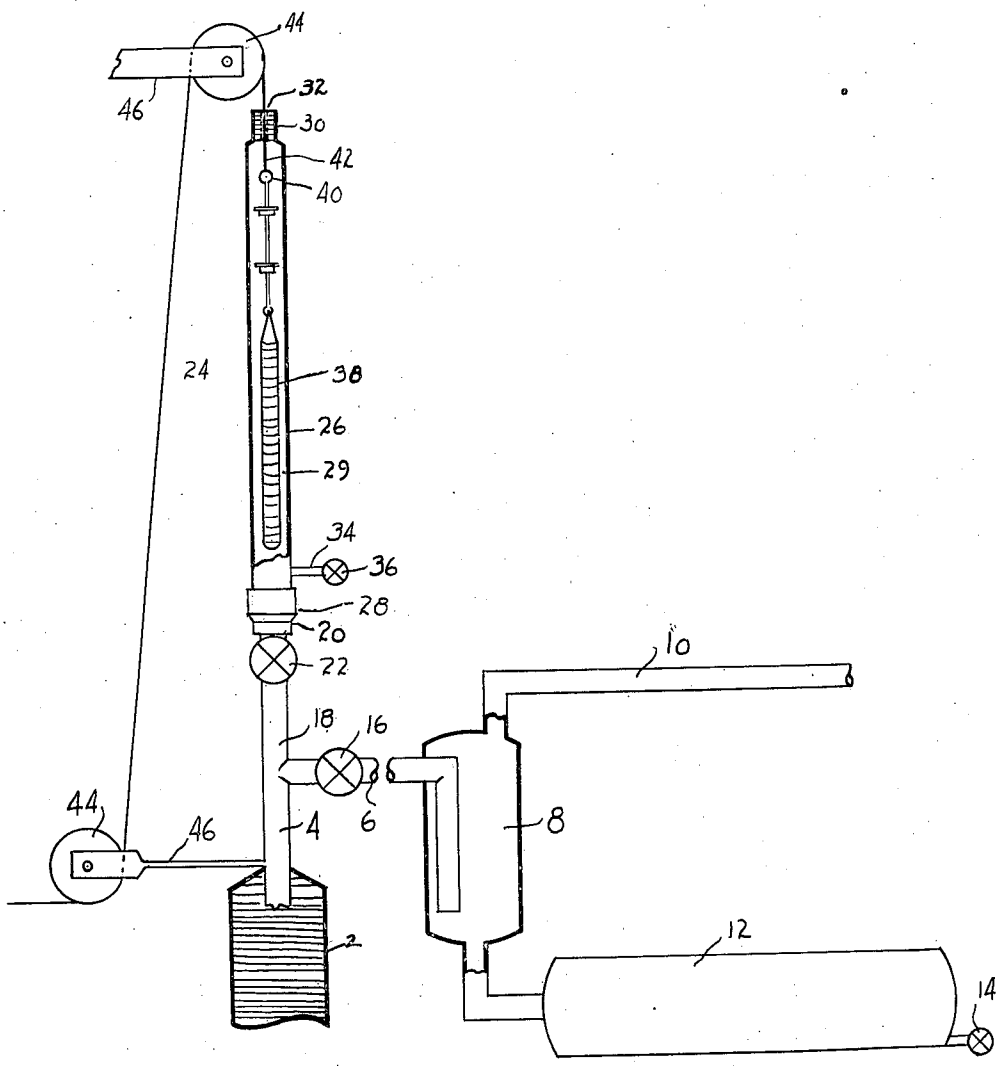
Sept. 20, 1949. E. W. BAILEY 2,482,455

WELL SWABBER

Filed Oct. 12, 1945



Inventor

Edward Wesley Bailey

By James H. Littlepage Attorney

Patented Sept. 20, 1949 2,482,455

UNITED STATES PATENT OFFICE

2,482,455

WELL SWABBER

Edward Wesley Bailey, Athens, Ohio

Application October 12, 1945, Serial No. 621,877

1 Claim. (Cl. 166—16)

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This invention relates to apparatus for cleaning wells and, more particularly, to swabbing apparatus for gas wells.

Ordinarily, water and oil accumulations are removed with a long swab which is lowered into a gas or an oil well on a cable. In order to insert a swab, it is necessary to provide an opening at the top of the well, either by removing the outlet pipe from the well casing or by opening a suitable valve, plug, or plate directly above the top of the casing and registering with the well bore. Usually, an appreciable quantity of gas escapes during the cleaning operation and, in addition, the well must be cut off from its gas output line for the duration. The primary object of this invention is to provide for the insertion and removal of a well swab with substantially no loss of gas and with but short interruption to the productive flow of the well.

More particularly, it is intended to provide a tube easily attachable to the vertical pipe at the top of a well to form a vertically elongated chamber for accommodating a swab, there being a normally closed gate valve adjacent the top end of the well pipe. The swab cable is to be passed out through a stuffing box at the top of the tube so that, when the gate valve is opened and the swab is lowered into the well, the only gas lost will be that which fills the swab chamber plus that which escapes through the stuffing box.

Another particular objective, in conjunction with those detailed above, is to provide a release valve for the swab chamber so that after the swab has been retracted into the swab chamber and the gate valve in the well pipe closed, the gas remaining under pressure in the swab chamber may be released before the tube is removed.

Among other intended accomplishments is the provision of a swabbing rig which may easily and quickly be moved from well to well and which may be utilized in conjunction with the now standard wells and swabs.

These and other objects will be apparent from the following specification and drawing, in which the sole figure is a diagrammatic representation of the inventive structure.

Referring now to the drawing, the top end 2 of a gas well is provided with a vertical well pipe 4, from which is led a horizontal pipe line 6 terminating downwardly in a drip drum 8. Gas line 10 conducts gas from drip drum 8 to a pipe line, storage tank, or other utilization device (not shown) while drippings from drum 8 are collected in storage chamber 12 for periodic drainage through valve 14. Additionally, a valve 16

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is provided in horizontal pipe 6 near its union 18 with vertical pipe 4, which latter pipe extends vertically beyond union 18 to a terminus 20, preferably threaded to receive a cap (not shown). A gate valve 22 normally closes the upper end of pipe 4.

The structure thus far detailed, which is conventional, was heretofore operated for swabbing as follows: Valve 16 was closed, thereby cutting off the useful output of the well, the cap (not shown) on terminus 20 was removed, gate valve 22 was opened, and a swab was lowered into the well through the then open upper end of vertical pipe 4. Quite obviously, the output of the well was dissipated over the surrounding countryside so long as valve 22 remained open.

The improvement comprises a swabbing apparatus indicated generally at 24 and shown attached to the top of pipe 4. For clarity, the apparatus is illustrated diagrammatically since all of the individual elements combined to form the improvement are well known to those skilled in the art.

To continue, apparatus 24 includes an elongated rigid tube 26, preferably metal, having its lower end removably engaged by coupling ring 28 with terminus 20 of vertical pipe 4 so that the swab chamber 29 defined by the tube is in registry with the bore of well 2. It is understood, of course, that any one of a number of conventional couplings may be utilized for connecting tube 26 to pipe 4 so long as the passage therebetween is not unduly restricted. The upper end of tube 26 is provided with packing 30 around an opening 32 and a relief outlet pipe 34 normally closed by relief valve 36 is disposed in the side wall of the tube.

A swab 38, which may be of various forms, is connected at 40 to a cable 42 which passes through packing 30 and then over pulleys 44 to a suitable winch. Parts of a supporting framework are indicated at 46, it being understood that the framework may be permanently installed at the well or, preferably, that the framework and winch can be mounted on a truck or trailer for ready transportation with apparatus 24 from well to well.

In operation, and while the output of well 2 is still being conducted away by gas line 10, the not-shown cap on terminus 20 of pipe 4 is removed and apparatus 24 is connected into place, with swab 38 in tube 26 as shown. Then, with relief valve 36 closed, gate valve 22 is opened to allow gas from the well to fill chamber 29 so that the swab will not have to buck the pres-

sure of the gas well as it is lowered into operating position. Then swab **38** is lowered by cable **42** into well **2** for swabbing, after which it is pulled back up into tube **26**. Next, gate valve **22** is closed and finally apparatus **24** is disengaged from vertical pipe **4** and moved on to the next well in need of swabbing. Before removing tube **26**, however, and after closing gate valve **22**, relief valve **36** should be opened to allow gas trapped in chamber **29** to escape so as to avoid danger as fitting **28** is loosened. Valve **16** is ordinarily left open during the swabbing operation so that the well gas may continue to flow without interruption. The flow of gas from the well assists in keeping the water or oil ahead of the rubber washers on the swab.

The invention has been described as applied to a gas well, since it was that use for which it was devised and in which success was attained, although apparatus is similarly useful for other wells. The invention is not limited to the specific apparatus disclosed but is intended to cover all equivalent arrangements within the scope of the following claim.

I claim:

Apparatus for cleaning a well having a vertical well pipe, a gate valve in said pipe adjacent the upper end thereof, and a flow line connected to said pipe below said gate valve, comprising an elongate tube having a cylindrical wall, said tube being disposed above the well pipe in alignment therewith, means for detachably connecting the lower end of said tube in substantially leak-proof relationship with the upper end of said well pipe, said tube having an opening in the upper end thereof, packing surrounding said opening, a well cleaning tool in said tube, a hoisting cable extending through said opening and connected to said tool for lowering the latter into said well when said gate valve is opened, and relief valve means controllably connecting the interior of said tube with the exterior thereof whereby to relieve said interior of well fluid trapped therein under pressure when said tool has been retracted into said tube and said gate valve closed, said relief valve being in the side wall of said tube adjacent the lower end thereof, whereby to prevent piston-like displacement of said tool in said tube upon opening of said relief valve means.

EDWARD WESLEY BAILEY.

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