

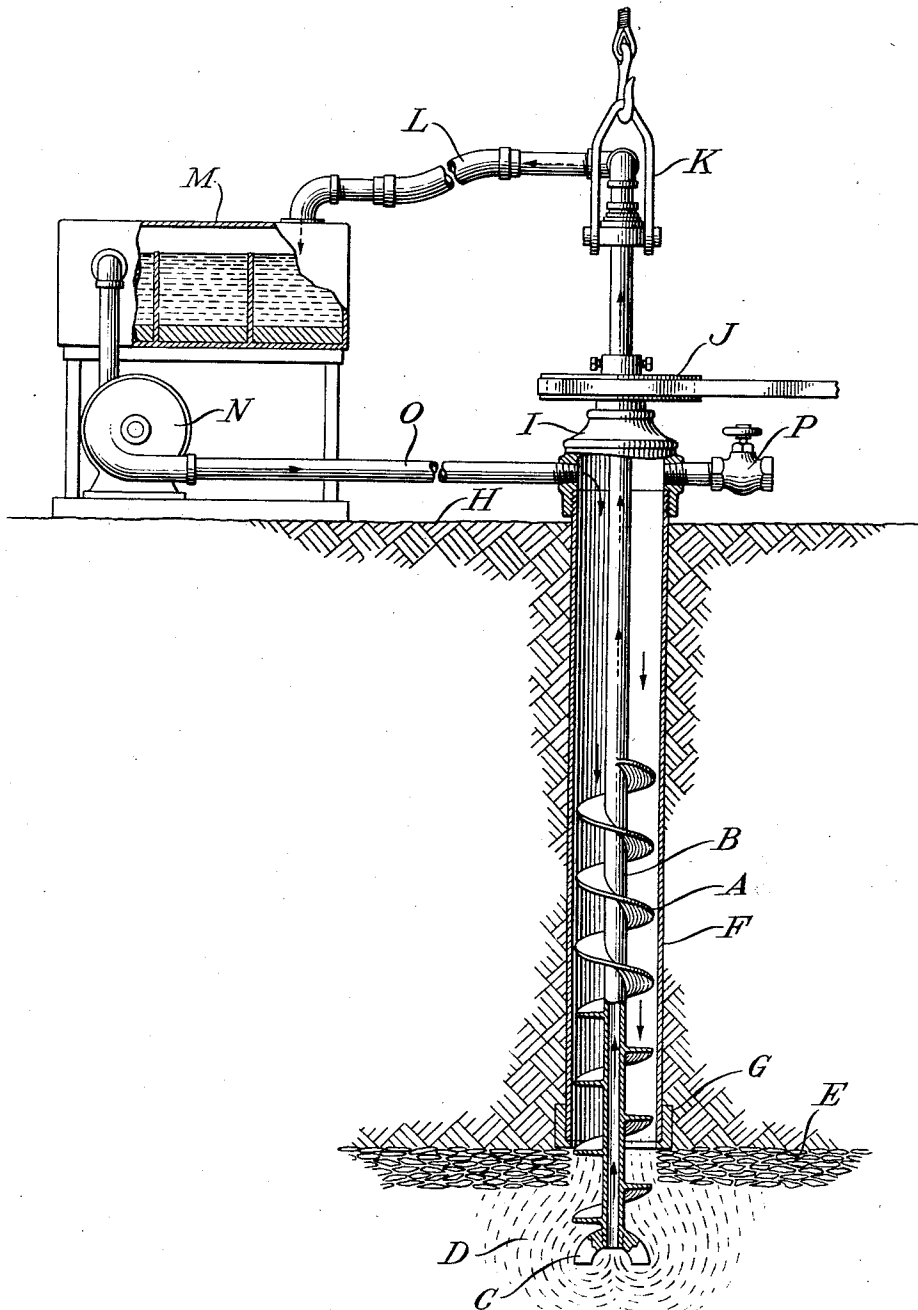
Oct. 31, 1939.

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2,178,194

WELL CLEANING DEVICE

Filed Jan. 19, 1938



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UNITED STATES PATENT OFFICE

2,178,194

WELL CLEANING DEVICE

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Application January 19, 1938, Serial No. 185,760

4 Claims. (Cl. 166—20)

My invention relates to new and useful improvements in devices used in cleaning out oil, gas and other wells after they have been drilled to completion; and for use in enlarging the wells at the bottom thereof; and relates to the process involved therein.

Having the foregoing and other uses in mind, the invention of the device consists in the novel construction, combination, arrangement and position of parts and devices as herein described, illustrated, and claimed.

The accompanying drawing is designed diagrammatically to present a picture of the essential features of the device.

15 A is the spiral auger.

B is the tube or pipe which is positioned as nearly as possible in the center of the casing and to which the spiral auger is welded or otherwise firmly fastened.

20 C is the rotary bit or drill which is firmly fastened to the bottom of the tube or pipe.

D represents the sand or other material in the bottom of the well.

25 E is rock, shale, or solid earth as the case may be, forming a cap at the top of the pay sand.

F is the casing in which the tube or pipe and the spiral auger are positioned.

30 G represents the casing shoe which is fastened to the bottom of the casing permitting it to rest on the cap as shown in the drawing.

H represents the surface of the ground in which the hole has been drilled.

35 I is the casing head which is equipped with an ordinary packer and with other suitable devices to keep foreign matter from going into the casing.

J is the rotary table which is fastened to the tube or pipe and to which the power is applied to rotate or turn it.

40 K is an ordinary swivel to be used in raising or lowering the tube or pipe.

L represents the fittings and pipe or hose as the case may be, through which the fluid and debris from the well, after coming up through the tube or pipe is transferred to the separating tank.

50 M is a separating tank into which the fluid and material from the well, as it comes to the top, through the tube or pipe is deposited. This tank may be of any suitable construction and is positioned conveniently to the well.

55 N is a small capacity pressure pump designed to force the oil from the separating tank back into the casing when desired.

O is the pipe leading from the pressure pump to the casing.

P is a vent or gate valve inserted in the casing head.

I have not shown on the drawing the power hook-up for rotating or turning the pipe or tube and the spiral auger fastened thereto, for the reason that any form of power plant convenient and suitable may be used.

A spiral auger of such dimension as to just clear the inner wall of the casing without impinging thereon when rotated, is positioned in the casing. The auger surrounds the tube or pipe, which is placed in the center of the casing, and is welded or otherwise suitably fastened firmly thereto.

In operation, the tube or pipe is rotated or turned by any suitable means, such as the table shown on the drawing, hooked up with any suitable power plant. The spiral auger being firmly fastened to the tube or pipe rotates or turns with it. The auger is so positioned that all substances or fluids coming in contact with it as it rotates or turns are forced downward into the well instead of as is usually the case in the use of augers forcing the substances or fluids upward. Fluid must be supplied to assist in the operation and this is preferably oil from the well itself, if available, if not then other oil can be used or water if oil is not readily obtainable. Due to its composition, oil is much more effective than water. It not only can be churned up by the bit or drill as readily as water, but it contains many ingredients which make it a much more effective agent in breaking up paraffin and otherwise assisting in cleaning out the well and in enlarging the bottom thereof. The fluid used is pumped into the casing head by means of a pressure pump and as it reaches the spiral auger it is forced downward with sufficient force and velocity so that as it reaches the bit or drill it is under considerable pressure. There is then created at the bottom of the well, a violent whirling motion induced by the rotating of the tube or pipe to the bottom of which a drill or bit is attached and by the action of the spiral auger. Such motion creates a churning up or agitation of the contents of the well at or near the bottom, resulting in the breaking up of loose substances so as to permit the well contents to be forced out through the tube or pipe. In addition to this the action just described will break loose the paraffin which in wells that have been drilled for some considerable time has become attached to the walls of the sand, forming somewhat of a

sealing effect which serves to interfere with and hinder the flow of gas or oil through the sand into the well. By the operation just described, the fluid velocity and pressure is such that the heaviest cuttings and debris are carried at a rapid rate with the fluid through the tubing to the top thereof, and so on into the separating tank shown on the drawing. On the lower end of the tube or pipe there is fastened a rotary bit with sufficient water course or courses to permit effective operation. Power may be economically furnished from an engine of an ordinary truck or from any other suitable power plant.

A circulation tank is positioned at the top adjacent to the well into which the material coming through the tube or pipe is deposited where the fluid is separated from the cuttings and debris and can be used over and over again.

The spiral auger described above is welded or otherwise attached firmly to the pipe or tube from the bottom and extending up to such point as may be deemed desirable according to the condition of the well and the character of its contents.

After a well is completed the bottom of it has been drilled into the oil or gas sand through which the oil or gas flows into the holes. If, as is usual, the well has been shot with some explosive, the sand has been disturbed, and shattered for a considerable distance back from the drill hole, so at the bottom of the hole there is a quantity of loosened sand and debris which interferes with and hinders the flow of oil and gas into the hole. By the process described herein, all material in the well which is of sufficiently small size is brought up to the surface as herein explained and thus the hole is cleaned out and enlarged so as to permit the flow of oil and gas therein.

There will, of course, be from time to time some loose sand or other material which will accumulate in the well and the device and process herein described can be cheaply and effectively used to again clean out the hole and thereby increase its productiveness.

The use of the device described as herein outlined in oil, gas, and other wells, results in a process which is new and novel and which will economically and effectively clean out such wells and enlarge the holes at the bottom thereof thus permitting greater recovery therefrom.

I claim:

1. A device of the type described comprising a tubular well casing, a rotatable conduit inside the casing, an impeller fixedly connected with

said conduit and having close fitting relation with said casing, the lower end of the impeller extending beneath said casing, a fluid agitating means fixed to the lower end of the conduit beneath said casing, a separating tank for fluid, a conduit connecting the first-named conduit with the separating tank, a conduit connecting the separating tank with said casing, and a pressure pump interposed in said last conduit for moving fluid from the separating tank into said casing, the pressure pump and said impeller forcing the fluid downwardly in the casing into the bottom of the well and upwardly in said first-named conduit.

2. A device of the type described comprising a tubular well casing, a rotatable fluid-conveying pipe inside said casing, means actuated by said pipe and cooperable on said casing for moving fluid downwardly of the casing, a separating tank, a conduit connecting the separating tank with said pipe, a conduit connecting the separating tank with said casing, a pressure pump interposed in said last conduit for conveying fluid from the separating tank into the casing and to said means, said pressure pump and said means cooperating to move fluid downwardly of the casing, into the bottom of the well, and upwardly of said pipe.

3. A device of the type described comprising a tubular well casing, a rotatable fluid-conveying pipe inside said casing, screw means fixed to said pipe and rotatable inside said casing for moving fluid downwardly of the latter, means for rotating said pipe, a fluid agitating means fixed to the lower end of the pipe beneath the lower end of said casing, a separating tank, a conduit connecting the separating tank with said pipe, a conduit connecting the separating tank with said casing, and a pressure pump interposed in said last conduit for conveying fluid from the separating tank into the casing and to the screw means, said pressure pump cooperating with said screw means for forcing fluid into the bottom of the well and upwardly of the pipe.

4. In a device of the type described, a well casing, a rotatable conduit inside the casing, impeller means fixedly related to the rotatable conduit for rotation therewith, a fluid agitating means fixedly related to the lower end of the conduit beneath said casing for rotation with the conduit, means for delivering liquid to said casing to be moved downwardly thereof by said impeller, the liquid passing downwardly of the casing into impinging relation with said agitating means and upwardly of said conduit.

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