

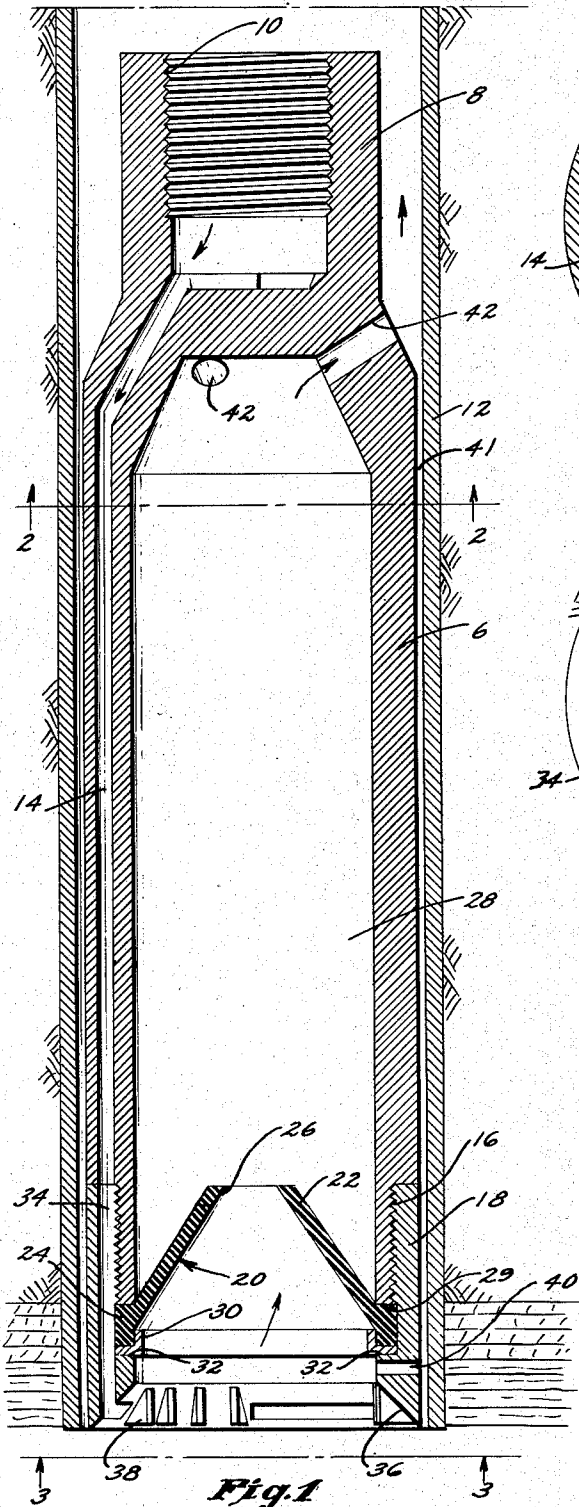
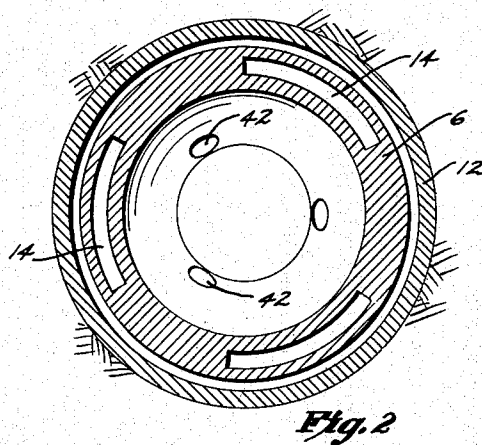
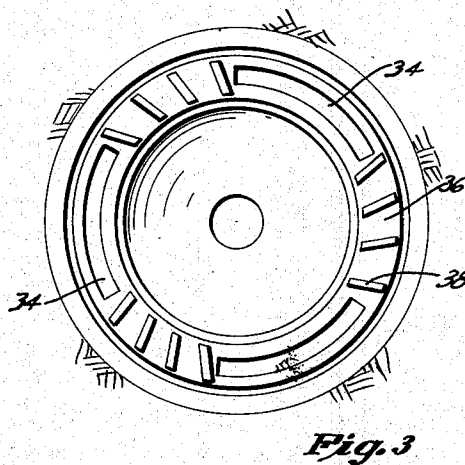
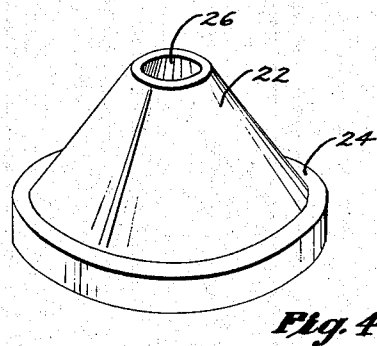
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L. F. BRAUER

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WELL CLEANOUT BAILER

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INVENTOR
Leo F. Brauer
BY *Barry & Cyr*
ATTORNEYS

UNITED STATES PATENT OFFICE

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WELL CLEANOUT BAILER

Leo F. Brauer, Oklahoma City, Okla., assignor to
Brauer Machine & Supply Company, Oklahoma City, Okla., a corporation of Oklahoma

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6 Claims. (Cl. 166—19)

This invention relates to a bailer or junk basket adapted for use in oil, water or gas wells for cleaning debris out of the bottom of the well, such as rock bits, reamer pins, bit heads, cones and the like.

In present day well bailers utilizing fluid circulation to force debris and the like into the bailer, a pivotal clapper valve is usually employed in order to entrap the debris in the bailer when there is a fluid stoppage. This method has a very particular disadvantage, because, with the fluid pressure stirring the debris up, it is very difficult for an operator at the top of the well hole to tell at what instance the debris is above the clapper valve in order to discontinue fluid circulation at the proper time and allow the clapper valve to entrap the debris in the bailer.

It is therefore an important object of this invention to provide a bailer for cleaning out oil and gas wells involving the use of fluid circulated through the bailer to cause lifting of any debris in the well into the bailer.

Another important object of this invention is to provide a bailer for cleaning out oil and gas wells having a flexible trapping member allowing debris in the well to be forced therethrough by fluid circulation to trap the debris in the bailer.

And still another important object of this invention is to provide a bailer for cleaning out oil and gas wells having a frusto-conical shaped flexible sleeve adapted to be expanded by debris forced against it by the fluid pressure to allow passage of the debris through the sleeve into the bailer.

An additional object of this invention is to provide a bailer for cleaning out oil and gas wells, having an apertured flexible trapping member through which debris is forced by fluid circulation, and of such construction that it may be disposed at a point near the lower end of the bailer without the danger of being damaged by the debris being stirred up by the fluid.

And still a further object of this invention is to provide a frusto-conical shaped flexible trap valve for an oil well bailer which is less susceptible of being damaged, durable, and can be easily and cheaply replaced.

Other objects and advantages of my invention will be evident from the following detailed description read in conjunction with the accompanying drawing which illustrates one form of my new invention.

In the drawing:

Fig. 1 is a vertical sectional view taken on lines

1—1 of Fig. 2 showing the invention disposed in a well hole.

Fig. 2 is a sectional view taken on lines 2—2 of Fig. 1.

Fig. 3 is a view taken on lines 3—3 of Fig. 1.

Fig. 4 is a detailed perspective view of the flexible valve member.

Referring to the drawing in detail and more particularly to Fig. 1 the improved bailer or "junk basket" as it is commonly called in the oil industry, comprises a cylinder 6 having an upper portion 8 of the reduced diameter provided with a threaded recess 10 adapted to be connected to a string of tubing (not shown) in a well hole. The cylinder 6 is disposed in spaced relation to the well casing 12. A plurality of longitudinal bores or ports 14 arranged in spaced relation to each other are provided in the wall of the cylinder 6. Any number of bores may be utilized but as clearly shown in Figs. 2 and 3, three bores are preferable. The bores 14 are in communication with the recess 10 and extend the full length of the cylinder 6.

The lower portion of the cylinder 6 is provided with a reduced threaded portion 16 adapted to receive a cylindrical bottom shoe 18. A valve member or sleeve 20 is constructed with a frusto-conical shaped body portion 22 provided with an outwardly depending rim or flange 24. The apex of the body 22 is provided with an aperture 26. The frusto-conical shaped body 22 is formed from soft or sponge-like rubber or the like, while the flange 24 molded to the body 22 is formed from hard rubber or the like. The sleeve 20 is disposed in a chamber 28 provided by the cylinder 2, with the flange 24 anchored between the lower end 29 of the cylinder 6 and an annular retaining ring 30 supported by a shoulder 32 of the shoe 18. It will be apparent that threading of the shoe member 18 to the portion 16 secures the rubber sleeve 20 in the chamber 28 of the cylinder 6.

The shoe 18 is provided with a plurality (preferably three) of longitudinal bores 34 adapted to be disposed in axial alignment with the bores 14 when the shoe 18 is secured to the cylinder 6. The lower end of the shoe 18 is provided with a tapered portion 36 having a plurality of projections or teeth 38 adapted to agitate the debris as will be hereinafter set forth. A plurality of circumferentially spaced apertures 40 are provided in the shoe 18 for a purpose as will be hereinafter set forth.

Operation

In operation the junk basket in complete as-

sembly is lowered into the well by a string of tubing (not shown) and is allowed to rest on the bottom of the well hole with the teeth 38 encompassing any debris or the like that is present in the well hole. Fluid, under pressure, such as gas or liquid, is introduced into the tubing from a source of supply from the top of the well (not shown) and flows from the tubing through the recess 10, the longitudinal bores 14 and 34, into the chamber 28 of the cylinder 6. The disposition of the bailer in the well hole causes a substantial sealing which directs the flow of fluid through the bailer rather than into the space 41 between the cylinder 6 and the casing 12. The apertures 40 allow a small amount of input fluid to discharge therethrough in order to prevent sticking of the bailer in the well formation. However, it will be apparent that the discharge of fluid from the apertures 40 is not sufficient to substantially decrease the flow of fluid into the chamber 28.

The flow of fluid from the bores 14 and 34 stirs up any debris encompassed by the cylinder 6 and the shoe 18, and where the debris is of small dimensions it will be forced by the fluid through the aperture 26 into the chamber 28. The cylinder 6 is provided with a plurality of outlet ports 42 (preferably three in number) spaced from the bores 14 to allow discharge of the fluid from the chamber 28 and up the casing 12. When larger pieces of debris, such as rock bit cones, and the like are encompassed by the cylinder 6, the pressure of the fluid will force the cone or the like into contact with the body 22 of the valve 20 and due to the flexibility of the rubber body 22, it will have a tendency to conform to the contour of the odd shaped cone and more or less plug the aperture 26 through which the fluid is allowed to pass. This plugging of the aperture 26 will in turn cause the fluid pressure to be increased, thereby increasing the force of the cone or debris acting against the rubber body member 22 to cause the body member 22 to expand and increase the size of the aperture 26 to allow the cone or debris to be forced into the chamber 28.

It will be apparent that with the debris in the chamber 28 the body member 22 contracts and the aperture 26 returns to its original size, thus entrapping the debris in the chamber 26 without necessarily shutting off the fluid circulation. It will be apparent that the fluid discharges through the outlet ports 42, which are of such size to prevent any passage of the debris. This operation can be repeated many times until the chamber 28 is full of the debris, when it can then be pulled from the well hole and emptied by merely unthreading the shoe 18 from the cylinder 6 to allow removal of the frusto-conical sleeve 20.

From the foregoing it will be apparent that the frusto-conical shaped valve member 20 is capable of an infinite number of variations as to size and shape of the aperture 26 to more efficiently entrap odd shaped and larger sized debris in the junk basket. Furthermore, the valve can be placed at a point closer to the lower end of the cylinder 6 or in proximity of the debris without any substantial danger of being damaged due to the stirring up of the debris.

Changes may be made in the combination and arrangement of parts as heretofore set forth in the specification and shown in the drawing, it being understood that any modification in the precise embodiment of the invention may be

made within the scope of the following claims without departing from the spirit of the invention.

What I claim is:

1. A well cleanout bailer disposed at the bottom of a well hole and in spaced relation to the casing of the hole, and comprising a cylinder having a plurality of longitudinal bores adapted to receive a fluid under pressure, a cylindrical shoe member secured to the lower end of the cylinder a plurality of bores in the shoe member in axial alignment with the cylinder bores and communicating with the interior of the cylinder for directing passage of the fluid into the cylinder, a frusto-conical valve having a continuous periphery interposed between the lower end of the cylinder and the shoe for entrapping debris in the cylinder, an aperture in the apex of the valve, said valve so constructed and arranged to allow variation in the size of the aperture whereby various sized debris can be forced through the aperture by the fluid.

2. A well cleanout bailer disposed in spaced relation to the casing in a well hole, and comprising a cylinder having means adapted to receive a fluid under pressure, a cylindrical shoe member secured to the lower end of the cylinder, means in the shoe member in axial alignment with the first mentioned means and communicating with the interior of the cylinder for directing passage of the fluid into the cylinder, means having a continuous periphery disposed in the cylinder for entrapping debris therein, an aperture in the entrapping means, said entrapping means so constructed and arranged to allow variation in the size of the aperture.

3. A well cleanout bailer disposed in spaced relation to the casing in a well hole comprising a cylinder adapted to receive a fluid under pressure, a cylindrical shoe member secured to the lower end of the cylinder, a valve interposed between the lower end of the cylinder and the shoe member for entrapping debris in the cylinder, said valve comprising a soft rubber conical body having an aperture in the apex thereof, said aperture adapted to be varied in size by expansion of the conical body due to fluid pressure forcing debris there against.

4. A well cleanout bailer disposed in spaced relation to the casing in a well hole, comprising a cylinder having a plurality of longitudinal bores adapted to receive a fluid under pressure, a cylindrical shoe member secured to the lower end of the cylinder, a plurality of bores in the shoe in axial alignment with the cylinder bores for directing passage of the fluid into the cylinder, a plurality of circumferentially spaced apertures in the shoe member allowing discharge of fluid therethrough to prevent sticking of the bailer in the well hole, means disposed in the cylinder for entrapping debris therein, an aperture in the entrapping means, said entrapping means so constructed and arranged to allow variation in the size and shape of the aperture.

5. A bailer for removing debris from a well hole comprising a cylinder adapted to be disposed at the bottom of the well casing, said cylinder adapted to receive a fluid under pressure, a cylindrical shoe secured to the lower end of the cylinder, a plurality of circumferentially spaced apertures in the shoe allowing discharge of fluid therethrough to prevent sticking of the bailer in the well hole, a valve disposed in the cylinder for trapping debris in the cylinder, said valve comprising a soft rubber conical body member hav-

ing an aperture in the apex thereof, said aperture adapted to be varied in size by expansion of the conical body member.

5 6. A well cleanout bailer disposed in a well hole comprising a cylinder adapted to receive a fluid under pressure, flexible means having a continuous periphery disposed in the cylinder for entrapping debris encompassed by the cylin-

der, an aperture in the entrapping means, said aperture adapted to be plugged by debris forced there-against by the fluid whereby the fluid pressure is increased causing the debris to expand the flexible entrapping means and vary the size of the aperture so that the debris can pass therethrough. 5

LEO F. BRAUER.