April 6, 1943. F. L. LE BUS 2,315,629

WALL CORE SCRAPER

Filed July 30, 1941

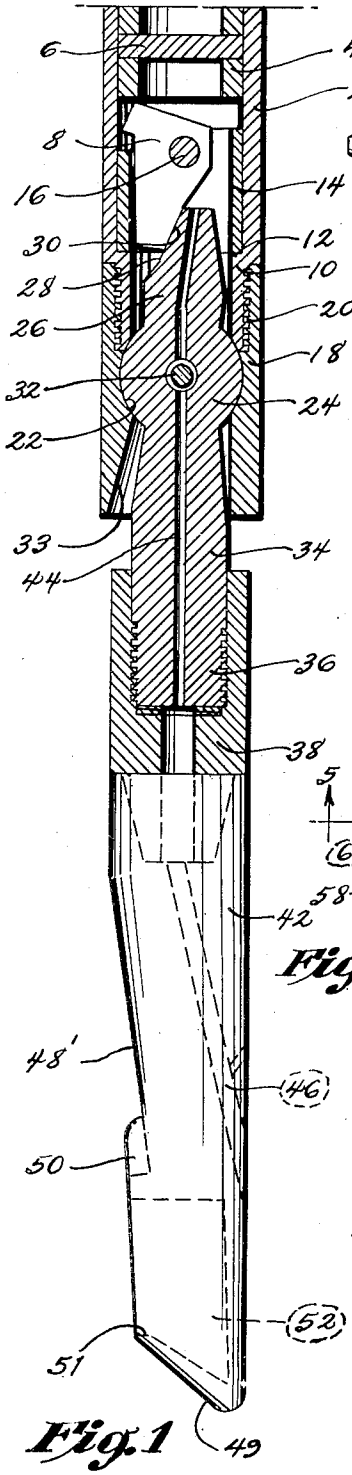


Fig. 1

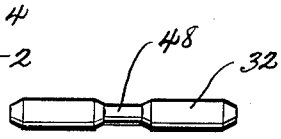


Fig. 3

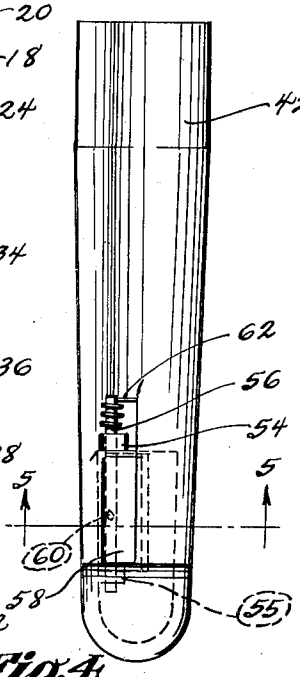


Fig. 4

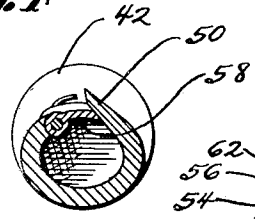


Fig. 5

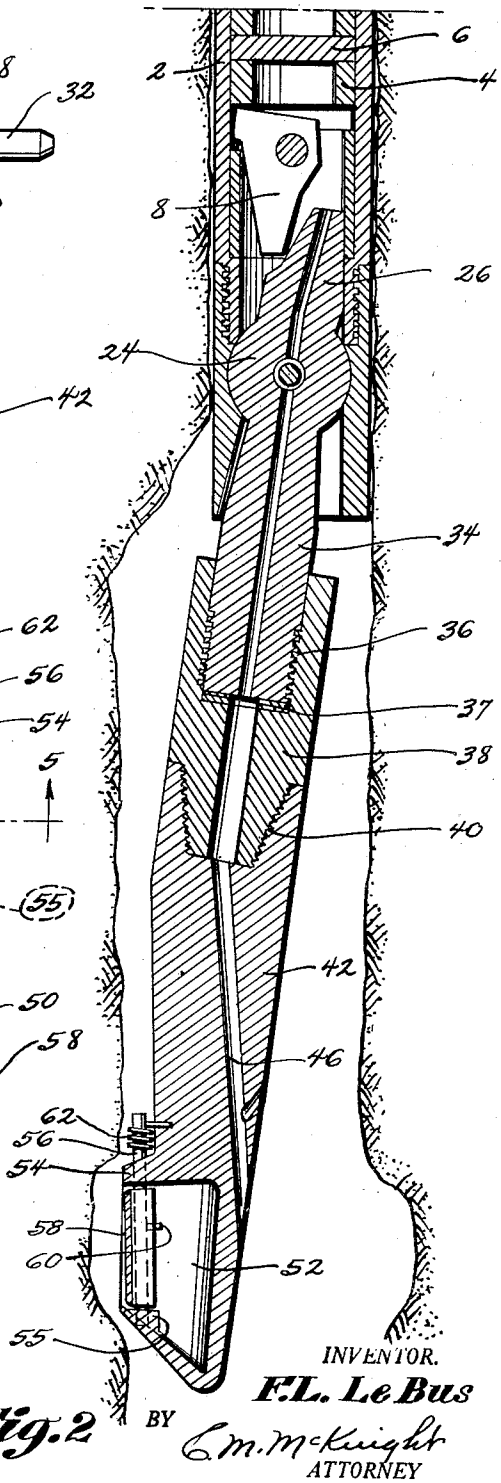


Fig. 2

INVENTOR.
F. L. Le Bus
BY
C. M. McKnight
ATTORNEY

Patented Apr. 6, 1943 2,315,629

UNITED STATES PATENT OFFICE

2,315,629

WALL CORE SCRAPER

Franklin L. Le Bus, Longview, Tex.

Application July 30, 1941, Serial No. 404,736

5 Claims. (Cl. 255—1.4)

This invention relates to a well core scraper for use in well holes, and more particularly, but not by way of limitation, to a core scraper or sampler capable of pivotable movement against the wall of the hole.

Heretofore, samples or cores of the formation structure have been usually taken by lowering a housing containing cylindrical bullets or core barrels into the well to the desired depth and firing the bullets into the wall of the well hole for a considerable distance thereby cutting a core of the formation. The core is retrieved by a flexible connection between a bullet or core barrel and the lowered housing.

It is an important object of this invention to provide a wall core sampler for use in a well hole that may be pivoted to an oblique or angular position in the well hole in order to contact and scrape samples from the side wall thereof.

And still another object of this invention is to provide a pivotable wall core sampler capable of movement against the side wall of the hole, which, upon rotation thereof, bites into the wall and entraps scrapings into a chamber provided therein.

And still an additional object of this invention is to provide a hydraulically actuated core scraper capable of pivotable movement against the side wall of a well hole so constructed and arranged that upon rotation of the wall scraper to force scrapings through a trap door into a chamber for depositing the sample.

And still another object of this invention is to provide a wall core scraper for taking side wall samples of a well hole which can likewise be used for enlarging the hole, and is so constructed and arranged to provide fluid circulation through the scraper and to the bottom of the string thereby insuring against cave-ins of the hole.

And still another object of this invention is to provide a wall core scraper for use in well holes which is simple in construction and capable of easy assembly and disassembly for cleaning, repairs and the like, which is positive in its action and easy to use.

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

In the drawing:

Fig. 1 is a vertical sectional view of the invention with the core scraper in elevation having certain parts omitted and shown out of the well bore.

Fig. 2 is a vertical sectional view of the invention shown disposed in a well bore including the trap door for the scraper and illustrating the knuckle joint and wall core scraper moved to an oblique or angular position upon application of fluid pressure.

Fig. 3 is a detailed view of the anchoring stud for the knuckle joint.

Fig. 4 is a front elevational view of the wall core scraper per se.

Fig. 5 is a view taken on lines 5—5 of Fig. 4.

Referring to the drawing in detail, reference character 2 disclosed a cylindrical member forming an upper housing for the knuckle joint proper. The upper end (not shown) of the housing 2 is secured in any conventional manner to the lower end of a drill stem (not shown). Disposed within the housing 2 is a freely movable cylindrical piston 4 which carries a cross pin 6 utilized to break any sharp circulation of fluid through the tool and prevent washing out of the pivotal control lever 8 disposed below the piston 4.

The inner periphery of the housing 2 is provided with a reduced diameter portion 10 forming a shoulder 12 on which is disposed a cylindrical cage 14. A cross pin or stud 16 is anchored in the cage 14 and in turn supports the freely movable cam lever 8 capable of swinging on the arc of a circle for a purpose as will be hereinafter explained. A lower housing 18 is threaded at 20 to the upper housing 2 and contains the knuckle joint proper. The inner periphery of the housing 18 is constructed with outwardly depending portions 22 forming a ball socket for receiving the knuckle joint or ball 24. The ball 24 is provided with an upper projecting arm 26 having a cam surface 28 cooperating with the cam surface 30 of the lever 8. In addition to supporting the ball socket 22, a supporting pin or stud 32 extends through the knuckle joint 24 and is anchored in diametrically opposite apertures (not shown) provided in the housing 18. In this manner a double support is provided for the ball 24 and the pivot arm 26.

An elongated arm or projection 34 extends downwardly from the joint 24 and is provided at its lower end with threads 36 for securing a connecting collar or apertured sub 38 which in turn is provided with threads 40 for receiving the wall core scraper 42. A set of washers 37 may be interposed between member 34 and collar 38 for adjusting the working side of the scraper to the swinging side of the pivot arm 34, it being understood that these washers may be of irregular thicknesses to provide for this adjustment. The knuckle joint member is provided with a duct 44

extending therethrough and cooperating with a complementary duct 46 in scraper member 42 to allow for passage of circulating fluid from the surface of the well through the tool and into the well hole thereby insuring against cave-ins and the like. The stud 32 is provided with a reduced central portion 48 (note Fig. 3) to allow passage of fluid therearound and through the duct 44.

The scraper member 42 comprises a substantially circular shaft having a portion 48' of its circumference tapering toward its lower end. The scraper body 42 is provided with a tapered lower end portion 49, and extending upwardly therefrom along the tapered portion 48' is an outward projection forming a scraping lip 50 (note Figs. 1 and 5). Adjacent the scraping lip 50 of the body 42 is cut away to form a cavity or recess 52 for a purpose as will be hereinafter explained. An outward shoulder portion 54 projects from the top of the chamber 52 and is in vertical alignment with a shoulder 55 disposed within the chamber.

The shoulders 54 and 55 anchor a hinge pin 56, having the top portion of the pin extending above the shoulder 54. The pin 56 carries a trap door 58 secured to the pin by a set screw 60. A torque spring 62 is anchored around the top of the pin 56 so that one end thereof contacts wall 48' to exert constant tension on the door 58 through the medium of the pin 56 in order to maintain the door normally in closed position with regard to the chamber 52.

Operation

In operation the drill stem, knuckle joint and wall core scraper are lowered into the well to a point where it is desired to take a sample of the structure. Circulation from the mud pumps at the surface of the well (not shown) is started through the drill stem to force the piston 4 downward against the lever 8 which in turn pivots about the stud 16 to cause a complementary movement of the knuckle joint 24 about the stud 32. The housing 18 is cut away at 33 to allow for pivotal movement of the extension 34. Pivotal movement of the joint 24 moves the wall core scraper 42 into contact with the wall of the well bore (note Fig. 2) whereupon rotation of the drill stem causes the scraping lip 50 to bite or cut into the side of the wall and force the scrapings through the trap door 58 and into the chamber 52. The tapered portion 49 cooperates with the scraping lip 50 to cut slightly upward on the wall 51 and the lip 50 is also provided with a horizontal edge 51 disposed under the trap door to prevent scrapings from falling down into the well bore and assure that they will be crowded through the trap door which closes with spring tension when the scraping is stopped.

From the foregoing it will be apparent that the invention provides a wall core scraper capable of contacting the side wall of the well bore for taking samples, enlarging the hole, or the like. Furthermore, it will be apparent that the samples can be taken at various depths in the bore. The wall core scraper is so constructed to allow fluid circulation to the bottom of the string and thus assure against cave-ins from the wall of the well bore. Furthermore, the sampler is sturdy and durable in construction, positive and simple in its action, making it easy to operate without the necessity of technical instruction and the like.

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.

I claim:

1. A well core scraper comprising an elongated body adapted to extend downwardly on an incline from the lower end of a drill stem, said body having a pocket therein, a substantially vertical doorway in the face of the body leading to said pocket, a scraper lip projecting outwardly from the face of said body along a side of the doorway and having a cutting edge arranged lengthwise of the body, a door pivotally connected to the body at the opposite side of the doorway and adapted to swing into the pocket in moving about a substantially vertical axis, and means operatively connected with the door for yieldingly maintaining it in closed position.

2. A well core scraper comprising an elongated body adapted to extend downwardly on an incline from the lower end of a drill stem, said body having a pocket therein, a substantially vertical doorway in the face of the body leading to said pocket, a scraper lip projecting outwardly from the face of said body along a side of the doorway and having a cutting edge arranged lengthwise of the body, a door pivotally connected to the body at the opposite side of the doorway and adapted to swing into the pocket in moving about a substantially vertical axis, means operatively connected with the door for yieldingly maintaining it in closed position, and a fluid conducting passageway extending downwardly through the body.

3. A well core scraper comprising an elongated body adapted to extend downwardly on an incline from the lower end of a drill stem, said body having a pocket therein, a substantially vertical doorway in the face of the body leading to said pocket, a scraper lip projecting outwardly from the face of said body along a side of the doorway and having a cutting edge arranged lengthwise of the body, a door pivotally connected to the body at the opposite side of the doorway and adapted to swing into the pocket in moving about a substantially vertical axis, and means operatively connected with the door for yieldingly maintaining it in closed position, the lower end of the body being inclined downwardly away from the bottom of the doorway.

4. In a device of the character described, a rod-like supporting structure, a member hingedly connected to the supporting structure and having an arm projecting upwardly above the hinge, means mounted in the supporting structure and engageable with the arm for causing the member to move about the hinge, an elongated body arranged below said member and adapted to operate while at an angle to the supporting structure, means rigidly connecting the body to the lower end portion of said member, said body being provided at its lower end portion with a pocket, a doorway at the face of the body leading into the pocket, a scraping blade projecting from the face of the body at one side of the doorway and having a substantially vertically disposed edge, a door adapted to close said doorway and pivotally mounted for movement about a vertical axis extending along the opposite side of the doorway, yielding means operatively connected with the door for normally holding it in closed position, said body having a lower end inclined downwardly away from the bottom of the door-

way, and the cutting edge extending from the top portion of the doorway to said end.

5. In a device of the character described, a supporting structure, a member hingedly connected to the supporting structure and having an arm projecting upwardly above the hinge, means engageable with the arm for causing the member to move about the hinge, an elongated body arranged below said member and adapted to operate at an angle to the supporting structure, means rigidly connecting the body to the lower end portion of said member, said body being provided at its lower end portion with a pocket, a doorway in the face of the body leading into the pocket, a scraping blade projecting from the body and having a substantially vertically disposed edge extending lengthwise at one side of the doorway, a door adapted to close said doorway and pivotally mounted for movement about a vertical axis extending along one side of the doorway, yielding means operatively connected with the door for normally holding it in closed position, said body having a lower end inclined downwardly away from the bottom of the doorway, the cutting edge extending from the top portion of the doorway downwardly to said end, and a fluid conducting passageway extending downwardly through said member, connecting means, and body.

FRANKLIN L. LE BUS.