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2,170,355

BAILER

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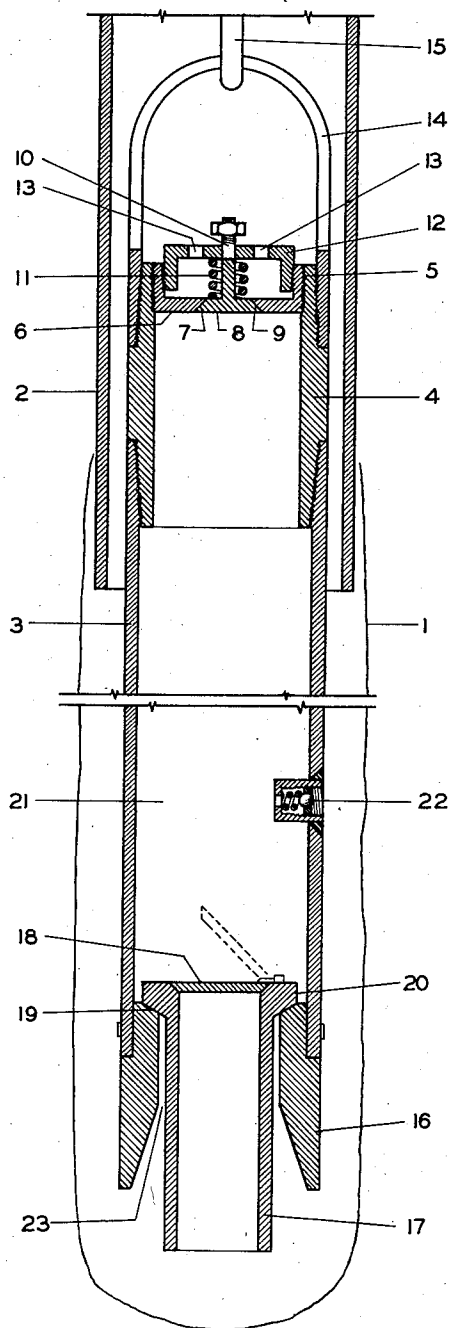


FIG. 1

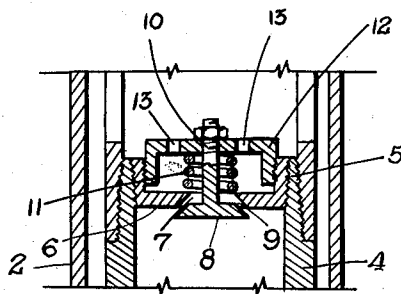


FIG. 3

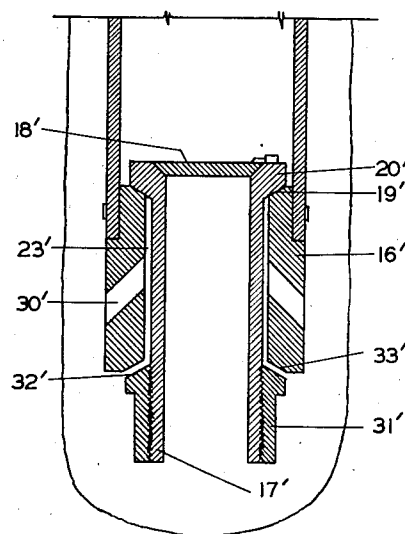


FIG. 2

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BAILER

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6 Claims. (Cl. 166—19)

This invention relates to improvements in bailers which have been primarily designed for bailing oil wells. More specifically it relates to mechanical equipment for bailing and removing sand or other particles from oil wells.

Heretofore bailers have been provided wherein the interior chamber of the bailer was kept under a vacuum, which chamber, upon the landing of the bailer on the bottom of the well hole, was opened to cause an inflow into the chamber. Such bailers, while having certain advantages, are disadvantageous in that no provision is made for washing away the particles and debris which are clogging the said particles around the well hole. With the above mentioned type of bailer, as well as in the conventional type of bailer, the bailer lands in the debris in the bottom of the well without having cleaned the well hole above the bottom of the well. The debris that is caused to enter the barrel of the bailer is only that debris which is ahead of or beneath the bailer. The debris which is opposite the sides of the bailer remains in close contact therewith and should there be any material settling or caving, such type of bailers may become stuck in the well.

An object of the present invention is to provide an improved bailer and oil sand washer wherein the bailer carries with it a supply of fluid under high pressure, which fluid is released on the landing of the bailer on the bottom of the well and causes a washing and agitation of the sand particles forming the wall of the well. When the fluid pressure has been exhausted from the bailer and the pressure has been reduced there is an inflow of debris into the chamber of the bailer. By releasing fluid pressure in the well, the discharged fluid will enlarge the cavity in the debris which is penetrated and formed by the bailer so that there is no danger of the bailer's sticking or becoming frozen in the well.

A further object of this invention is to provide an improved bailer which will loosen tightly packed cavings, sand, silt, wax and other residues collected in the bottom of the well or accumulated along the sides of the well or on the sand faces.

A still further object of this invention is to provide an improved bailer which fills rapidly with the loosened material that is to be removed from the well hole.

A still further object of the invention is to provide an improved bailer which has a simple and effective means for dumping or removing the material from the bailer when removed from the well hole.

A still further object of the invention is to pro-

vide an improved bailer which has a simple and effective means for releasing the pressure fluid from the chamber when the bailer strikes the bottom of the well hole.

A still further object of the invention is to provide an improved bailer which is assembled from a minimum number of parts and is cheap to manufacture.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference is made to the accompanying drawing for an illustrative embodiment of the invention, wherein:

Fig. 1 is a vertical sectional view throughout the entire length of the improved bailer.

Fig. 2 is a vertical sectional view showing the lower end of the improved bailer with a modified discharge means for the fluid pressure.

Fig. 3 is a vertical sectional view of the upper valve member in open position.

Referring to the accompanying drawing, wherein similar reference characters designate similar parts throughout, in Fig. 1, the improved bailer is shown as comprising a barrel 3, which may be constructed of one or more sections of steel tubing, said bailer being shown as passing through the casing 2 into the well hole 1. The upper end of the barrel 3 is closed by a head piece 4 which head piece has mounted therein a valve member 5. The valve member comprises a main bottom portion 6 having a conical seat portion 7 screwed into the head piece 4. A cap member 12 having orifices 13 is screwed into the main valve body member 6 with a space between the members 6 and 12. A valve member having a head 8 has a seat portion 9 which seats on the seat 7 of the body member 6. The valve head has a stem 10 passing through the space between the members 6 and 12 with a coil spring 11 mounted in the space with the spring being so tensioned as to open the valve when the pressure in the chamber reaches a predetermined point. A bolt head on the top of the valve stem holds the valve member assembled in the members 6 and 12 and the valve stem has a sliding fit through the member 12. The bailer has a bail 14 mounted on the top thereof which attaches to the line 15 for raising or lowering the same in the well.

The lower end of the barrel has a bottom piece 16 mounted thereon secured to the barrel by either lugs or screw threads. Mounted in the bottom piece 16 is a member 17 which is slidable in the bottom piece and closed at the top thereof

by the flap valve 18. The bottom piece 16 has a seat 19 on the top thereof on which the flange portion 20 of the slidable member 17 seats to form a ground joint seal to close off the chamber portion 21. Mounted in the side wall of the barrel 3 is a check valve 22 through which the chamber is filled with gas to place the same under pressure.

High pressure gas is stored in the chamber 21 and the gas employed is the volatile gas which comes from the crude oil in the oil well. If the pressure of this gas is not sufficient as it comes from the well, the pressure of the same is raised sufficiently by pump means before being placed in the bailer. To accomplish the filling of the chamber 21, the gas is entered into the chamber through the check valve 22. The pressure of the gas will force the slidable member 17 to seal with the seat 19 and since the flap valve is hinged in the opposite direction, it will also be forced downward by the pressure of the gas, thus causing the bottom portion of the bailer to be tightly sealed at this point. At the time the chamber is being filled with gas through the lower fill valve any air in the chamber can be exhausted through the top valve 8 as the spring holds the same open when the chamber is below a predetermined gas pressure. The holding of the upper valve open to exhaust the air therefrom is to insure against having an explosive mixture of air and gas within the chamber. When all the air has been exhausted from the chamber, pressure will be applied to the upper valve to close the same and when the gas pressure builds up will hold the valve closed, thus giving a completely sealed and pressure tight chamber.

The high pressure gas in the chamber is discharged from the bottom of the barrel through the space 23 between the members 16 and 17. The sliding member 17 extends below the bottom of the member 16 so that the bottom of the sliding member 17 comes into contact with the bottom of the well first, thus lifting the sliding member from the seat 19, allowing the gas to flow out through the passage 23. The valve 8 in the head piece of the bailer has the spring 11 so tensioned that the valve will open when the pressure in the chamber has been reduced to a predetermined amount which will insure complete evacuation of the high pressure gas within the bailer body. The sand and silt will be broken loose and thrown into suspension in the liquid filling the bottom of the well and since the pressure in the chamber has been completely exhausted, the sand and silt will rush into the space in the chamber formerly occupied by the gas under pressure. The pressure of the fluid in the well now being higher than the interior of the chamber, the fluid will force the flapper valve to open and thus allow the liquid to pass into the chamber. When the bailer is removed from the well, the weight of the fluid in the chamber will force the slidable member to seat on the seat 19 and the flapper valve to close, thus sealing the contents in the chamber.

In operation the chamber 21 of the bailer is filled with gas under pressure as previously described which gas pressure automatically closes the top valve 8, the flapper valve 18 and seats the slidable member 17 so as to give a closed sealed chamber. The bailer is then attached by the bail 14 to the sand line or cable 15 and lowered into the well. When the bailer reaches the bottom of the well 1, the slidable sleeve 17 will seat first and be raised which unseats the sleeve from

the seat 19 and allows the gas in the chamber to be discharged. This discharge of gas breaks up the sand and silt accumulations and reduces the pressure within the bailer to such an extent that the top valve 8 opens and allows the chamber to be completely exhausted of its gas. When the gas pressure is completely exhausted, the sand and silt particles in suspension in the oil will rush into the bailer through the flapper valve to occupy the area formerly occupied by the gas. This inrush of sand and silt particles will take place through the bottom sleeve valve although some will enter through the top valve which will remain open until the bailer is recharged with gas. After sufficient time has elapsed for the bailer to fill it is lifted from the bottom of the hole and returned to the surface to be emptied. The weight of the liquid in the chamber when the bailer is raised from the bottom of the well will cause the flapper valve to close and hold the sand and silt within the body of the bailer. Upon reaching the surface of the ground, the bailer may be emptied by removing the bailer bottom which is attached to the bailer body by lugs or a threaded joint.

Fig. 2 shows a modified structure of the slidable sleeve member mounted in the bottom of the barrel. Mounted in the bottom of the barrel is a bottom piece 16' similar to the one disclosed in Fig. 1 having a seat portion 19' at the upper end and a seat portion 33' at its lower end. Slidable in the bottom piece is the sleeve 17', having flapper valve 18' on top, ledge 20' to seal on the seat 19' and a lower flange member 31' having a seat 32' to seal with the seat 33' when the sleeve is moved upwardly. The bottom piece has ports 30' therein bored at approximately a 45° angle to the main body of the bailer barrel having one end of the bore discharging into the well hole bottom and the other end connecting with the passage 23'. The operation of the modified structure is similar to that previously described except that the gas is discharged at an angle into the formation. In some well holes encountered, this modified structure has been found more desirable than that disclosed in Fig. 1.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A bailer comprising a main barrel portion closed at both the top and bottom thereof forming thereby a closed chamber within the barrel for holding fluid under pressure and means for releasing the pressure fluid upon the landing of the bailer on the bottom of the well hole comprising a slidable sleeve member mounted in the bottom of the bailer.

2. A bailer comprising a main barrel portion closed at both top and bottom thereof forming thereby a closed chamber within the barrel for holding fluid under pressure, the bottom of the barrel having mounted therein a sleeve member, the top thereof forming a seat portion, a slidable member mounted within the sleeve and concentric therewith and having a ledge portion to seal with the seat portion on the sleeve.

3. A bailer comprising a main barrel portion closed at both top and bottom thereof forming thereby a closed chamber within the barrel for holding fluid under pressure, the bottom of the

barrel having mounted therein a sleeve member, the top thereof forming a seat portion, a slidable member mounted within and spaced from the sleeve member, a ledge portion on top of the slidable member to seal with the seat portion on the sleeve and a channel space between the sleeve and slidable member discharging the fluid under pressure at the bottom of the bailer.

4. A bailer comprising a main barrel portion closed at both top and bottom thereof forming thereby a closed chamber within the barrel for holding fluid under pressure, the bottom of the barrel having mounted therein a sleeve member, the top thereof forming a seat portion, a slidable member mounted within and spaced from the sleeve member, a ledge portion on top of the slidable member to seal with the seat portion on the sleeve, a channel space between the sleeve and slidable member discharging the fluid under pressure at the bottom of the bailer and the slidable member extending below the sleeve member so as to strike the bottom of the well first when the bailer is lowered to break the seal between the sleeve and the slidable member.

5. A bailer comprising a main barrel portion closed at both top and bottom thereof forming thereby a closed chamber within the barrel for holding fluid under pressure, the bottom of the

barrel having mounted therein a sleeve member, the top thereof forming a seat portion, a slidable member mounted within and spaced from the sleeve member, a ledge portion on top of the slidable member to seal with the seat portion on the sleeve, a channel space between the sleeve and slidable member discharging the fluid under pressure at the bottom of the bailer and a flapper valve mounted in the slidable member functioning to allow liquid from the well to enter the chamber after the pressure fluid has been discharged therefrom.

6. A bailer comprising a main barrel portion closed at both top and bottom thereof forming thereby a closed chamber within the barrel for holding fluid under pressure, the bottom of the barrel having mounted therein a sleeve member with discharge ports through the side wall thereof, the top thereof forming a seat portion, a slidable member mounted within and spaced from the sleeve member, a ledge portion on top of the slidable member to seal with the seat portion on the sleeve and a channel space between the sleeve and slidable member discharging the fluid under pressure through the channel and ports in the wall of the sleeve member.

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