

Dec. 14, 1965

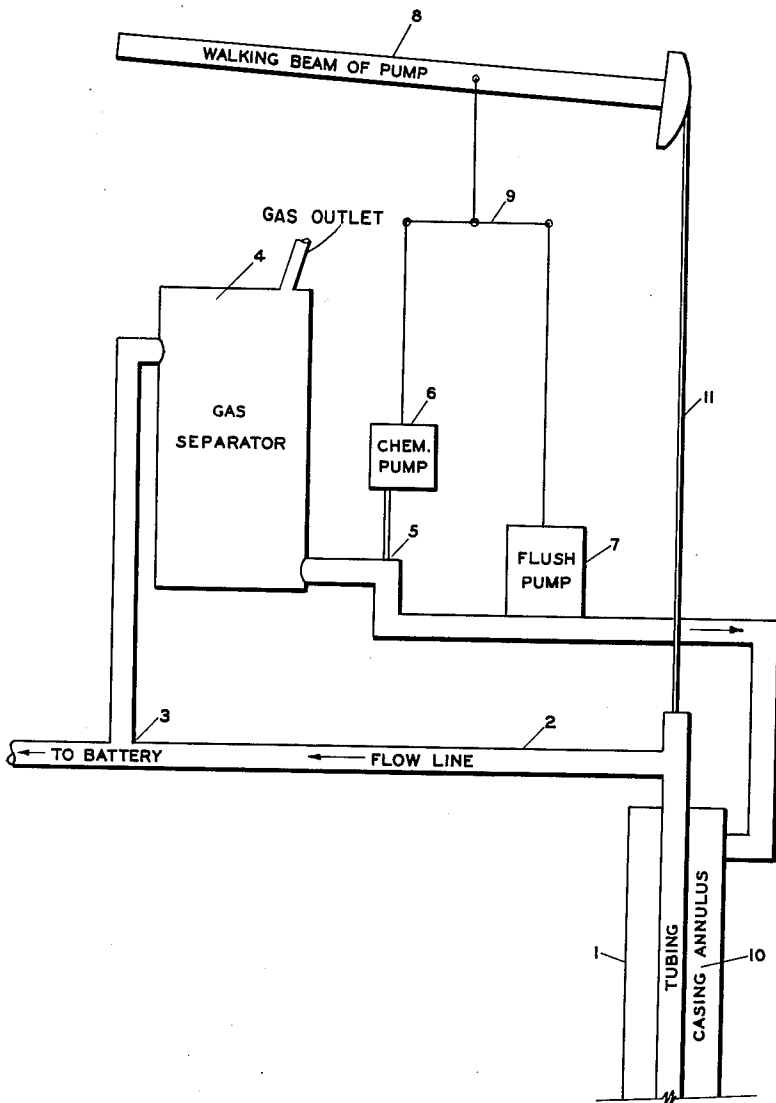
J. L. HAMPTON
WELL DEVICE

3,223,167

Filed March 29, 1962

2 Sheets-Sheet 1

FIGURE 1



INVENTOR
JOHN L. HAMPTON

BY *Redney King*
ATTORNEY

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FIGURE 2

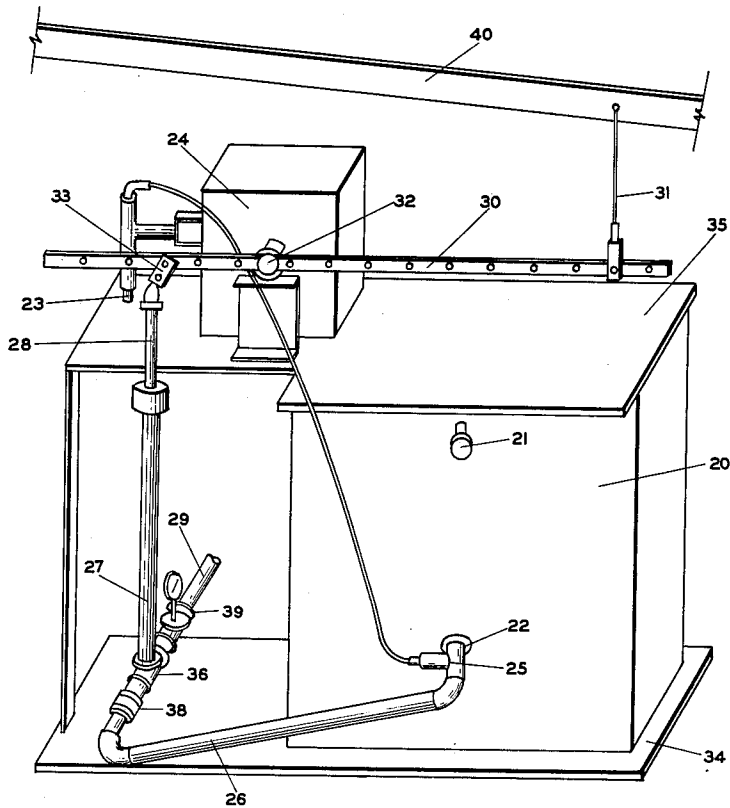
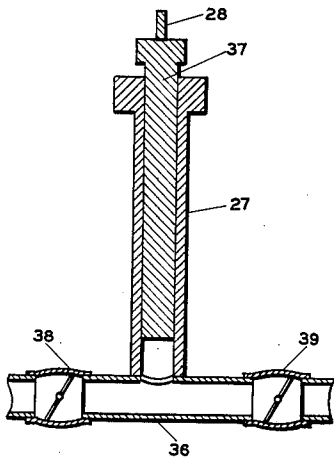


FIGURE 3



INVENTOR
JOHN L. HAMPTON

BY *Richard W. King*
ATTORNEY

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3,223,167

WELL DEVICE

John L. Hampton, Midland, Tex., assignor to Petrolite Corporation, Wilmington, Del., a corporation of Delaware

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1 Claim. (Cl. 166—75)

This invention relates to an apparatus for chemically injecting and flushing an oil well.

Oil production requires the addition of certain chemicals to the well, for example corrosion inhibitors, scale preventatives, paraffin deposit inhibitors, demulsifiers, wetting agents, bactericides, and the like.

In the operation of an oil well, it is important to minimize costs and to render the operation of a well as automatic as possible. However, and particularly in the case of a small operator, it is important that the automatic device be as inexpensive as possible. When chemicals are to be added at a determined rate, it is desirable that addition occur only when the well is in operation and that addition automatically cease when the operation of this well is interrupted. Furthermore, it is desirable that such additions be made even to a well or annulus under high pressure.

I have now discovered an apparatus for chemically injecting and flushing an oil well which comprises (1) means for withdrawing oil fluids from the flow line (2) means for separating gas from the fluids (3) means for adding chemicals to the fluids (4) and means for reintroducing the chemical-well fluid mixture into the well; with the proviso that the means for pumping the chemical and injecting it into the well be powered by the well's pumping device, such as by the walking beam of the pump so that operation occurs only when the well is pumping. Thus, when the oil production stops, chemical addition and flushing also stops. By means of this invention it is also possible to inject and flush wells in which the annulus is under higher pressure than the casing.

FIGURE 1 shows a schematic flow diagram of the process of this invention.

FIGURE 2 is a view in perspective of an embodiment of the compact apparatus of this invention.

FIGURE 3 is a vertical cross-sectional view of a portion of the apparatus shown in FIGURE 2.

More particularly, referring to FIGURE 1, as the oil well 1 produces, petroleum fluids are withdrawn from the flowline 2 by tying into it at 3. These fluids are then passed into a gas separator 4 to separate the gas therefrom. To the gas-separated fluids thus obtained is added the desired chemical at 5 by means of a chemical pump 6 which is controlled so as to add the chemical at the desired rate. The chemical-petroleum fluid mixture is then pumped at the desired rate by means of a flush pump 7, which is designed to mix the well fluids with the chemical and to inject this mixture in the well at a pressure sufficient to overcome the well or annulus pressure. Both the chemical pump 6 and the flush pump 7 are activated by means of the walking beam 8 of the well through activating means 9 to which the chemical and flush pumps are attached. When the walking beam stops and the well is out of operation, both chemical and flush pump also cease operating since they are activated by the action of the walking beam. The flush pump drives

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the chemical-petroleum mixture into the well, in this instance, into the casing annulus 10 at the desired pressure and rate. The walking beam pumps and removes oil from the well in the conventional manner by means of rod 11 which pumps petroleum.

Referring to FIGURES 2 and 3, the well fluids taken from the flow line enter gas separator 20 through opening 21. The pipe connecting the gas separator to the flow line is not shown. The well fluids from which the gas has been separated by means of a vent in the rear of the separator (not shown in drawing) exit from the separator at opening 22. The chemical source (not shown) is attached at 23 and is pumped by means of chemical pump 24 to opening 25 where it mixes with the gas-separated well fluids. The chemical-fluid mixture flows along pipe 26 where it is joined to the exterior shell 27 of flush pump at 36. The flush pump operates by means of a piston 37 attached to rod 28.

By means of piston displacement in the flush pump, fluids are ejected along pipe 29 to the well. Check valves 38 and 39 open and close in such a manner that flow occurs in the desired direction and pressure. The chemical and flush pumps are powered by means of the walking beam of the pump 40 which is connected to cross bar 30 by means of rod 31.

The cross bar is attached to the chemical pump at 32 and the flush pump at 33. The rise and fall of the walking beam through the cross bar so activates the chemical pump, which is of the ratchet type, that the chemical is pumped in metered amounts; and so activates the piston through the rod of the flush pump that the chemical-well fluid mixture is pumped into the well. Since the walking beam activates both pumps, it is evident that the apparatus operates only when the well is in operation. The apparatus is set on base plate 34 and is covered by a roof plate 35.

With respect to FIGURE 3, the flush pump operates by means of rod 28 activating a piston 37 within the pump exterior shell 27. The pump operates by displacement. Check valves 38 and 39 coordinate in such a manner that flow of the desired pressure and direction is maintained. In this way fluids from casings of a lower pressure may be injected into an annulus of a higher pressure.

The chemical pump may be any suitable pump, for example a ratchet driven chemical pump sold by Tex-Stream Corp. of Houston, Texas.

While the presently preferred apparatus has been described, changes in details may be made which are within the spirit of the invention as defined by the scope of the appended claim.

Having thus described my invention, what I claim as new and desire to obtain by Letters Patent is:

In combination with an oil pump having a walking beam, an apparatus for chemically injecting and flushing an oil well with treating chemical agent comprising, in combination, a gas separator having an inlet for gas-containing petroleum fluids and an exit for gas-separated petroleum fluids, flush pump means for mixing well treating chemical agent and gas-separated petroleum fluids and for injecting a mixture of said well treating chemical agent and said gas-separated petroleum fluids into the oil well, means for transporting said gas-separated petroleum fluids from said exit to said flush pump means,

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chemical pump means between said exit and said flush pump means for adding chemical treating agent to said gas-separated petroleum liquids while passing through said transport means from said exit to said flush pump means, said chemical pump means and said flush pump means being powered by said walking beam of said oil pump, whereby operation of said respective pump means occurs only when the oil well is pumping, thereby stopping chemical agent addition and flushing when oil production stops.

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CHARLES E. O'CONNELL, Primary Examiner.