April 24, 1951 G. W. MOORE 2,550,080

HYDRAULIC TYPE FISHING TOOL FOR DRILLED WELLS

Filed March 11, 1949

FIG. 1.

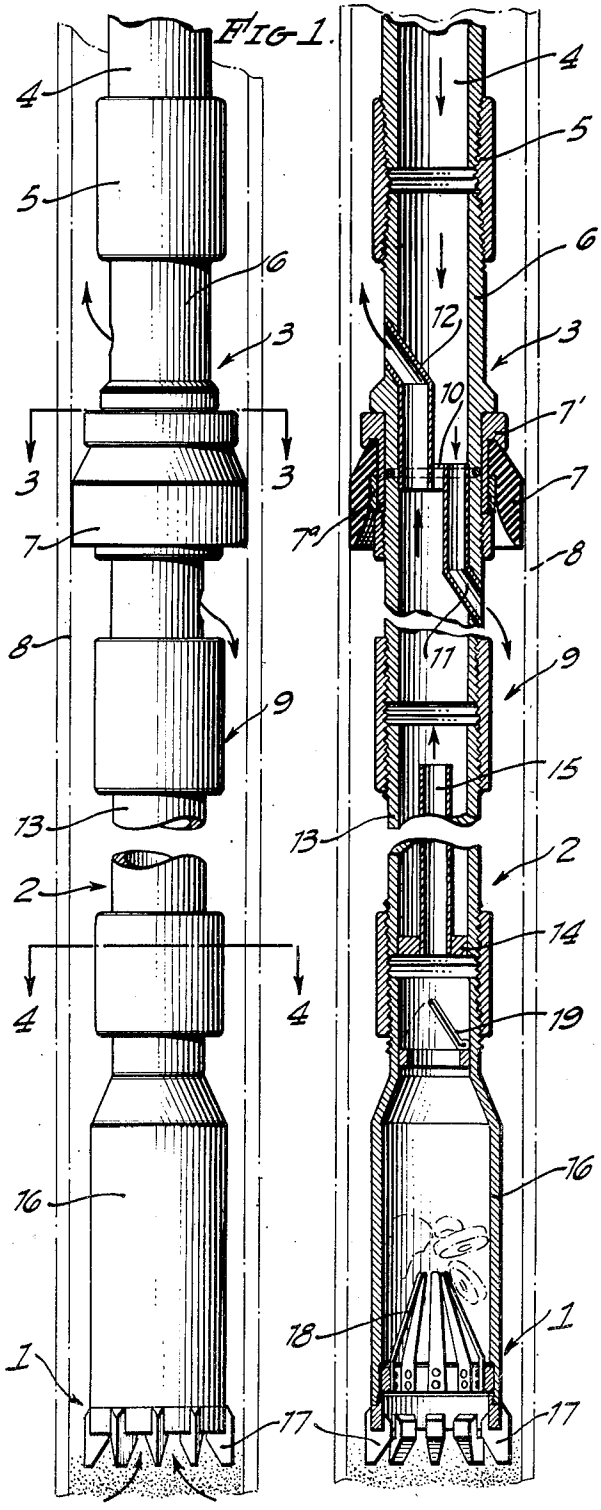


FIG. 2.

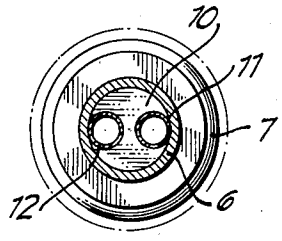


FIG. 3.

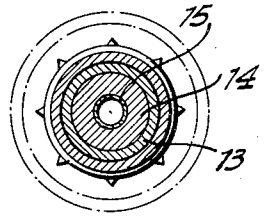


FIG. 4.

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HYDRAULIC TYPE FISHING TOOL FOR DRILLED WELLS

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11 Claims. (Cl. 294—86)

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This invention relates to a hydraulic type junk basket, whereby certain articles in an oil or gas well may be recovered from the bottom of the well. These small articles, such as: rock bits, cutters, reamer pins, core heads, cones, pipe fragments and the like, are termed debris or junk.

An object of my invention is to provide a novel hydraulic type junk basket with a diversion unit forming a part thereof, this diversion unit directing the circulating fluid first outwardly to the annular area around the tool and then directing the fluid from within the tool to the annular space around the drill pipe or tubing supporting the tool.

Another object of my invention is to provide a novel hydraulic type junk basket including a settling space in which the velocity of the circulating fluid is reduced, thus permitting the recovered debris to settle and remain within the basket.

A feature of my invention is to provide a hydraulic type junk basket with a packer or sealing means to separate the downwardly and upwardly moving columns of pressure fluid.

Another feature of my invention is to provide a hydraulic type junk basket of the character stated, which is relatively simple in construction and which will effectively recover debris and other small articles from the bottom of a bored hole.

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

In the drawing:

Fig. 1 is a side elevation of my hydraulic type junk basket.

Figure 2 is a longitudinal sectional view of the same.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is a sectional view taken on line 4—4 of Figure 1.

Referring more particularly to the drawing, it is to be understood that my tool may be operated entirely within casing or it may be operated in open hole where the hole is in solid formation, that is, to gauge, or the tool may be operated partly within a cased area and partly in open hole.

My tool includes essentially three elements, a junk basket 1, a settling basin 2, and a diversion unit 3. It is to be understood that these units may be spaced vertically in any manner desired and which will conform to the requirements of the well. The elements 1, 2 and 3, as stated,

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which comprise my hydraulic type junk basket, are superimposed, substantially as shown, and are attached to the lower end of a drill pipe or tubing 4.

The circulation of fluid in an oil well is usual and well known and this fluid is pumped downwardly into the drill pipe or tubing 4 by means of pressure pumps on the surface, which are not shown since they are usual and well known. A collar 5 screws on to the bottom of the pipe 4 and on to the tube 6, which forms part of the diversion unit 3. A flexible packer or cup 7 is rotatably mounted on the tube 6 and this cup expands outwardly and seals the space between the tube 6 and the casing or bore 8. The cup 7 is mounted on a sleeve 7' which is rotatable on the outer surface of the pipe. A ring packing 7a may be mounted inside of the sleeve 7 to seal the space between the sleeve and the outside of the tube 6. This annular space is indicated at 9. A transverse wall 10 is provided in the tube 6 and a diversion pipe 11 extends through this wall and thence outwardly and through the side of the tube 6, below the cup 7, thus the downwardly moving circulating fluid in the drill pipe 4 is diverted outwardly below the cup 7 and into the annular space 9. The subsequent course of this fluid will be further described.

A second diversion pipe 12 extends upwardly from the transverse wall 10 and thence out through the side of the tube 6, above the cup 7, thus the upwardly moving fluid is diverted to the space within the casing 8 and can flow upwardly to the surface of the ground in the usual manner.

The settling basing element 2 consists of a pipe section 13, which is threaded or otherwise attached to the bottom of the tube 6. The pipe 13 also is provided with a transverse wall 14, through which the pipe 15 extends and projects upwardly into the pipe 13. The fluid, in passing through the Venturi pipe 15, increases in velocity and then suddenly passes into the enlarged area of the pipe 13, thus losing its velocity and permitting any small articles, junk or debris, to settle out around the Venturi pipe 15 and within the pipe 13.

The junk basket element 1 includes a cylinder 16, which is threaded onto or otherwise fixedly attached to the bottom of the pipe 13. This cylinder is open at the bottom and is provided with the usual teeth 17 and also with suitable retainer fingers 18, so that articles forced through these fingers will be retained within the junk basket or cylinder 16, and may be withdrawn to the sur-

face. A flap valve 19 may be mounted adjacent the upper end of the cylinder 16, if desired. This flap valve may serve to entrap some articles above it, however, the flap valve is not absolutely essential but may be alternatively used.

In operation, the tool is mounted on tubing or drill pipe and is lowered to the bottom of the bored hole. The junk or debris to be recovered is at the bottom and the tool will surround or partially surround this debris. The cup 7 engages the wall of the bored hole (the casing or open hole). The pressure pumps at the surface are now started and fluid is forced downwardly through the pipe 4, thence through the diversion pipe 11, below the cup 7, and thence downwardly into the annular space 9. The cup 7 prevents the fluid from moving upwardly and, consequently, the fluid must pass downwardly around the bottom edge of the cylinder or junk basket 16 and then upwardly into this cylinder. The velocity of the fluid will pick up the debris, carrying it into the cylinder 16, through the fingers 18. The fluid, due to its velocity, might still be carrying small articles of junk, and, consequently, moves upwardly through the Venturi tube 15 and then into the larger pipe 13, where the velocity is reduced. The small junk will then settle around the outside of the pipe 15 and within the pipe 13, and the relatively clean fluid will pass upwardly through the diversion pipe 12, into the casing above the cup 7 and thence to the surface. It is thus evident that the cup 7 separates the downwardly moving and the upwardly moving fluid, compelling this fluid to pass downwardly around the lower edge of the junk basket and moving any debris which is in the hole.

Having described my invention, I claim:

1. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit means rotatably mounting said packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, and a transverse wall in said diversion unit, both of said by-pass pipes extending through said transverse wall.

2. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, each of said by-pass pipes extending through said wall.

3. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, both of said by-pass pipes extending through said transverse wall, and a settling basin between said basket and diversion unit.

4. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, both of said by-pass pipes extending through said transverse wall, and a settling basin between said basket and diversion unit, and a vertically extending constrictor pipe in the settling basin.

5. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, each of said by-pass pipes extending through said wall, a settling basin positioned between the basket and the diversion unit, and a constrictor pipe in the settling basin extending vertically thereof.

6. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, both of said by-pass pipes extending through said transverse wall, a plurality of flexible fingers in the basket, said fingers retaining the junk as it enters the basket, and a flap valve above said basket.

7. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, both of said by-pass pipes extending through said transverse wall, a plurality of flexible fingers in the basket, said fingers retaining the junk after it enters the basket, and a flap valve above said basket, a settling basin between the basket and the diversion unit, and a constrictor pipe in the settling basin, extending vertically thereof.

8. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit,

said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, each of said by-pass pipes extending through said wall, a settling basin between the basket and the diversion unit, and a constrictor pipe in the settling basin extending vertically thereof.

9. A well clean out hydraulic type basket comprising a diversion unit, means securing said diversion unit to a string of pipe, a junk collecting basket mounted below said diversion unit, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall of said diversion unit below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall of the diversion unit above the packer cup, a transverse wall in said diversion unit, each of said by-pass pipes extending through said wall, flexible fingers in said basket whereby junk is retained therein, and a flap valve adjacent the upper end of said basket.

10. In an oil well tool, a fluid diversion unit, means securing said diversion unit to a string of pipe, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall thereof below the packer cup,

a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall thereof above the packer cup, a transverse wall in said diversion unit, both of said by-pass pipes extending through said transverse wall, and means rotatably mounting said packer cup on said diversion unit.

11. In an oil well tool, a fluid diversion unit, means securing said diversion unit to a string of pipe, a packer cup on said diversion unit, a by-pass pipe within said diversion unit and opening through the wall thereof below the packer cup, a second by-pass pipe in the diversion unit, said second by-pass pipe opening through the wall thereof above the packer cup, a transverse wall within said diversion unit, both of said pipes extending through said wall.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,181,187	Jennings	Nov. 28, 1939
2,360,311	Ausburn et al.	Oct. 17, 1944