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2,415,608

HYDROSTATIC BAILER FOR WELLS

Filed June 19, 1944

2 Sheets-Sheet 1

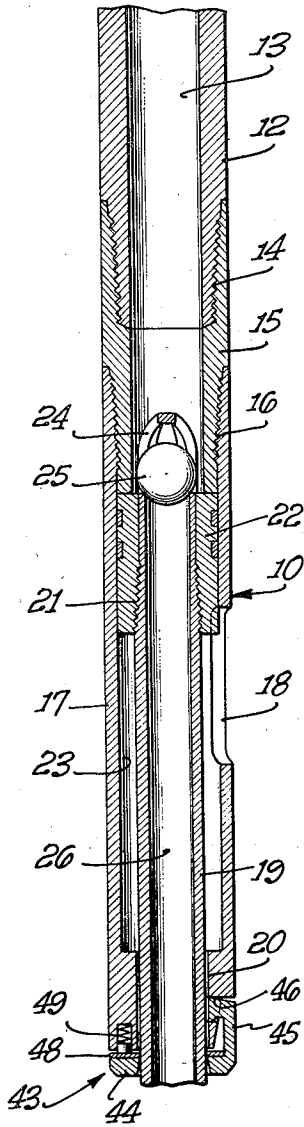


Fig. 1.

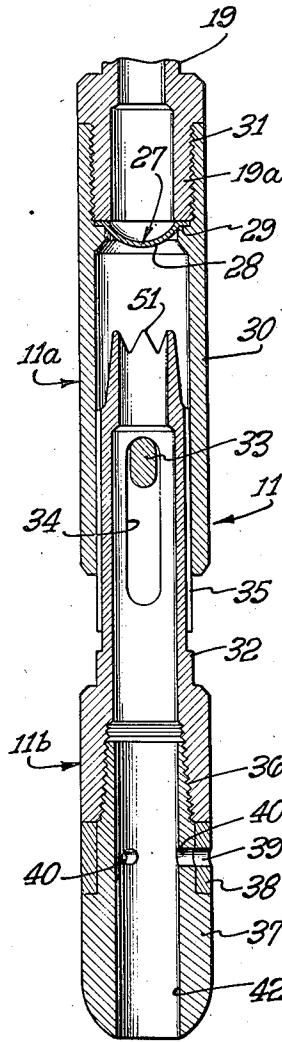


Fig. 1a.

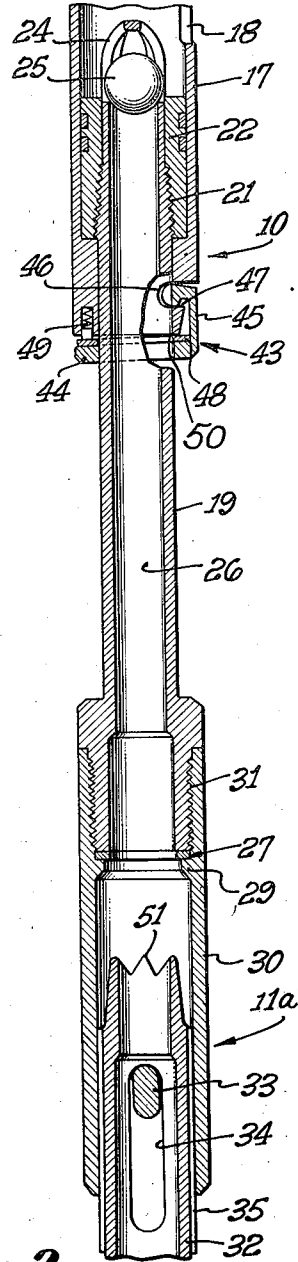


Fig. 2.

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2 Sheets-Sheet 2

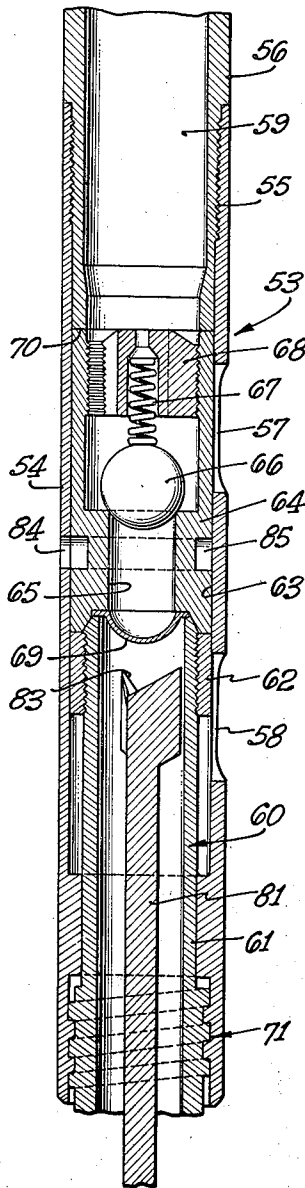


Fig. 3.

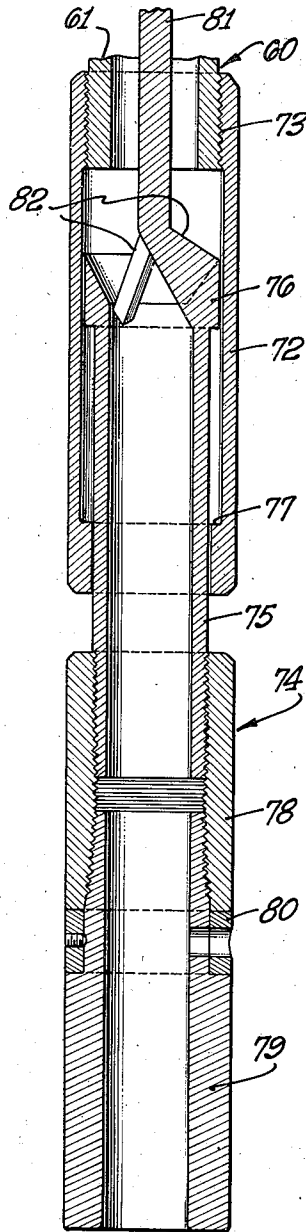


Fig. 3a.

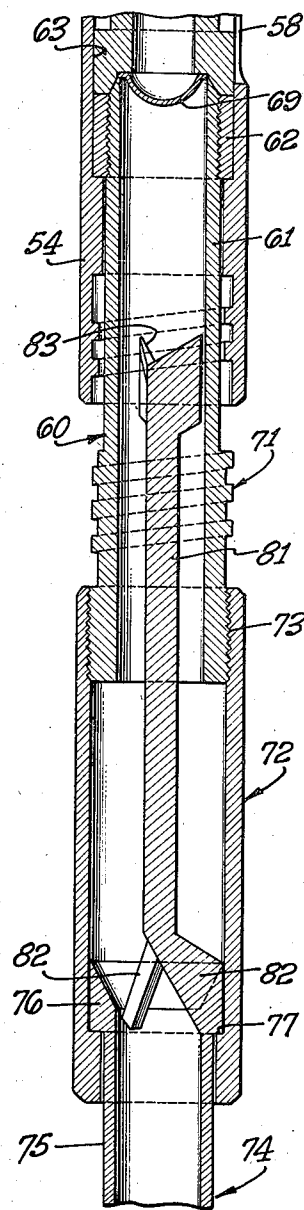


Fig. 4.

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UNITED STATES PATENT OFFICE

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HYDROSTATIC BAILER FOR WELLS

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10 Claims. (Cl. 166—19)

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This invention has to do with improvements in hydrostatic well bailers of the general type comprising a body section containing a normally closed charge receiving chamber, and a relatively vertically movable mandrel section operable to open the chamber for reception of a well fluid charge and to retain the charge in the chamber until such time as it may subsequently be removed at the ground surface.

One primary object of the invention is to provide in the body section of the bailer a dump port adapted to be opened and closed by the mandrel section in a manner such that upon reception of the charge into the chamber, the mandrel section retains the charge therein, the mandrel subsequently being movable to place the chamber in communication with the port to permit dumping of the charge. Preferably, the mandrel normally is releasably held in raised position within the body and in closing relation to the dump port, and as the bailer is bottomed in the hole the charge is taken upwardly through the mandrel into the chamber and retained therein, as by a valve preventing downward flow of the charge through the mandrel. After removal of the bailer from the well, the holding means is released permitting the mandrel section to move downwardly within the body to a position at which the dump port is placed in communication with the charge-receiving chamber.

Another feature and object of the invention is to provide in the movable mandrel section a closure normally sealing the chamber against entry of the well fluid and adapted to be opened as an incident of engagement of the bailer with the bottom of the well. For this purpose the mandrel may contain a closure element, such as a frangible disc, and may include relatively vertically movable sections so related to the disc that the latter is broken as a result of relative vertical movement of the mandrel sections at the charge receiving location of the well.

A further object of the invention is to locate the closure element or disc in the mandrel section at a location below the dump port and below the mandrel-carried section valve so that the chamber is closed against escape of the charge both through the mandrel and dump port, at locations above the location at which the chamber normally is sealed against fluid entry.

All the various objects and details of the invention will be understood to better advantage from the following description of certain typical and illustrative embodiments of the inven-

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tion shown in the accompanying drawings, in which:

Figs. 1 and 1a are vertically continuing sectional views showing one form of the invention with the mandrel in raised position to close the dump port;

Fig. 2 is a fragmentary sectional view showing the mandrel lowered to open the dump port;

Figs. 3 and 3a are vertically continuing sectional views illustrating a variational form of the invention; and

Fig. 4 is a fragmentary section showing the mandrel in lowered position within the body.

Referring first to Figs. 1 and 1a, the bailer may be regarded generally as comprising a body section 10 and a relatively vertically movable mandrel section 11, itself including relatively vertically movable sections 11a and 11b. The body 10 comprises a tubular section 12 containing the charge receiving chamber 13 and of sufficient length to accommodate a chamber of the desired volume. As will be understood without necessity for specific illustration, section 12 may have a closed upper end connected to a suitable suspension means, such as a cable on which the bailer is run into and out of the well. The lower end of section 12 is connected by threaded joint 14 with a coupling or sub 15 which in turn is threaded at 16 into the upper end of a tubular barrel 17 containing one or more dump ports 18.

The upper mandrel section 11a includes a tube 19 having suitable clearance at 20 within the lower end of the barrel 17, and connected at 21 with a head 22 having sliding and substantially sealing engagement with the inside 23 of the barrel. The upper end of tube 19 carries an apertured cage 24 containing a check valve 25 which prevents downward fluid flow from the chamber 13 through the mandrel bore 26.

Normally, the flow of well fluid upwardly through the mandrel into the chamber is prevented by a closure, generally indicated at 27, carried by the mandrel section 11a, which closure may be of any suitable type and form adapted to be opened by relative upward movement of the lower mandrel section 11b, as later explained. Preferably, the closure 27 consists of a frangible disc 28 clamped between the lower end portion 19a of the tube 19 and an internal shoulder 29 on a coupling 30 having a threaded connection 31 with the tube.

The lower mandrel section 11b consists of a tubular disc breaker 32 normally supported on a pin 33 terminating in the coupling 30 and extending through elongated slots 34 in the tube

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32. The latter may carry longitudinally extending surface projections 35 engaging the bore of the coupling 30. To the lower end of the disc breaker tube is attached at 36 a nose 37 carrying a rotatably adjustable metering ring 38 of the usual type containing openings 39 adapted to be adjusted with relation to openings 40 to regulate the size of the passages through which well fluid may be taken in through the openings to dilute or lubricate the charge of well fluid, sand, cuttings and the like, displaced upwardly from the bottom of bore 42 through the mandrel assembly into the chamber 13.

While the bailer is being run into and out of the well, the mandrel section 11 is releasably retained in the raised position of Figs. 1 and 1a by a holding means which may be of any suitable type capable of release to drop the mandrel when the charge is to be dumped. Merely as illustrative, such holding means, generally indicated at 43, may comprise a ring 44 surrounding the tube 19 and having an upwardly extending arm 45 projecting within recesses 46 in the barrel 17 and resting upon surface 47 to support the ring. The latter carries a lock washer 48 and the ring and washer assembly normally is maintained in the inclined position illustrated, by a spring 49 pressing downwardly against the washer so that its sharp inner edge at 50 engages against and holds the mandrel against downward movement.

In operation, the bailer parts in the position of Figs. 1 and 1a are lowered in the well until mandrel section 11b reaches the bottom of the hole. Continued downward movement of the body and upper mandrel section 11a impacts the disc 28 against the pointed end 51 of tube 32, causing the disc to break and the well fluid charge to be taken upwardly through the mandrel past check valve 25 into the chamber 13. After the full charge is received, valve 25 seats to retain the charge and the bailer is removed from the well. When at the ground surface, the charge may be dumped simply by pressing ring 44 and the lock washer 48 upward against the resistance of spring 49, permitting the mandrel to drop to the position of Fig. 2 in which the head 22 has uncovered the dump port 18 to allow the charge to flow out from the chamber 13.

In the form of the invention shown in Figs. 3, 3a and 4, the body section 53 comprises a barrel 54 connected at 55 to a coupling 56 corresponding to the sub 15 in Fig. 1. As illustrated, the barrel contains upper and lower openings or ports 57 and 58, the former of which normally is closed against fluid escape from the charge receiving chamber 59.

The mandrel section 60 comprises a tube 61 carrying a sleeve 62 closely engaging the bore 63 of the bailer. Above tube 61 is a head 64 containing bore 65 and a check valve 66 seated by coil spring 67 contained within a spider or apertured plug 68 threaded into the upper end of the head. Frangible disc 69 is clamped between the head 64 and the upper end of tube 61, and the head normally is maintained in engagement with the coupling shoulder 70, by taking up a releasable, threaded connection at 71 between the tube and the lower end portion of the barrel 54. The upper mandrel section 60 also includes a coupling 72 threaded at 73 on the lower end of tube 61 as shown in Fig. 3a. The lower mandrel section 74 comprises a tube 75 movable vertically within the coupling 72 and normally supported in the depending position of Fig. 4 by engagement of the head 76 with the internal coupling

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shoulder 77. Coupling 78 connects the lower end of tube 75 with the tubular nose 79 carrying the adjustable metering ring 80. The disc breaker 81 integrally attached to the tube 75 as by spider webs 82, projects upwardly within tube 61 and has a sharp end portion 83 to be engaged by the disc 69.

The tool is run into the well with the upper mandrel section 60 in the position of Fig. 3 and the lower mandrel section 74 supported on coupling 72 in the position of Fig. 4. After the nose 79 bottoms in the hole, the disc 69 is impacted down against the head 83 of the breaker, whereby the disc is ruptured and the charge is taken upwardly through the mandrel, past check valve 66 into the chamber 59. After removal of the bailer from the well, the connection at 71 is unscrewed, permitting the mandrel section 60 to drop down to the position of Fig. 4, at which the head 64 is brought below opening 57 to permit the chamber contents to discharge therethrough.

For the purpose of inserting a new disc 69 in place, the head 64 may be held in the position of Fig. 3 by insertion of a tool through opening 84 into recess 85, and tube 61 fully dropped to allow the disc to be inserted through opening 58. Thereafter, the connection at 71 may be taken up to restore the parts to the position of Fig. 1 for the next run.

I claim:

1. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a tubular mandrel movable vertically within the body to open and close said port, valve means carried by said mandrel for preventing downward flow of fluid therethrough, a closure carried by the mandrel below said valve to normally prevent upward flow of well fluid through the mandrel into said chamber, and means for opening said closure.

2. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a tubular mandrel movable vertically within the body to open and close said port, valve means carried by said mandrel for preventing downward flow of fluid therethrough, a closure carried by the mandrel below said valve to normally prevent upward flow of well fluid through the mandrel into said chamber, means for opening said closure, and means for releasably holding the mandrel in its port closing position.

3. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a tubular mandrel movable vertically within the body to open and close said port, valve means carried by said mandrel for preventing downward flow of fluid therethrough, a disc carried by the mandrel below said valve to normally prevent upward flow of well fluid into said chamber, means for breaking said disc, and means for releasably holding the mandrel in its port-closing position.

4. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a depending tubular mandrel having a head movable vertically within the body to open and close said port, a check valve carried by the mandrel to prevent downward flow of fluid therethrough from the chamber, a disc carried by the mandrel below said valve for preventing upward flow of fluid therethrough into the chamber,

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means normally and releasably holding said mandrel in its port closing position, and a tubular disc breaker carried by said mandrel and movable upwardly relative thereto to break said disc.

5. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a depending tubular mandrel having a head movable vertically within the body to open and close said port, a check valve carried by the mandrel to prevent downward flow of fluid there-through from the chamber, a disc carried by the mandrel below said valve for preventing upward flow of fluid therethrough into the chamber, means normally and releasably holding said mandrel in its port closing position, and a tubular disc breaker depending below the mandrel and movable upwardly therein to break said disc and permit the flow of well fluid through the disc breaker and mandrel into said chamber.

6. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a depending tubular mandrel movable vertically within the body to open and close said port, valve means carried by the mandrel for preventing downward fluid flow through the mandrel, a closure in the mandrel below said valve means for normally preventing upward flow of well fluid through the mandrel into said chamber, and means below said valve means and closure operable independently of the valve to open said closure and permit such flow by virtue of downward movement of the bailer after the mandrel has engaged the bottom of the well.

7. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a depending tubular mandrel movable vertically within the body to open and close said port, a closure in the mandrel normally preventing upward flow of well fluid into said chamber, said mandrel having a bore above said closure to pass well fluid upwardly into the chamber when said closure is opened, a valve carried by the mandrel above said closure for preventing downward flow of said fluid through the mandrel, means below said bore operable independently of the valve to open said closure and permit such flow by virtue of downward movement of the bailer after the mandrel has engaged the bottom of the well, and means for releasably holding the mandrel in its port closing position.

8. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a tubular mandrel movable vertically within

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the body to open and close said port, valve means carried by the mandrel for preventing downward flow of fluid through the mandrel, a closure carried by the mandrel and normally positioned below said port to prevent upward flow of well fluid into said chamber, said mandrel having a bore above said closure to pass well fluid upwardly into the chamber when said closure is opened, and means below said bore operable independently of the valve to open said closure and permit such flow through the mandrel by virtue of downward movement of the bailer after the mandrel has engaged the bottom of the well.

9. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a depending tubular mandrel movable vertically within the body to open and close said port, a disc carried by said mandrel and normally preventing upward flow of well fluid through the mandrel into the chamber, a check valve carried by the mandrel above the disc to prevent downward fluid flow through the mandrel, means below the disc and valve for breaking said disc to permit such upward fluid flow into the chamber, and means for releasably holding the mandrel in its port closing position.

10. A hydrostatic well bailer comprising a body containing a charge-receiving chamber and having a dump port communicable with said chamber, a tubular mandrel movable vertically within the body and comprising an upper tubular section and a lower tubular section slideably connected together, said lower section depending below the lower end of said upper section, said mandrel normally closing said port and being movable to open the port and permit fluid discharge therethrough from the chamber, a check valve carried by said upper section to prevent downward flow of fluid therethrough from the chamber, and a disc carried by said upper mandrel section below said valve to normally prevent upward flow of well fluid therethrough into said chamber, said lower section when bottomed in the well being directly engageable with said disc to break the disc when the bailer is further lowered after said lower section has bottomed.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,214,350	Santiago	Sept. 10, 1940
2,059,629	Erwin et al.	Nov. 3, 1936
2,098,520	Santiago	Nov. 9, 1937