June 15, 1937. E. D. KEELER 2,083,714

EXTENSIBLE PRESSURE BAILER

Filed Jan. 8, 1934 3 Sheets-Sheet 1

Fig. 1.

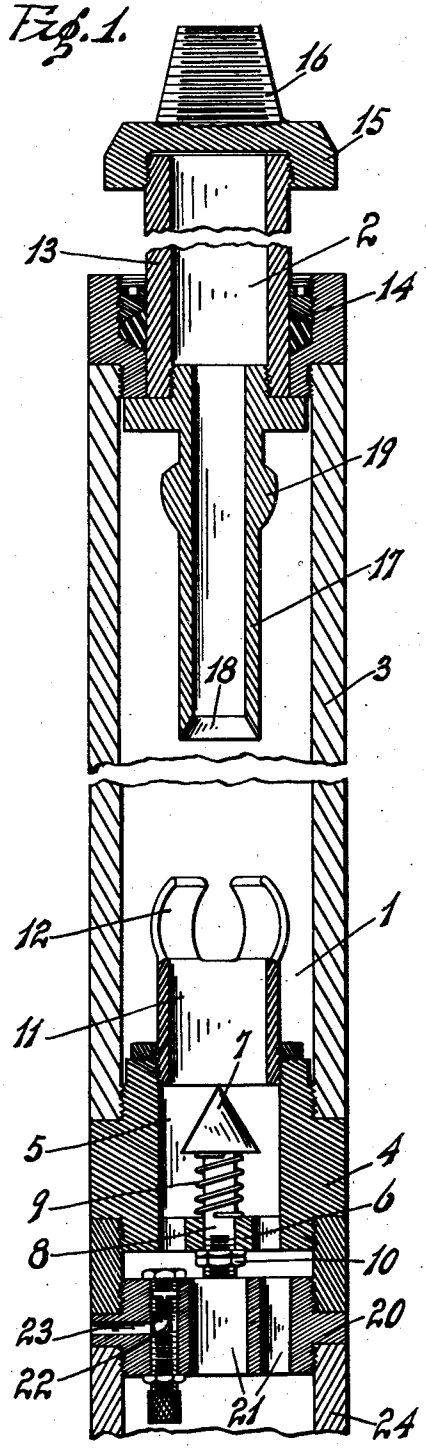
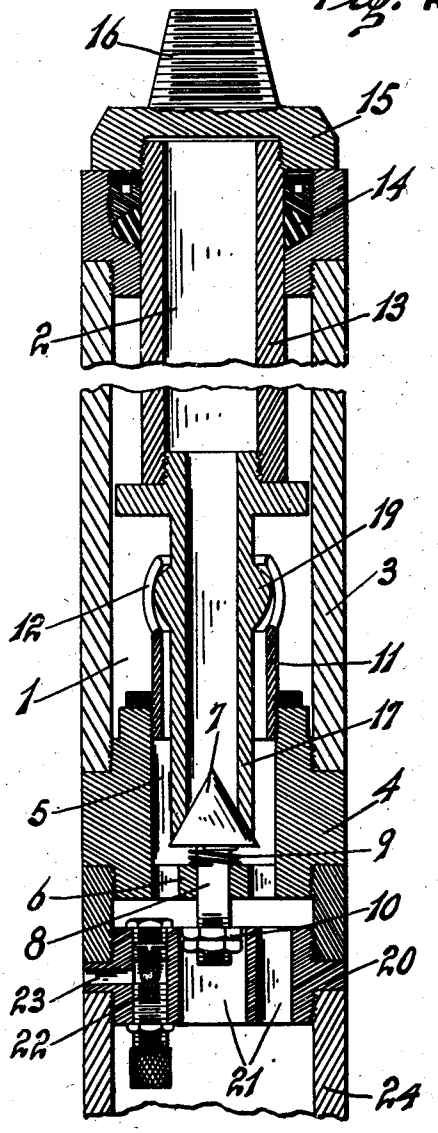


Fig. 2.



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Filed Jan. 8, 1934 3 Sheets-Sheet 2

Fig. 3.

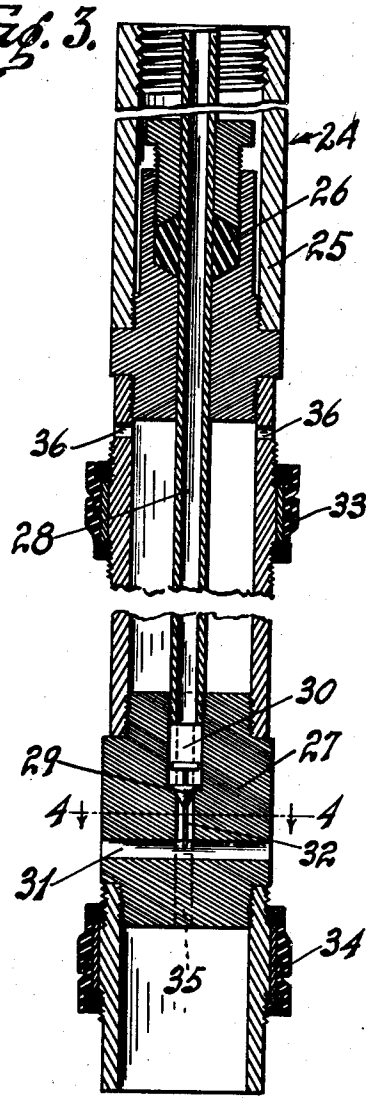


Fig. 4.

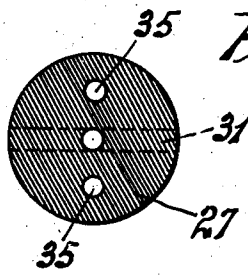


Fig. 5.

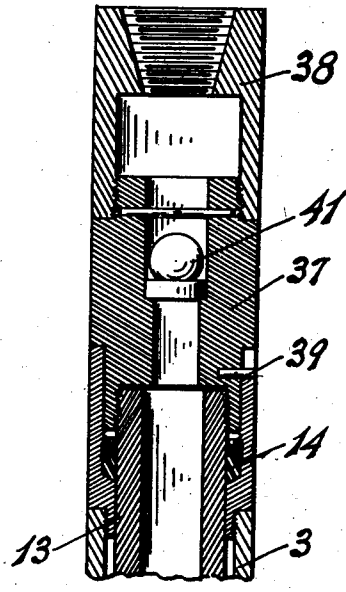
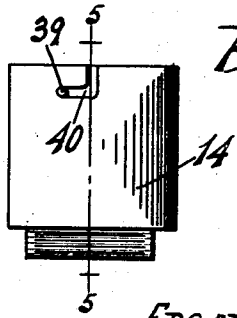


Fig. 6.



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EXTENSIBLE PRESSURE BAILER

Filed Jan. 8, 1934 3 Sheets-Sheet 3

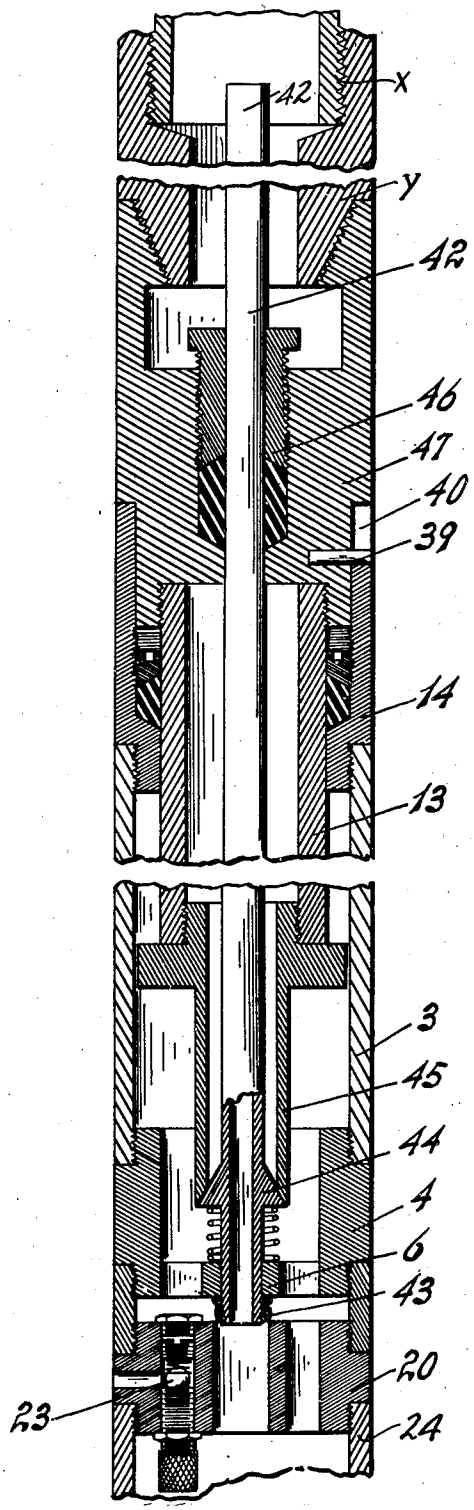

Fig. 7.

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2,083,714

EXTENSIBLE PRESSURE BAILER

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Application January 8, 1934, Serial No. 705,753

24 Claims. (Cl. 166—19)

This invention relates to an extensible pressure bailer, i. e., one in which the hydrostatic pressure of fluid in a well is used to force sand or the like into a chamber in the bailer upon the opening of a pressure chamber.

An object of my invention is to provide a pressure bailer comprising two telescopic tubes, the upper tube being movable upwardly and thereupon opening a valve in the upper or pressure chamber.

Another object is to provide a bailer of the character stated in which a tube is slidably mounted in the upper chamber and this tube is releasably held in contact with a valve seat on the bottom of the tube.

Another object is to provide a bailer which can be operated on either drill pipe or cable.

A feature of my invention is the extension of the lower or sand chamber when the pressure chamber is opened and the bailer operated.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing

Figure 1 is a longitudinal, sectional view of my bailer in extended position.

Figure 2 is a longitudinal, sectional view of my bailer in collapsed position.

Figure 3 is a longitudinal, sectional view of a releasing bottom which may be attached to my bailer.

Figure 4 is a sectional view taken on line 4—4, of Fig. 3.

Figure 5 is a fragmentary, longitudinal, sectional view of the upper part of my bailer when used on drill pipe.

Figure 6 is a side elevation of the upper collar, as used in connection with drill pipe.

Figure 7 is a longitudinal, sectional view of a modified form of bailer.

Referring more particularly to the drawings, my bailer comprises a lower or sand chamber 1, and an upper or pressure chamber 2.

The pressure chamber is movable upwardly relative to the lower chamber when the bailer is operated, as will be further described.

The lower chamber 1 consists of a casing 3, adjacent the lower end of which a sub 4 is attached. This sub has a central passage 5 and a spider 6 across the lower end of the passage 5.

A valve is mounted in the spider 6, and consists of a conical valve head 7 and a stem 8 extending thru the spider. A spring 9 encircles the stem and normally urges the valve head 7 upwardly. A nut 10 screws onto the lower end of the stem 8 so as to limit the upward movement of the valve. A tubular catch 11 screws into the upper end of the sub 4 and is provided with spring fingers 12 on the top thereof.

The upper chamber 2 consists of a section of tubing 13 which extends thru a packing gland 14 on the top of the casing 3. The tube is closed at the top by a cap 15 from which a pin 16 extends. The construction shown in Figs. 1 and 2 is used in connection with a cable.

A sleeve 17 depends from the tube 13 and extends into the chamber 1. The lower end of this sleeve is provided with a valve seat 18 which fits against the conical valve head 7, as shown in Fig. 2.

An annular boss 19 is formed on the sleeve 17 and is adapted to fit within the fingers 12 and to be held by said fingers. The fingers 12 will grip the boss 19 sufficiently so that in normal operation of running the tool into the hole, the boss will be in collapsed position, as shown in Fig. 2. Thus, the pressure within the chamber 2 will be at atmospheric pressure, whereas the pressure within the chamber 1 will be under whatever pressure exists in the well.

When the point has been reached where it is desired to bail the well, a sharp upward pull on the cable or tube will release the boss 19 from the fingers 12, and the tubing 13 will slide upwardly. Due to the difference in pressure between the well and the chamber 2, there will be a sudden inrush of fluid, sand, and the like, into the chamber 1. The fluid material passes into the chamber 1 thru the spider 6 and the passage 5, while the sand remains in the lower part of the casing 3 below the sub 4.

A block 20 is mounted on the sub 4 and is positioned below said sub. This block has a plurality of vertical ports 21 extending therethru. These ports permit the fluid to pass upwardly into the chamber 1, while the sand remains below the block.

A relief valve 22 is provided in the block 20, for the purpose of relieving any excess pressure in the chamber 1, as the bailer is being pulled out of the well. This relief valve is preferably of the ball check type which exhausts thru a side port 23.

A bailer bottom 24 of a suitable length is attached to the block 20, and may be of the usual and well known type or a bottom as disclosed in Fig. 6 of my Patent No. 1,944,434, issued January 23, 1934, or it may be of the type shown in Fig. 3. The bailer bottom illustrated in Fig. 3 consists of

an outer shell 25 in which are positioned a packing gland 26 and a valve chamber 27. The packing gland and valve chamber are in spaced relation, as is evident from Fig. 3. The shell 25 screws onto the block 20 to form the complete bailer.

A tube 28 extends thru the packing gland 26 and screws into the valve chamber 27. A valve 29 is positioned in a bore 30 which communicates with the tube 28. The bore 30 extends to a transverse port 31 which latter port also serves as a means to unseat the valve 29.

A pin 32 depends from the valve 29 and projects into the port 31. A tool is inserted in the port and the valve 29 is raised off its seat in order to release the fluid and other materials which are trapped within the chamber 1.

An upper and lower set of leather or rubber packing rings 33, 34 is positioned on the outer shell 25 adjacent the lower end thereof. These rings are positioned one on either side of the transverse port 31 so that fluid from the well cannot enter this port. Fluid can, however, pass upwardly thru ducts 35 in the valve chamber 27 and thence thru side ports 36 in the shell 25. The ports 36 are positioned above the cups 33.

In Figs. 5 and 6, I have illustrated a coupling for drill pipe, or tubing. The tubing 13 threads into a collar 37 which collar, in turn, screws into a box 38 to which the drill pipe or tubing is attached. A pin 39 projects from the coupling 37 into a bayonet slot 40 in the packing gland 14. Left-hand rotation of the drill pipe will release the pin 39 from the slot 40, and thus permit the bailer to be extended in order to operate the same.

If desired, a ball check valve 41 can be provided in the coupling 37 so that the bailer can be operated somewhat like a pump, in order to create a suction in the chamber 1 after the valve 7 has been unseated. If necessary, a set of jars (not shown) can be placed above my bailer in order to release the boss 19 from the spring fingers 12.

The ball check valve 41 is used only in connection with drill pipe or tubing and with the bailer bottom shown in Fig. 3. The tubing 13 of the bailer can be reciprocated and acts as a pump to pull fluid and sand into the bailer if the first inrush of material is not sufficient to completely fill the same. This arrangement will also be advantageous where there is a low fluid level in the well or if, for any other reason, the material does not flow quickly and freely into the bailer.

When used on drill pipe or tubing X, circulation can be maintained thru my bailer, since there is a clear passage thru the bailer and out of the bottom thereof, as shown in Figure 7. It is to be understood that the arrangement shown in Figure 7 is only used in connection with drill pipe or tubing which screws into the sub Y at the top of the bailer. The general arrangement of my bailer is substantially the same as shown in Figures 1 and 2, but preferably with the pin-locking arrangement, as shown in Figure 5 and Figure 6. The spring fingers are eliminated and the pin 39 and slot 40 are used to hold the bailer in collapsed position with the valve seated against the bottom of the pressure chamber.

A circulation pipe 42 extends longitudinally thru the bailer, and is slidably mounted at the lower end in the spider 6. Nuts 43 screw onto the bottom of the circulation pipe so that the upward movement thereof is limited.

A valve head 44 is attached or formed on the pipe 42 above the lower end thereof. This valve head seats against the bottom of the sleeve 45 which depends from the tubing 13. The pipe 42 extends thru a packing gland 46 in the upper sub 47. The pipe 42 extends upwardly a sufficient distance so that the longitudinal movement of the tubing 13 is not hindered, and the pipe will not pass out of the gland 46 on upward movement of the tubing 13. The sleeve 45 is moved away from the valve head 44 in the same manner, as previously described.

It will be evident that in this circulating arrangement, the fluid is conducted thru the pressure chamber and thence downwardly and out of the bottom of the bailer. The packing gland 46 prevents the fluid from passing into the pressure chamber within the tubing 13.

If desired, a relief valve, similar to the valve 23, can be provided adjacent the upper end of the lower chamber 1, i. e., in the lower part of the packing gland 14.

The operation of my bailer will be evident from the foregoing description. It will also be evident that my bailer can be operated off of bottom, i. e., it is not necessary to have the bailer strike an obstruction in the well or the bottom of the well in order to operate the same. If my bailer should strike an obstruction, such as a collar, or the like, in a well, it will not be tripped. The bailer can be lifted and again lowered so as to avoid the obstruction, without withdrawing the bailer from the well and resetting it.

Having described my invention, I claim:

1. A fluid pressure bailer comprising a lower casing, an upper tubing telescopically mounted in the casing, said casing and tube each having chambers therein, valve means seated in the lower end of the tubing, mounting means for the valve in the casing, means releasably engaging the tubing whereby it is held in lowered position and with said valve closing the tube, said tubing being adapted to be disengaged from the releasable means, and the valve opened whereby a charge is taken into the casing on relative upward movement of the tubing and valve, said casing having an intake at the bottom thereof.

2. A fluid pressure bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing being telescopically mounted in the casing, a valve engaging the lower end of the tubing, mounting means for the valve in the casing, a means releasably engaging the tubing whereby said tubing is held in lowered position with the valve closed.

3. A fluid pressure bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing being telescopically mounted in the casing, a valve engaging the lower end of the tubing, mounting means for the valve in the casing, a means releasably engaging the tubing whereby said tubing is held in lowered position with the valve closed, and a relief valve in the casing.

4. A bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing being telescopically mounted in the casing, a sleeve depending from the tubing, a valve seated in the bottom of the sleeve, mounting means for the valve in the casing and means releasably engag-

ing the sleeve whereby the tubing is held in lowered position and with the valve seated in the sleeve.

5. A bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing being telescopically mounted in the casing, a sleeve depending from the tubing, a valve seated in the bottom of the sleeve, mounting means for the valve in the casing, means releasably engaging the sleeve whereby the tubing is held in lowered position and with the valve seated in the sleeve, said means comprising spring fingers and a boss on the sleeve engageable with said fingers.

6. A bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing being telescopically mounted in the casing, a sleeve depending from the tubing, a valve yieldably mounted in the casing, a valve seat in the sleeve against which the valve is pressed, and releasable means engaging the sleeve whereby the tubing is held in lowered position, and with the valve seated.

7. A fluid pressure bailer comprising a casing having a sand chamber therein, a tube having a pressure chamber therein, said tube being telescopically mounted in the casing, a valve in the casing, a seat in the tube, said valve resting against the seat in lowered position of the tube, releasable means engaging the tube whereby said seat is held against the valve, said tube being movable upwardly on release of said means whereby the valve is unseated.

8. A bailer comprising a casing, a packing gland on top of the casing, a tubing slidably mounted thru the packing gland, said casing having a sand chamber therein and said tubing having a pressure chamber therein, a sub on the lower end of the casing, a valve yieldably mounted in the sub, a sleeve depending from the tubing, spring fingers on the sub, a boss on the sleeve engageable by the spring fingers whereby the tubing is releasably held in lowered position, a seat in the sleeve upon which the valve rests, said pressure chamber being opened on upward movement of the tubing.

9. A bailer comprising a casing, a packing gland on top of the casing, a tubing slidably mounted thru the packing gland, said casing having a sand chamber therein and said tubing having a pressure chamber therein, a sub on the lower end of the casing, a valve yieldably mounted in the sub, a sleeve depending from the tubing, spring fingers on the sub, a boss on the sleeve engageable by the spring fingers whereby the tubing is releasably held in lowered position, a seat in the sleeve upon which the valve rests, said pressure chamber being opened on upward movement of the tubing, and a relief valve in the sub.

10. A bailer comprising a casing and a tubing telescopically mounted in the casing, said casing and tubing each having chambers therein, valve means adapted to engage and close the tubing, mounting means in the casing for the valve means, means releasably engaging the tubing whereby the tubing and casing are held in a telescoped position and with said valve closing the tubing, said tubing being adapted to be disengaged from the releasable means, and the valve opened whereby a charge is taken into the bailer.

11. In a bailer the combination of a casing and a tube telescopically mounted together, both having chambers therein, valve means adapted to engage and close the tubing, mounting means in the casing for the valve means, an air chamber above the valve, a sand chamber below the valve and automatic releasable means engaging the tube whereby said tube and casing are held in a telescoped position with the valve closed.

12. In a bailer the combination of a casing and a tube telescopically mounted together, a valve mounted within the casing, a sand chamber in the casing with a bottom inlet below the valve, a pressure chamber in the tube above the valve, means to open the valve on upward movement of the pressure chamber independent of the sand chamber, said valve seating in the pressure chamber and closing the same in telescoped position of the bailer.

13. In a bailer the combination of a casing and a tube, said casing having a sand chamber adjacent its lower end with a bottom inlet, said tube and casing being telescopically arranged, a valve located in the casing between the sand chamber and the tube, a seat on the tube above the valve, adapted to close by a downward movement of the tube onto the valve, means releasably holding the valve closed, upward movement of the tube unseating the valve.

14. In a bailer the combination of a casing having a sand chamber and a closed substantially air tight tube, telescopically mounted in the casing, a valve mounted in the casing between the sand chamber and the tube and adapted to close the tube in the lowered position of the tube, means for lowering the bailer in a hole in a telescoped position with said tube closed by the valve, a check valve in the casing, means to open the first named valve and means to pull fluid into the bailer by reciprocating the tube independent of the casing.

15. In a bailer the combination of a casing, a valve mounted within the casing, a sand chamber in the casing below the valve, a tube telescopically mounted in the casing above the valve, said valve being adapted to close the tube, means to open the valve by the upward motion of the tube independent of the sand chamber, the tube effecting a pump action in the casing above the valve as the tube is raised.

16. In a bailer, the combination of the casing having a sand chamber in the lower end thereof and a closed, substantially air-tight tube telescopically mounted in the casing, a valve mounted in the casing below the tube, releasable means between the tube and the casing, whereby the tube and the casing are held in telescoped position when lowering the bailer in a hole, said valve engaging and closing the tube in the telescoped position of the bailer.

17. A bailer comprising a lower casing, an upper tubing telescopically mounted in the casing, said casing and tube each having chambers therein, a valve in the casing, a seat in the tubing against which the valve bears, means releasably engaging the tubing whereby it is held in lowered position and with said valve closed, said tube being adapted to be disengaged from the releasable means, and the valve opened whereby a charge is taken into the casing, a bailer bottom depending from the casing, a valve chamber in the bailer bottom, an upwardly opening valve in the valve chamber, a tube rising from the valve chamber, a packing gland surrounding the last named tubing, cups above and below the valve chamber, said cups being mounted on the bailer bottom, a horizontal port extending thru the valve chamber and to the valve therein, a vertical port extending thru the valve chamber, and ports in the bailer bottom above the uppermost cups.

18. A bailer comprising a casing, said casing having a sand chamber therein, a tube, said tube having a pressure chamber therein, said tube being telescopically mounted in the casing, a pipe coupling on the tube, a valve in the casing, a valve seat in the tube upon which the valve rests, releasable means engaging the tube whereby the valve seat is held against the valve, disengageable means connecting the tube and the casing whereby the tube is held in collapsed position on right-hand rotation thereof, said disengageable means being releasable on left-hand rotation of the tube.

19. A bailer comprising a casing, said casing having a sand chamber therein, a tube telescopically mounted in the casing, said tube having a pressure chamber therein, a check valve in the tube, a pipe coupling means on the tube, a valve in the casing, a valve seat in the tube, said valve resting on the seat in collapsed position of the tube, releasable means engaging the tube whereby the tube is held in collapsed position.

20. A bailer comprising a casing, said casing having a sand chamber therein, a tube telescopically mounted in the casing, said tube having a pressure chamber therein, a check valve in the tube, a pipe coupling means on the tube, a valve in the casing, a valve seat in the tube, said last mentioned valve resting on the seat in collapsed position of the tube, releasable means engaging the tube whereby the tube is held in collapsed position, a bailer bottom extending from the casing, spaced cups on the bailer bottom, a valve chamber between the cups, an upwardly opening valve in the valve chamber, said valve chamber having a transverse port extending to the last mentioned valve, a tube rising from the valve chamber above the valve in said chamber, and a packing gland around the last named tube in the bailer bottom.

21. A bailer comprising a lower casing, an upper tubing telescopically mounted in the casing, said casing and tube each having chambers therein, a valve in the casing, a seat in the tubing against which the valve bears, means releasably engaging the tubing whereby it is held in lowered position and with said valve closed, said tubing being adapted to be disengaged from the releasable means, and the valve opened whereby a charge is taken into the casing, a bailer bottom depending from the casing, spaced cups on the bailer bottom, a valve chamber between the cups, said valve chamber having a transverse bore therein and a vertical bore intersecting the transverse bore, an upwardly opening valve in the vertical bore, said last named valve being adapted to be unseated thru the transverse bore, said valve chamber having by-pass ports extending vertically therethru, outlet ports in the bailer bottom above the upper cups, a tube rising from the vertical bore, and a packing gland in the bailer bottom around the last named tube.

22. In a bailer having a lower sand chamber and an upper pressure chamber therein, valve means in the sand chamber, a valve seat therefor in the lower end of the pressure chamber, said valve means being releasable on relative longitudinal movement of the pressure chamber and sand chamber, releasable means holding said chambers in telescoped position and with the valve seated, and a circulation pipe extending thru said pressure chamber and thru said valve means whereby circulating fluid is conducted thru the pressure chamber.

23. A bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing and casing being telescopically mounted, a valve in the casing, a seat in the tube against which the valve bears, a means releasably engaging the tubing whereby said tubing is held in lowered position with the valve closed, and a circulation pipe extending thru the pressure chamber and thru said valve whereby circulating fluid is conducted thru the pressure chamber.

24. A bailer comprising a lower casing having a sand chamber therein, an upper tubing having a pressure chamber therein, said tubing and casing being telescopically mounted, a valve in the casing, a seat on the tubing against which the valve bears, a means releasably engaging the tubing whereby said tubing is held in lowered position with the valve closed, a circulation pipe extending thru the pressure chamber and thru said valve whereby circulating fluid is conducted thru the pressure chamber, and a packing means around the circulation pipe above the pressure chamber.

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