

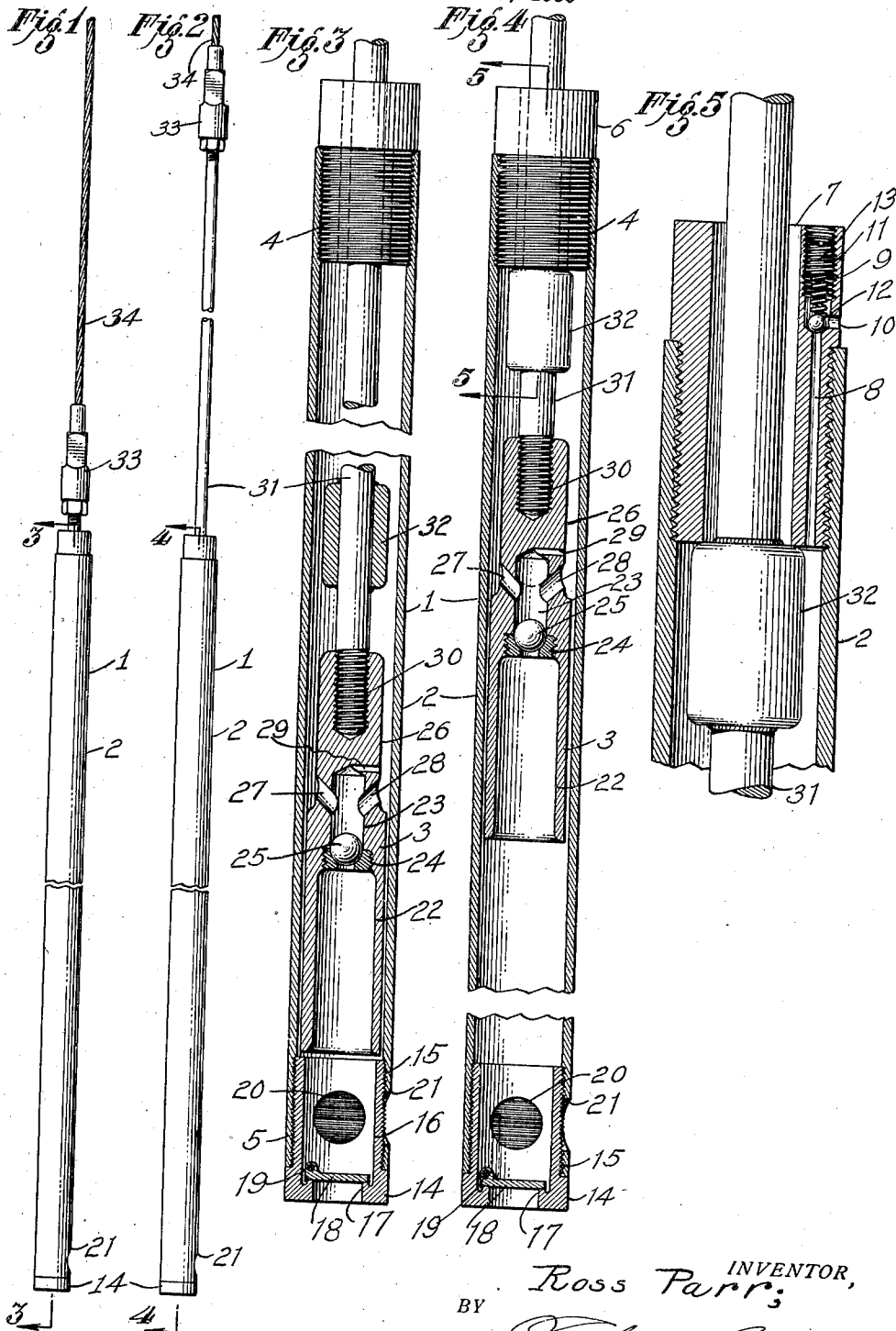
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BAILER

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BAILER

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1 Claim. (Cl. 166—19)

This invention relates to bailers, and has for an object a bailer which may be manufactured very cheaply. In fact, practically all the bailer parts may be unfinished castings. Very little machine work is required, loose fitting members and the like do not impede the efficiency of the device, and unskilled labor may be used for the assemblage thereof.

Another object of the invention is the provision of a bailer which is efficient in operation, of few parts, and generally superior to bailers now known to the inventor.

With the above mentioned and other objects in view, as will be hereinafter detailed in the description, the invention consists in the novel and useful provision, formation, construction, association, and relative arrangement of parts, members and features, all as disclosed in the drawing, described generally, and more particularly pointed out in the claim.

In the drawing.

Figure 1 is a fragmentary elevation of the bailer, one member thereof being received within the barrel,

Figure 2 is a view similar to Figure 1, with one of its members extended above the barrel,

Figure 3 is a fragmentary vertical sectional view on the line 3—3 of Figure 1,

Figure 4 is a fragmentary vertical sectional view on the line 4—4 of Figure 2, and,

Figure 5 is a fragmentary sectional view on the line 5—5 of Figure 4, and on an enlarged scale.

Referring now to the drawing, the bailer as an entirety is designated by the numeral 1, wherein 2 is the barrel within which is adapted to be actuated a plunger 3. As is usual in bailers, the length of the barrel may be determined in accordance with the use of the device, and to this end the barrel may be from twenty to forty feet in length. Bailers are, of course, used in wells for the purpose of removing sand, cuttings, or various sorts of other debris so that drilling may proceed at an orderly rate. Therefore, it becomes essential that the bailer be as efficient as possible in order that the maximum amount of drillings, cuttings, and the like, may be removed after a certain drilling operation. It is also essential that the bailer be capable of being dumped when raised to the surface of the well and with safety to the operator. The present invention is so constituted and arranged, as hereinafter disclosed, that injury to the operator upon opening the bailer will not result.

As is customary, the barrel closely approximates the inner diameter of the casing. The bar-

rel here shown is threaded internally at the top and bottom, as designated at 4 and 5, respectively. The top threads 4 are adapted to have secured thereto a threaded nut 6. This nut is provided with a central bore 7 and likewise provided with bores 8, 9 and 10, the bores 8 and 9 being eccentric to the central bore but bores 8 and 9 have the same axis, while the bore 10 communicates with the bore 9. The wall bounding the bore 9 is threaded at 11. The bores 8 and 10 act in the capacity of by-pass ports, as hereinafter described. A spring-pressed ball valve 12 normally closes the upper end of the bore 8, the spring and the ball being held in such seated or closed position through the medium of a nut 13 secured to the threads 11. Thus, when the ball valve is lifted from its seat, fluid may be passed through the bore 8 and outwardly of the bore 10.

A nut 14 is externally threaded at 15 and has threaded engagement with the threads 5 at the lower end of the barrel. This nut is provided with an enlarged diameter bore 16 and a smaller bore 17, there being a flap valve 18 closing communication between the two bores when the flap valve is in the position shown in Figures 3 and 4. However, this flap valve is hinged in any approved manner, such as by the pin 19 to the nut and said valve may readily move inwardly so as to permit ingress of any substance within the confines of the nut. This nut is likewise provided with a transverse bore 20 and the barrel is provided with a transverse bore 21 which may register with the bore 20 when the nut is turned. This construction affords a ready means for passing material outwardly from the barrel.

The plunger 3 has a loose fit within the barrel, which is to say the periphery of the plunger is spaced a certain amount from the inner surface of the barrel. No rings are used on the plunger for engagement with the surface of the barrel. This plunger is provided with two axial bores of different diameters 22 and 23. The bore 22 is the bore of largest diameter and opens inwardly from the working end of the plunger. Included between the bores of different diameter is an annular nut 24, which may be threaded within the barrel, and a ball valve 25 may be seated upon one side of said annular nut so as to close passage therethrough, this ball valve being permitted movement within the bore 23. The plunger is reduced in diameter at 26, and two or more inclined ports 27 and 28 communicate between the bore 23 and the periphery of the part 26. There is also a transverse port 29 between the periphery of the part 26 and the bore

23, so that any fluid that might be trapped above the ball valve 25 might be relieved through said port 29. The part 25 is formed with a central threaded bore 30 adapted to have threaded there-
to a rod or stem 31. This rod or stem carries
an enlargement 32 which acts as a means for
stopping upward movement of the plunger when
the plunger is in one position within the barrel,
as see Figures 4 and 5. This stop engages the
inner end of the nut 6. The stem or rod 31 in
turn, through the medium of a connector 33,
is secured to the sand line 34, which leads to
the surface of the well.

The operation, uses and advantages are as follows:

It will be observed first that the piston or plunger has a loose fit within the barrel; that the stem has a loose fit within the bore 7 of the nut 6. When the bailer is lowered through the casing, the bailer will be received within fluid containing sand and other debris within the well. The bailer will become completely immersed within the material to be bailed, and said material may find passage into the bailer through the space included between the bore 7 and the periphery of the rod or stem above the plunger. Also, in entering the fluid, the flap valve 18 may open so that fluid will be received within the nut and the barrel. A certain amount of the fluid will find its way between the inner surface of the barrel and the periphery of the piston and some of the material will likewise enter the bore 22 in the piston and may lift the valve 25. In any event, when the device is lowered, the piston will be at the top of the barrel with the stop member engaging the lower surface of the nut 6, as shown in Figure 4, the general appearance of the tool during the lowering operation being that of Figure 2. The well operator can determine by the action of the cable tool at the surface of the well at what time the bailer reaches the bottom of the well hole. The operator now raises and lowers the cable which, of course, will raise and lower the stem or rod 31 and its piston connected thereto. As the piston raises within the barrel, the flap valve 18 will open to permit sand and other debris to enter the barrel. As the piston lowers, the material may pass the valve 25 and through the ports 27 and 28 to the space included above the piston and within the barrel. Upon again raising the piston, the ball valve 25 will close. However, the material above the piston is allowed to escape through the passage 7 in the nut 6. The fluid that is received between the periphery of the piston and the inner surface of the barrel acts as an effective seal so that the piston readily performs a useful working stroke to draw into the barrel material. The strokes of the piston will gradually become shorter and shorter as the barrel fills, until such time is reached that no appreciable movement of the piston can be obtained. The operator then raises the bailer to the surface of the well hole to allow the material within the barrel to be discharged therefrom. This is

conveniently accomplished because the by-pass ports 8 and 10 permit a release of pressure at the surface of the well the ball valve being so regulated as to permit such release. Furthermore, if the stop 32 is dropped slightly below the bottom surface of the nut, pressure is released through the bore 7. Hence, by turning the nut 14 to where the transverse bores 16 and 20 register, material within the bailer is allowed to pass through these openings, in the well understood manner.

As stated in the objects of the invention, the loose fit accorded the piston within the barrel, and the simple nature of the valves, such as shown at 25 and 12, do not require for this bailer any large amount of machine work. The barrels are common and easily made from tubing, with their inner surfaces threaded from both ends to receive the nuts. It becomes apparent that rough castings may be utilized, as a casting does not impair the efficiency of the plunger. Damage to the bailer during a working stroke is obviated by the arrangement shown, in that when the stop reaches the nut against which it may abut, there is a dash-pot action because the fluid must escape between the stop and the bottom of the nut into the bore 7 of said nut. As this passageway is restricted, due to the presence of the stem or rod, the fluid can only escape at a certain velocity.

I claim:

In a suction type bailer: a barrel formed at one end with a transverse opening, a nut threaded to said barrel and provided with a transverse opening adapted to register with the opening in said barrel when the nut is turned, a valve carried by said nut to permit entrance of fluid within the barrel and to stop exit therefrom at the valve zone, an annular nut carried by the opposite end of said barrel, a plunger loosely fitted within the barrel, said plunger provided with a fluid actuated valve adapted to remain closed during an upward stroke of the plunger to open the other of said valves and permit entrance of fluid within the barrel, the plunger valve opening upon a reverse reciprocation of the plunger within the barrel, a stem passed through the annular opening of said annular nut and secured to said plunger to permit when actuated reciprocation of the plunger within the barrel; the fit between the stem and the annular opening of said nut being such that any fluid trapped above the said plunger is obstructed sufficiently as to passage outwardly through the annular opening of said nut to exert a fluid pressure against the top of the plunger and provide a fluid seal between the periphery of the plunger and the barrel during an upward stroke thereof; movement of the nut at the opposite end to align the transverse bore thereof with the transverse bore of the barrel relieving fluid pressure within the barrel to permit removal of the fluid from said barrel after the barrel is filled with fluid.

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