Nov. 25, 1969 F. CLYNCH 3,480,093

TOTAL RECOVERY CORE CATCHER

Filed Jan. 4, 1968

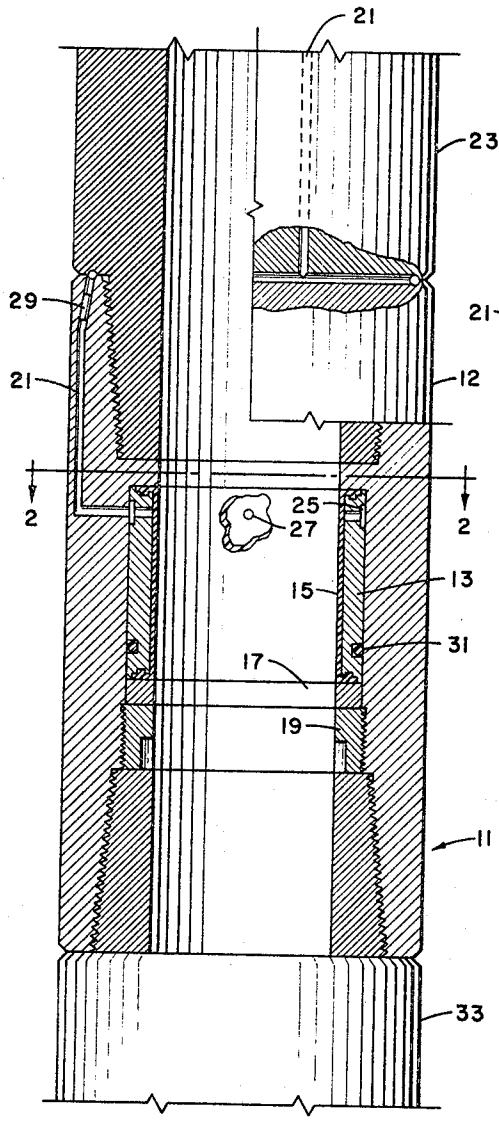


FIG. 1

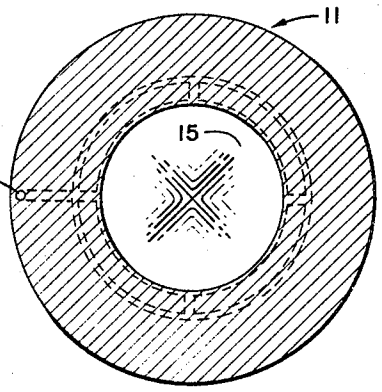


FIG. 2

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TOTAL RECOVERY CORE CATCHER

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U.S. Cl. 175—58 5 Claims

ABSTRACT OF THE DISCLOSURE

A core catcher for collecting liquid, semi-solid or solid cores from a bore hole comprising a hollow housing with an elastic expandable liner positioned inside the housing, said liner being capable of forming a total seal against liquid flow upon being expanded by the application of gas pressure between the interior wall of said housing and said liner.

This invention relates to core drilling and more particularly to devices for removing soft or liquid containing cores.

Soft or friable cores such as sand, coal or the like are difficult to hold and extract with known hollow core barrels due to the cores' disintegrating and crumbling. Core catchers using a wedging action on the core and positioned at the bottom of an associated core barrel are well known. Collapsing fingers to cut off and hold soft cores have also been used. Also it is known to utilize a core catcher having an inner and outer tube with the inner tube being constructed of pliable material which can be collapsed by applying hydraulic force so as to partially seal off the space occupied by the core and in addition a filling of dough-like material has been used in conjunction with said pliable material to aid in sealing off and retaining the semi-solid core.

In accordance with this invention a core catcher is provided which is capable of obtaining a liquid or semi-solid core sample and which is also capable of being used repeatedly. This invention comprises a housing having a passageway therethrough, an elastic liner positioned inside the housing and secured to said housing so that a gas source can be used to expand the elastic liner to form a seal against liquid flow through said housing. Gas may be applied through a separate line for shallow operations, but for deeper operations the standard drill pipe can be equipped with a gas channel to provide the gas necessary to expand said elastic liner. Upon removal of said gas pressure the elastic liner returns to its original position and a new core sample can be obtained.

The invention is illustrated in the accompanying drawings in which:

FIG. 1 is a view of the core catcher, partly in section, and connected to a section of drill pipe having a gas passageway therein.

FIG. 2 is a view taken along the lines 2—2 of FIG. 1 and showing the elastic liner in its expanded position.

Referring to FIG. 1 of the drawings, the total recovery core catcher **11** is attached to a section of drill pipe **23** at one end and to a core cutting bit **33** at the other end. Inside of the housing **12** there is a rigid liner **13**, and inside said rigid liner is a tubular elastic liner **15** having an overlapping lip at its upper and lower ends which is held in place by retaining ring **17** and threaded ring **19**. Both the drill pipe **23** and the housing **12** are equipped with a gas passageway **21**. An O-ring **31** is positioned in a channel of said rigid liner **13** to prevent gas leakage between rigid liner **13** and the interior wall of housing **12**.

In FIG. 2 of the drawings the elastic liner **15** is shown in an expanded position while under gas pressure exerted through passageway **21**. The inwardly expanded elastic liner **15** completely closes off the passageway through the center of housing **12**.

In the operation of the invention a core sample is cut in the normal manner. After the core sample is positioned inside the elastic liner **15**, gas pressure is applied through gas passageway **21** to expand elastic liner **15** inwardly at its mid-portion to seal off the passageway through the center of housing **12**. To insure that gas pressure sufficient to keep elastic liner **15** expanded to maintain a seal against liquid flow through the center of housing **12** and thereby retaining said core sample regardless of its viscosity, a standard check valve **29** can be installed in gas passageway **21**. This check valve will also enable the housing **12**, containing said core sample, to be removed from the bore hole without losing said core sample. For shallow drilling operations the gas pressure can be applied through a separate line from the surface to the total recovery core catcher **11**; however, for deeper operations a gas passageway **21** as shown in FIG. 1 is preferred. In the preferred embodiment the rigid liner **13** is equipped with a gas passageway **25** in communication with the gas passageway **21** of the housing **12** with said gas passageway **25** terminating in a gas port **27**. In the preferred embodiment a plurality of gas ports **27** are used to insure that the passageway through the center of housing **12** will be completely sealed to prevent the liquid part of said core sample from flowing out of said housing.

The elastic liner can be made of any material which is impervious to gas and which will maintain its elasticity under the conditions present in core drilling operations. An example of a material suitable as said elastic liner is rubber.

The rigid liner can be made of any material which will remain rigid under the conditions present in core drilling operations. Examples of materials suitable as said rigid liner are metals, alloys, and rigid plastics.

It will be evident that various details of construction and operation will be modified without departing from the invention as defined in the following claims.

What is claimed is:

1. A total recovery core catcher comprising:

(1) a tubular housing having a passageway therethrough;

(2) a tubular elastic liner positioned inside said housing;

(3) means for securing said tubular elastic liner to said housing at the upper and lower extremes of said tubular elastic liner;

(4) means for expanding the middle portion of said elastic liner inwardly to seal said passageway against liquid flow; and

(5) means for returning said expanded portion of said elastic liner to its original position.

2. A total recovery core catcher as claimed in claim **1** wherein said elastic liner is made of rubber.

3. A total recovery core catcher as claimed in claim **1** wherein said means for securing said elastic liner to said housing comprises a rigid liner having a channel for receiving an upper and lower lip of said elastic liner and in which said elastic liner is placed prior to inserting said rigid liner into said housing and a retaining member for holding said rigid liner in place in said housing.

4. A total recovery core catcher as claimed in claim **1** wherein said means for expanding said elastic liner comprises the housing of claim **1** having a gas passageway therein in communication with a gas source and with the outermost wall of said elastic liner for the passage of a gas sufficient to expand said liner inwardly to form a total seal against liquid flow through said first passageway of claim **1**.

5. A method of obtaining a liquid containing core sample from a bore hole comprising:

(a) placing a core catcher having an elastic liner into said bore hole;

(b) cutting a liquid containing core sample;

(c) filling said core catcher with said liquid containing core sample;

(d) expanding said elastic liner inwardly at its mid-portion seal to retain said liquid containing core sample;

(e) removing said core catcher from said bore hole; and

(f) recovering said liquid containing core sample from said core catcher.

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NILE C. BYERS, JR., Primary Examiner

U.S. Cl. X.R.

75—250; 166—212

U.S. PATENT OFFICE

United States Patent Office

Certificate of Correction

Patent No. 3,480,093 Dated Nov. 25, 1969

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 5, sub-section (d), "to form a total" has been omitted after "portion."

SIGNED AND
SEALED
JUN 2 1970

(SEAL)
Attest:

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