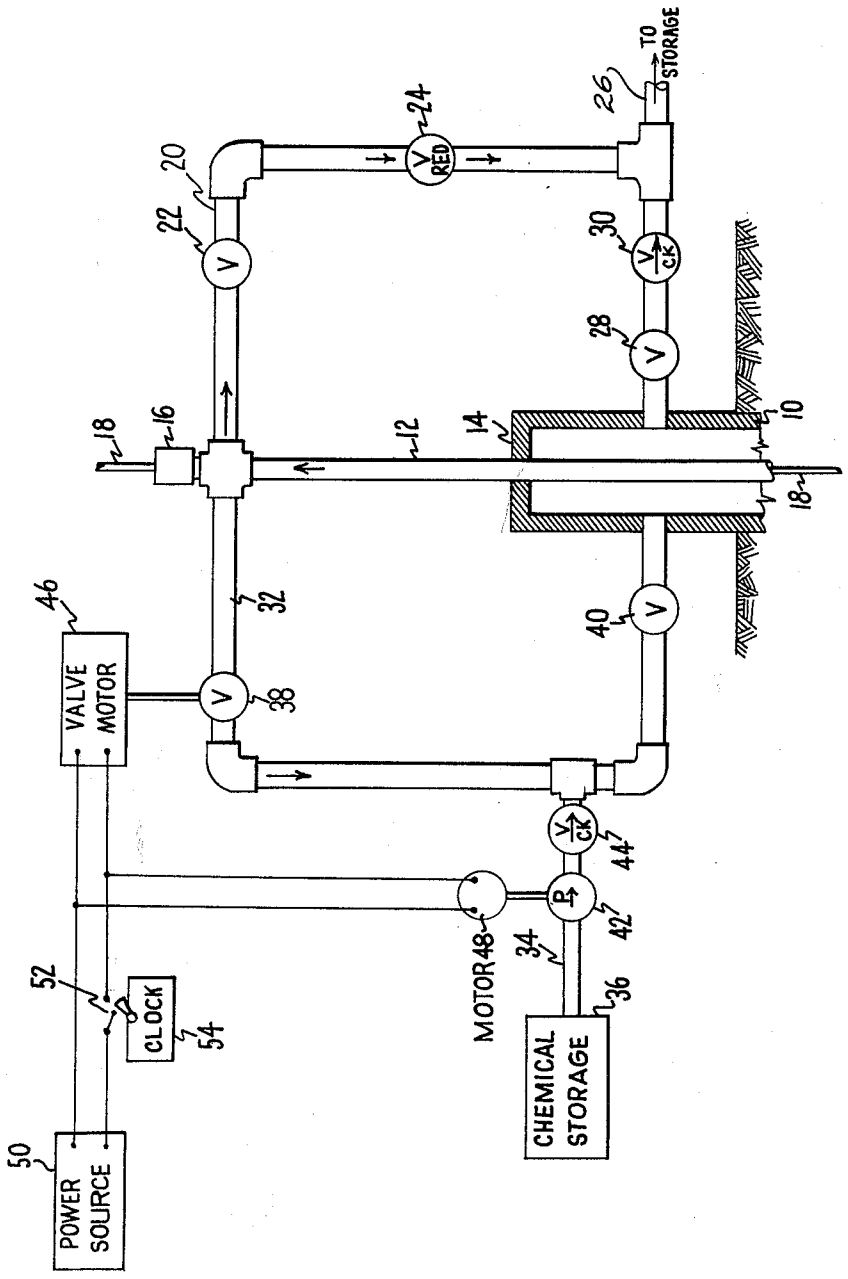
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AUTOMATIC CHEMICAL INJECTION SYSTEM FOR WELLS

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AUTOMATIC CHEMICAL INJECTION SYSTEM FOR WELLS

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This invention relates to chemical treating apparatus for wells and more particularly for injecting chemicals periodically into oil wells.

In producing oil from underground formations, often it is desirable to inject chemicals (such as corrosion inhibitors) into the casing of the well at periodic intervals. Previous systems have been suggested for this wherein the chemical has been continuously pumped into a flushing chamber and then periodically flushed from the chamber into the well. Traditionally, the produced oil is used to flush the chemical back into the well.

I have invented a system wherein the chemical is pumped directly into the produced oil at the same time the produced oil is recirculated back into the well casing.

An object of the invention is to provide a system for flushing chemicals into a well.

Another object is to provide such a system which has a high degree of safety.

A further object is to achieve the above with a system which is sturdy, compact, durable, simple, and reliable, yet inexpensive and easy to manufacture.

The specific nature of the invention as well as other objects, uses, and advantages thereof will clearly appear from the following description and from the accompanying drawing, in which:

The figure is a schematic representation of an embodiment of the invention.

As may be seen in the drawing, the system operates with a conventional oil well having production string 12 of tubular material telescoped into casing 10 through casing closure plate 14. Rod 18 extends through stuffing box 16 at the top of the tubular string 12. The rod 18 is reciprocated by mechanism not shown to operate a pump far below the ground to pump oil through the production string 12.

The main flow of oil from the production string 12 is through production pipe 20 which has manually operated valve 22 therein. The production pipe 20 also contains pressure reducing valve 24 for purposes to be described later. Pipe 20 terminates into the line 26 which leads to a place of storage. The line 26 to storage is connected back into the casing 10 by valve 28 and check valve 30.

The above described elements are all conventional and conventionally arranged with the exception of the reducing valve 24.

Chemical pipe 32 extends from the production string 12 into the casing 10. Line 34 leads from chemical storage 36 into the chemical pipe 32. Motor controlled valve 38 and manual valve 40 are both located in the chemical pipe 32. Pump 42 in line 34 pumps the chemical from storage 36 into the chemical pipe 32. Check valve 44 prevents back-flow from the chemical pipe 32 into the chemical storage 36.

With the valves 38 and 40 open and with pump 42 operating, the flow of produced oil will be through the chemical pipe 32 blending with the injected chemical from line 34 and back into the casing 10. The oil will not flow through pipe 20 because the reduction valve 24 causes a pressure in pipe 20 to be greater than the pressure in the chemical pipe 32. With the valve 38 closed, the flow will be through pipe 20 into a storage area (not shown).

Valve 38 is opened when valve motor 46 is energized. Likewise, pump 42 operates when pump motor 48 is energized. Valve motor 46 and pump motor 48 are connected to a common power source 50. Switch 52 connecting the source 50 to the motors 46 and 48 normally is open. The power source 50 has been represented schematically as electrical. Any source of power such as pressurized fluid could be used.

Normal operation will be with the switch 52 open (valve 38 closed, pump 42 not running) and the flow of oil through pipe 20. However, with the switch 52 closed, the oil will flow through the chemical pipe 32 with chemicals from storage 36 injected thereinto and returned to within the casing 10.

Two embodiments are contemplated. By one, the switch 52 is closed manually and opened by clock 54 after a predetermined time of treatment. Thus, the clock 54 is means for opening switch 52 after a predetermined injection time. By the other, the switch 52 is periodically closed by the clock 54 and then opened by the clock 54 after a predetermined time.

It will be seen that all elements and parts are readily available upon the market. The various parts are inexpensive, e.g., the valve 38 is a conventional open-shut valve and the use of expensive three-way valves is avoided. The reducing valve 24 is inexpensive. Other type valves could be used for valve 24. Its function is merely to supply sufficient pressure on pine 20 so that if the valve 38 is open the flow is through the chemical pipe 32. E.g., valve 24 could be regulated to maintain the pressure in the line 20 a set amount above the pressure within the casing 10.

It will be apparent that the embodiment shown is only exemplary and that various other modifications can be made in construction, materials, and arrangement within the scope of the invention as defined in the appended claims.

I claim as my invention:

1. In a system for injecting chemicals into a well having
   (*a*) a casing,
   (*b*) a production string telescoped within the casing, and
   (*c*) a production pipe leading from the production string to a place of storage;

the improvement comprising:

   (*d*) a chemical pipe leading from the production string into the casing,
   (*e*) a valve in the chemical pipe,
   (*f*) a chemical storage means,
   (*g*) a pump interconnecting the chemical storage means to the chemical pipe,
   (*h*) a valve motor connected to the valve,
   (*i*) a pump motor connected to the pump,
   (*j*) a common power source,
   (*k*) a clock means for periodically connecting and disconnecting the common power source to both said motors, and
   (*l*) means for maintaining the pressure on the production pipe higher than the pressure on the casing, so that when the two motors are connected to the power source the produced flow is from the production string to the casing with chemical injected thereto.

2. In a system for injecting chemicals into a well having
   (*a*) a casing,
   (*b*) a production string telescoped within the casing, and
   (*c*) a production pipe leading from the production string to a place of storage;

the improvement comprising:

   (*d*) a chemical pipe leading from the production string into the casing,
   (*e*) a valve in the chemical pipe,
   (*f*) a chemical storage means,
   (*g*) a pump interconnecting the chemical storage means to the chemical pipe,

(*h*) a valve motor connected to the valve,
(*i*) a pump motor connected to the pump,
(*j*) a common power source,
(*jj*) means for connecting the common power source to both said motors,
(*k*) a clock means for disconnecting the common power source from both said motors a predetermined time after the power source is connected to both said motors, and
(*l*) means for maintaining the pressure on the production pipe higher than the pressure on the casing so that when the two motors are connected to the power source the produced flow is from the production string to the casing with chemical injected thereto.

3. In a system for injecting chemicals into a well having
(*a*) a casing,
(*b*) a production string telescoped within the casing, and
(*c*) a production pipe leading from the production string to a place of storage;
the improvement comprising:
(*d*) a chemical pipe leading from the production string into the casing,
(*e*) a chemical storage means,
(*f*) a pump interconnecting the chemical storage means to the chemical pipe,
(*g*) a pump motor connected to the pump,
(*h*) valve means for directing the flow of produced fluid from the production string to the chemical pipe,
(*i*) a valve motor connected to the valve means,
(*j*) a common source of power,
(*k*) means for connecting the two motors to a common source of power,
(*kk*) means for maintaining pressure on the production pipe higher than the pressure on the casing, so that when the two motors are connected to the source of power the produced flow is from the production string to the casing with chemical injected thereto, and
(*l*) a clock means for disconnecting the source of power from both said motors a predetermined time after the source of power is connected to both of said motors.

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