

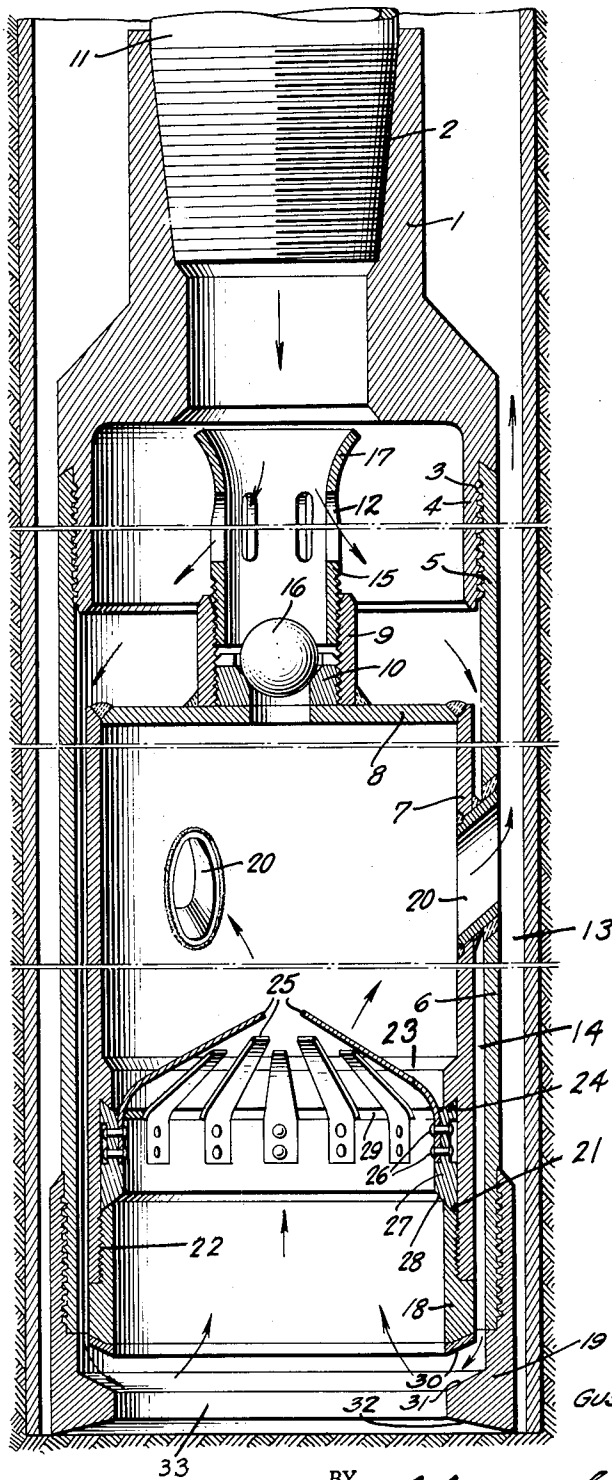
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JUNK BASKET

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JUNK BASKET

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1 Claim. (Cl. 166—99)

This invention, relating as indicated to a junk basket, is more particularly directed to the provision of a device which will remove various forms of debris, such as parts of packers, rock bit cones, broken blades of fish tail bits, and other small pieces of either tools or equipment that, for one reason or another, are found in the bore of a well.

One specific object of the invention is to remove small pieces of any type of material without having to core over the pieces which it is desired to remove.

Another object of the invention is to provide a device, which is generally termed a basket, with a trap through which fluid may flow freely and in so doing will carry the debris upwardly into the interior of the basket in such a manner that it cannot escape from the basket.

Another object of the invention is to provide a junk basket which will operate by fluid passing downwardly and then upwardly in such volume that even heavy, metal pieces will be lifted by the fluid and entrapped in the basket.

A more detailed object of the invention is to provide an inner barrel supported within an outer barrel, the inner barrel being provided with a valve member that may be in the form of a ball or similar device.

In spite of the fact that there are a number of devices on the market which are designed to retrieve debris from a well bore, there are none which depend upon control of a circulating fluid to permit the debris to be removed by the force of the circulating fluid alone. In practically all forms of junk retrieving tools it is necessary to core over the junk and then retrieve the same. In the present invention it is an object to take advantage of the reverse flow of the circulating fluid and to provide a tool so designed that the reverse flow has sufficient force to lift junk and debris.

Another object of the present invention is to provide an improved junk retrieving tool that is simple, rugged, and inexpensively manufactured, involving a minimum of parts.

These and other objects will appear from the following detailed description and appended claim when read in conjunction with the attached drawing, wherein:

The sole figure is a vertical, sectional view, broken in three places in order to accurately depict the invention on one sheet instead of several.

Referring now to the drawing, the tool shown is adapted to be run into the well on the bottom or lowermost portion of a drill pipe 11 or other similar tubular member. The pipe 11 is provided with screw threads which mate with screw threads on the upper coupling 1, the threaded connection being generally indicated by the reference numeral 2. The pin end 4 of the upper coupling 1 is provided with threads thereon, these threads being engageable with corresponding threads 3 on the box end 5 of the outer barrel 6.

The basket itself is formed from a relatively few number of parts and consists mainly of an outer barrel 6, an

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inner barrel 7 spaced from the outer barrel so as to provide an annular space 14, and means to cause fluid flowing down through the drill pipe 11 to pass into such annular space.

5 The outer barrel 6 is provided with screw threads adjacent its lower end upon the outer surface thereof so as to receive what is known in the art as a burning shoe head 19, which will be described more in detail herein-after.

10 An inner barrel 7 is provided, this being concentrically mounted with respect to the outer barrel 6 and supported in place by means of one or more tubes 20 which are welded or otherwise secured to the inner and outer barrels. These tubes extend outwardly and upwardly so as to provide an exhaust port or passage for the exit of fluid from the interior of the inner barrel 7 to the exterior of the outer barrel 6 into the annulus 13 formed between the tool and the inner surface of a well bore. In the present case the well is shown as being cased, but the tool operates also in a well with no casing.

15 The upper end of the inner barrel 7 is provided with a closure 8 in the form of a cylindrical plate, and it is of course to be understood that this closure, instead of being a separate welded member, could be an integral end of the cylindrical member 7.

20 A ball seat 10 has exterior screw threads which mate with interior screw threads on the guide collar 9, and the guide collar 9 is in turn welded or otherwise secured to the upper surface of the closure or upper end 8. An extended valve member guide 15 is screw-threadedly received in the guide collar 9. The valve member guide 15 can extend longitudinally as long as desired, it being shown here somewhat shortened due to the break in the drawing. The upper end 17 of the guide is flared so as to receive a valve member which, in this instance, is illustrated as a ball 16. Slots 12 are provided in the guide 15 to act as ports for the fluid flowing downwardly through drill pipe 11 and the bore of the upper coupling 1. In connection with the bore of the upper coupling 1, it is to be understood that the coupling 1, instead of being a separate member and screw-threadedly received on the box end 5 of the outer barrel, may be an integral part thereof.

25 Referring again to the lower end of the outer barrel 6, this lower end or what is termed a burning shoe head 19 has a lowermost surface 32 which extends upwardly and inwardly. It also has an upper surface 31 which extends downwardly and inwardly, the two surfaces being connected by a cylindrical inner surface 33. The purpose of the lower surface 32 is to permit forcing of the lower end 19 of the outer barrel into the lowermost horizontal surface of the well bore so as to obtain, in practical effect, a seal which will prevent fluid that is descending in the annular space 14 from passing underneath the surface 32 and outwardly into the annulus 13.

30 Referring now to the inner barrel 7 and the lower portion thereof, it will be seen that a trap is formed by means of the radially extending, upwardly curved, resilient fingers 25. These fingers terminate short of the center of the inner barrel 7 and are so bent that fluid will flow past the same and carry heavy objects, such as metal and the like, into the space immediately above the fingers where the same will be retained because of the diameter of the exhaust ports 20, which is somewhat exaggerated as shown to better illustrate the device. The lower end of each resilient finger 25 is attached to the collar 27 by means of rivets 26 or the like. This collar 27 is dove-tail in vertical cross-section so that the angular or flaring surfaces 29 and 28 thereon will mate with the angular surfaces 24 and 21, respectively. The surface 24 is in the form of an undercut made in a thick-

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ened portion 23 of the inner barrel 7, whereas the surface 21 defines the upper edge of the flow shoe 18, which is removably secured to the inner barrel 7 by means of the threads 22. In this way the flow shoe 18 can be very easily removed and any or all of the resilient fingers can be repaired or renewed or the entire collar 27, with a new set of retaining fingers, can be installed. The lowermost end of the flow shoe 18 has affixed thereto in any preferred manner a hardened wearing surface 30 so as to resist the abrasive effect of the fluid where it is forced to turn abruptly from a downward direction to a substantially horizontal direction. If desired, the surface 31 on the burning shoe head can likewise be fitted with a hardened wear surface.

In operation the basket is attached to the lower end of a drill stem 11 or the like and lowered to the bottom of the well bore and rotated, and some downward pressure applied so as to seal the surface 32 of the burning shoe head 19 with the lowermost surface or bottom of the well bore. The valve member, which, as illustrated, is shown in the form of a ball 16, is dropped through the fishing string from the surface. It is guided to the ball seal 10 by means of the guide 15 and will firmly close the opening in the valve seat 10, thus sealing off the inner barrel 7 from the outer barrel 6. Pumping fluid is now caused to flow in the direction as shown by the arrows outwardly and downwardly through the annular space 14.

The fluid next passes between the surfaces 30 and 31 on the flow shoe 18 and the burning shoe head 19, respectively. The fluid then strikes the bottom of the well and is forced to turn abruptly and pass upwardly through the spring fingers 25 with such force that any debris within the confines of the flow shoe and burning shoe head is caused to pass upwardly and be forced over the spring fingers 25. These will of course bend upwardly to permit the passage of the parts and pieces forming the junk in the bottom of the well. The fluid then passes outwardly through the exhaust ports 20 and into the annulus 13 and thence upwardly to the surface of the well.

It will be readily appreciated from the foregoing detailed description of the novel junk basket of the present invention that it is of relatively simple, rugged construction and that the same may be easily assembled from inexpensive and available parts. It will be noted that the entire tool is formed by simple screw-threading, welding, and sawing operations. It will also be observed that all of the various parts are made from conventional materials as distinguished from any element requiring expensive machining and/or molding operations.

In connection with the operation of the device, it will be noticed that the tool is operated entirely by pressure

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of the pump fluid as distinguished from a coring operation. In addition to the foregoing it will be seen that all of the parts are readily removable so that upon wear or breakage of any part the same may be easily repaired or renewed.

The present invention may be embodied in other specific forms without departing from the spirit or essential scope or characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claim are therefore intended to be included therein.

I claim:

A junk basket comprising an outer barrel, means to attach said outer barrel to the lower end of a tubular pipe, an inner barrel mounted in radially spaced relation to said outer barrel, thus forming an annular space, a closure member extending across the top of said inner barrel, an opening in said closure member adapted to be closed by a valve member, an exhaust port leading from the interior of said inner barrel to the exterior of said outer barrel, retaining spring fingers extending radially inwardly from said inner barrel, said inner barrel terminating below said retaining spring fingers and above the lower end of said outer barrel, said retaining spring fingers having their outer ends secured to a collar removably attached to the inside of said inner barrel, said collar having a dove-tail cross-section and being held in place by a removable lower end member on said inner barrel whereby said retaining fingers may be repaired or replaced, whereby when fluid flows to the interior of the upper part of said outer barrel and said valve member is seated in said opening, said fluid is forced to flow downwardly through said annular space and around the lower end of said inner barrel and then upwardly past said retaining spring fingers and finally through said port to the annulus between said outer barrel and the inner surface of a well bore.

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