Nov. 18, 1930. H. J. SMITH 1,781,824

FLUID LEVEL REDUCER FOR OIL WELLS

Filed Jan. 21, 1929

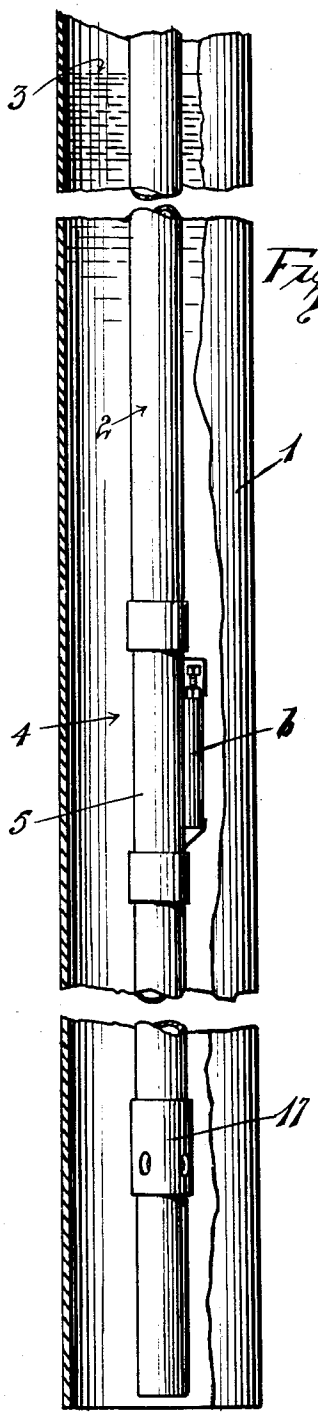


Fig. 1.

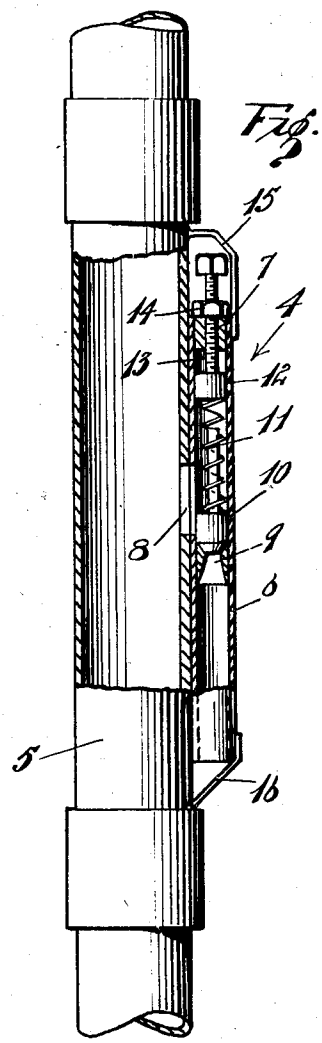


Fig. 2.

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FLUID-LEVEL REDUCER FOR OIL WELLS

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In oil wells which are produced by means of a gas pressure exerted in the casing it has been found that when these wells are off production for a length of time that the fluid will rise to a considerable height in the casing. When it is again desired to place the well on production usual pressures of the gas are not sufficient to over-come the fluid head and cause the well to flow. Consequently, the well is bailed for a long period of time until the fluid level has been reduced. This process of bailing is slow and requires a considerable length of time, sometimes as long as a month, and places the operator to a considerable expense.

An object of my invention is to provide a fluid level reducer for oil wells which will reduce the fluid level to a point where the well can be produced from the bottom of the tubing or adjacent that point.

A further object is to provide a fluid level reducer which operates on the usual gas pressures and which automatically becomes inoperative when the fluid level has been reduced the desired amount.

Still another object is to provide a device of the character stated which is simple in construction and effective in operation.

Other objects, advantages, and features of invention may appear from the accompanying drawing, the subjoined detailed description, and the appended claims.

In the drawing:

Figure 1 is a fragmentary side elevation with parts broken away showing my fluid level reducer.

Figure 2 is an enlarged fragmentary side elevation of my reducer with parts broken away to show interior construction.

Referring more particularly to the drawing, the numeral 1 indicates the usual casing which is placed in the well and inside of which the tubing 2 is placed. After the well has stood without being produced for a considerable length of time the fluid level rises in the casing to a point shown at 3 which, for example may be 2000 feet from the bottom. The usual pressure necessary to flow a well is about 350 pounds, more or less. In order that the well may be produced with a pressure of approximately 350 pounds it is necessary to reduce the fluid level from 2000 feet to 800 feet, for example.

If it is found that well can be produced with the fluid level 800 feet above the bottom, my fluid reducer 4 is placed at this point. The reducer consists of a section of tubing 5 which is placed in the tubing 2 and a pipe 6 of smaller diameter than the tubing is welded to the side of the section 5. The pipe 6 is opened at the bottom and closed at the top by a plug 7. A slot 8 is cut through the section 5 and pipe 6 and a seat 9 is provided in the pipe 6 below the slot 8.

A valve 10 rests on the seat 9 and is urged downwardly upon the seat by the spring 11, which spring bears against an adjustable head 12, whereby the tension of the spring can be adjusted. A threaded bolt 13 rises from the head 12 through the plug 7 and a lock nut 14 holds the bolt in any desired adjusted position. A guard 15 is positioned over the bolt 13 to protect the bolt against injury when coming out of the well and a guard 16 extends over the lower open end of the pipe 6 to protect the opening when going into the well.

The usual flow device 17 is mounted in the tubing 2 adjacent the bottom thereof and the well is normally produced from this latter flow device. This device consists of a plurality of orifices or nozzles which extend into the tubing 2, and the gas under pressure from the casing, flows therethrough and forces the oil upwardly in the tubing to the surface of the ground.

The operation of my invention is as follows: As previously stated the fluid level reducer 4 is mounted a considerable distance above the bottom of the well and the fluid level is, of course, a considerable distance above the reducer. If the normal flowing pressure of the well is 350 pounds, then a higher pressure of about 600 pounds, for example, is exerted on the well, and the spring 11 is so adjusted that the valve 10 will open under a pressure slightly under 600 pounds.

Under this increased pressure the oil will flow upwardly in the pipe 6, past the valve 10, through the slot 8, and thence upwardly

in the tubing 2 to the surface. This flow continues until the oil level drops below the bottom of the pipe 6, then the fluid level is to a point where the normal pressure of about 350 pounds is sufficient to flow the well from the bottom flow device 17.

Having described my invention, I claim:

1. In combination with an oil well including casing, tubing, and a flow device adjacent the lower end of the tubing, of a fluid level reducer positioned in said tubing above the flow device, said reducer comprising, a pipe secured to the flow tubing, said pipe and tubing having a communicating slot formed therein, a valve in the pipe below said slot, and spring means bearing against said valve.

2. In combination with an oil well including casing, tubing, and a flow device adjacent the lower end of the tubing, of a fluid level reducer positioned in said tubing above the flow device, said reducer comprising a pipe secured to the flow tubing, said pipe and tubing having a communicating slot formed therein, a valve in the pipe below said slot, and spring means bearing against said valve, and means to adjust the tension of said spring whereby the pressure required to open the valve is varied.

3. In combination with an oil well including casing, tubing, and a flow device adjacent the lower end of the tubing, of a fluid level reducer positioned in said tubing above the flow device, said reducer comprising a pipe secured to the side of the tubing, a plug closing the top of the pipe, said pipe being open at the bottom thereof, said pipe and tubing having a communicating slot therein, a valve in the pipe below said slot, a spring bearing against said valve, a head against which said spring bears, a threaded bolt rising from the head through the plug, and a lock nut on the bolt adapted to seat against the head.

In testimony whereof, I affix my signature.

HUBERT J. SMITH.