention.

Fig. 2 is an enlarged sectional view of my casing tester in position in the well casing.

Fig. 3 is a sectional view taken on the line 3—3, Fig. 2.

More particularly, referring now to the drawing, a well casing 1 is provided with a casing head 2 of any suitable design, and provided with packing means 3 adapted to pack a drill pipe 4, to the lower end of which my casing tester 5 is secured. The casing tester comprises a body portion 6, an expandible packer 7, and a valve 8 adapted to seat upon a valve seat 9.

The valve 8 is provided with a valve stem 10, provided with guide members 11. The valve stem terminates in a mushroom head 12.

When it is desired to test a casing which has been landed and cemented in a well, the testing device is run in the well inside the casing to the desired depth, carried screwed to the bottom of a string of drill pipe 4. The valve assembly comprising valve 8, the valve stem and the valve head, is not inserted in the tool when running the drill pipe into the well. This is to permit the circulation of water or drilling fluid, if desired.

After the testing tool has been lowered to the desired depth, the blowout preventer 13, containing the sealing means 3, is closed around the drill pipe, making a tight seal between it and the casing to be tested. The valve dart is then dropped into the drill pipe from the derrick floor, being guided by the guide members 11. It falls to its seat 9 on the bottom of the testing tool, closing the opening 14 through the body 6. Any suitable fluid, such as compressed air, water, drilling mud, or the like, is then pumped through the drill pipe from the surface. This builds up pressure inside the expandible rubber packer 7 and causes it to seal against the casing, it being understood that eduction pipes 16 and 17 leading from the casing are closed by suitable valves (not shown). Fluid will then escape as shown by the arrows through the ports 15, building up pressure within the casing. Pressure of any desired magnitude may be built up and held. A leak is determined by a drop in pressure over a period of time, as will readily be understood by those skilled in the art. If a leak is discovered, the valves controlling the pipes 16 and 17 are opened relieving the pressure. The valve dart is then removed by an extracting tool shown in dotted lines in Fig. 2. This extracting tool is well known to the art and is similar to that used for retrieving core barrels. The extracting tool is adapted to grip mushroom head 12 pulling the valve from its seat and permitting the pressure within the expandible packer 7 to escape, thus collapsing the packer. The drill pipe is then lifted a predetermined distance and the test run again. If a leak still occurs, it is known that the leak is between the top of the casing and the point at which the packer was last positioned. The procedure is repeated until the packer is removed to a place above that where the last leakage was noted and the leak is thus located. It may be then repaired by cementing or the like, and the casing again tested.

It will be seen that I have accomplished the objects of my invention. I have provided a casing tester tool which may conveniently and expeditiously locate leaks within oil well casings. It is extremely important to have a tight casing where it is known that gas under high pressure will be encountered. The leakage of such gas from a casing may cause serious blowouts, often resulting in the loss of the well. Then, too, such gas leakage with the resultant formation of craters presents a distinct fire hazard.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is, therefore, to be understood that my invention is

not to be limited to the specific details shown and described.

Having thus described my invention, I claim:

1. A casing tester comprising in combination a body member, means for securing the body member to a pipe adapted to be inserted within a casing to be tested, fluid pressure expandible packing means carried by said body member, said body member being formed with a bore, a valve seat formed in said bore, a valve adapted to be seated upon said seat, means providing communication between said bore and said packing means, means above said last named communicating means and providing communication between said bore and the well casing, said valve being formed with means permitting its removal from said seat from the surface of the well.

2. A casing tester as in claim 1 in which said valve is formed with guide means permitting its dropping from the surface to seating position through said pipe.

3. An oil well casing testing assembly including in combination a casing to be tested, a pipe housed within the casing to be tested, a body member carried by the lower end of said pipe, means for sealing the pipe and the upper end of the casing, said body member being provided with fluid pressure expandible packing means adapted to seal against said casing, means providing communication between said pipe and said expandible packing means, and means providing communication between said pipe and the annular space between the pipe and the casing above said packing means.

4. An oil well casing testing assembly including in combination a casing to be tested, a pipe housed within the casing to be tested, a body member carried by the lower end of said pipe, means for sealing the pipe and the upper end of the casing, said body member being provided with fluid pressure expandible packing means adapted to seal against said casing, means providing communication between said pipe and said expandible packing means, means providing communication between said pipe and the annular space between the pipe and the casing above said packing means, means providing communication between said pipes and said casing below said packing means, and a valve operable from the surface for selectively closing said last named communicating means.

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