This invention relates to a side wall sample
taker.

An object of the invention is to provide equip-
ment of the character described adapted to be
lowered into a well and operable to take a sample
of the formation from the side wall of the bore
and to withdraw the same to the ground sur-
face for inspection.

Another object of the invention is to provide
a tool of the character described which may be
anchored at any desired elevation in the well
and which embodies a core barrel and a core
forming device with a deflector for directing the
drill into the side wall of the bore for drilling
a substantial core or sample which will be en-
trapped in the core barrel for withdrawal to the
ground surface.

The invention also embodies novel means for
holding the deflector closely against the side
wall of the bore from which the sample is to be
taken.

The invention also embodies novel means for
connecting the drill stem to the whipstock, or
the deflector, which will allow the core forming
tool to be deflected at the required angle into
the side wall of the bore.

The invention also embodies novel means for
anchoring the deflecting tool in the well bore.

Other advantages will be apparent from the
following description which is illustrated in the
accompanying drawings, wherein:

Figure 1 is a side elevation of the tool as being
lowered into the well and shown partly in section.

Figure 2 is an enlarged, fragmentary, vertical
sectional view taken on the line 2—2 of Figure 1.

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

Figure 4 is an enlarged vertical sectional view
taken on the line 4—4 of Figure 1.

Figure 5 is an enlarged, fragmentary, side
view, partly in section of the anchoring device.

Figure 6 is a cross sectional view thereof taken
on the line 6—6 of Figure 5.

Figure 7 is a side elevation of the tool, partly
in section and in position in a well for taking a
sample, and

Figure 8 is a cross-sectional view taken on the
line 8—8 of Figure 7.

In the drawings the numeral 4 designates an
anchor block which has an elongated tenon 5 which fits up
into the mortise 3 but is somewhat narrower in
width than said mortise, as illustrated in dotted
lines in Figure 1. The tenon is pinned to the de-
flrctor 1 by means of a frangible pin 6 in posi-
tion so that the lower end of the deflector will
be spaced above the upper end of the anchor
block 4. These opposing ends are correspond-
ingly pitched, or tapered, as shown in Figures
1 and 7.

The tenon 5 has a diagonal slot 7 cut there-
through which is pitched to substantially cor-
respond to the pitch of the lower end of the de-
flrctor with its forward end turned downwardly
and its other end turned upwardly; and a pin
8 has its ends anchored to the sides of the de-
flrctor and extends through the slot 1.

Screwed into the lower end of the anchor
block 4 there is a spindle 9 which is securely
held therein against unscrewing by the set screw
10 which is screwed into said block and whose
inner end projects into the spindle.

Beneath the anchor block 4 the spindle is
thickened in diameter forming an external, an-
nular shoulder 11 and surrounding the upper end
of the spindle and supported on the shoulder
11 there is a collar 12 which has the pairs of
radial spaced lugs as 13, 13.

The lower end of the spindle 9 is formed with
the spaced cams 14 which are correspondingly
pitched.

There are the legs 15 whose upper ends are
pivoted between the respective pairs of lugs 13
and whose lower ends are free and are held in
contact with the cams 14 by the outwardly bowed
wiper springs 16. The outer margins of the legs
15 are formed with ratchet teeth so as to readily
engage the side walls of the bore when the legs
are spread by the cams 14.

Fastened to the upper end of the deflector,
whipstock, or the tapering face thereof there is a collar 17 through which the lower sec-
tion 18 of the drill stem extends said section of
the drill stem being pinned to the collar 17 by a
frangible pin 19.

Beneath the collar 17 and screwed on to the
lower end of the drill stem there is a core form-
ing drill 20.

Within the collar 17 there is a spherical cavity
21 and within this cavity there is a ring 22
through which the drill stem 18 extends and this
ring has external antifriction bearings 23 which
ride against the wall of the cavity 21 and the pas-
sageway through the collar 17 for the drill stem
section 18 is larger, in diameter, than the external diameter of said drill stem section so as to give the drill stem section 18 the required range of movement to allow the core drill to follow the angular course of the deflecting face 2 and, for this purpose, the section 18 of the drill stem is connected to the adjacent section above by means of the universal coupling 24.

A tubular core barrel 25 is located in the drill stem section 18 and is supported on the upper end of the drill 20 and has the conventional core catcher 26 within its lower end and an outlet port controlled by the outwardly opening check valve 27 at its upper end.

Drilling fluid may be forced down through the drill stem and around the core barrel 25 and on through the ducts 28 in the drill 20 so as to conduct drilling fluid to the cutting points of the drill.

In operation the tool may be lowered into the well bore 23 to the desired location with the wiper springs 16 in contact with the walls of the bore and with the cross pin 8 in the upwardly turned end of slot 7. When the desired location has been reached the tool may be turned but the wiper springs will hold the collar 12 and the legs 15 against rotating so that the cams 14 will operate against the lower ends of said legs and force the legs outwardly into contact with the walls of the bore so that said legs will support the tool as shown in Figure 7. Additional weight from above will then be applied and the pin 6 will be sheared and the deflector will move on downwardly relative to the anchor block 4 but the cross pin 8 moving on the diagonal slot 7 will cause the deflector to move forwardly into the position indicated in Figures 7 and 8 and in contact with the walls of the bores and with the tapering lower end of the deflector resting upon the tapering upper end of the anchor block 4. The pin 8 will then be seated in the downwardly turned end of slot 7 to maintain the parts in said position. Additional weight from above may be then applied and the pin 13 will be sheared and the core drill will then be lowered and as lowered will be deflected by the face 2 into the side wall of the bore.

As lowered the drill should, of course, be rotated and it will drill out into the sidewall of the bore and will form a core which will pass by the core catcher 26 into the core barrel 25 and will be retained therein. The contents of the core barrel ahead of the entering core may escape past the valve 27. When a sufficient sample has thus been obtained the entire tool may be withdrawn from the bore to the ground surface and broken up for access to, and inspection of, the sample.

Claim 1 includes:

1. A sample taking device comprising, an anchor having means thereon engageable with the walls of a well bore to support the anchor thereon, in a deflector connected to the anchor and downwardly movable relatively thereto, said deflector and anchor being provided with a diagonal slot and the other with a cross pin movable in the slot and forming means for moving the deflector laterally relative to the anchor, and adjacent one side of the bore, upon such downward movement, a core forming tool containing a sample chamber and having a universal connection with the deflector and arranged to be deflected by said deflector into said side of the bore and means having a universal connection with the tool for rotating said tool to form a core from said side wall.

2. A device for taking samples from the side wall of a well bore comprising, an anchoring device engageable with the wall of the well bore, a deflector mounted on the anchoring device having a diagonal slot and movable downwardly and laterally relative to the anchoring device, a cross pin on the anchoring device which works in said slot to cause such lateral movement, a coring tool for rotating the coring tool to form a core of the well formation and a sample receiver in the device for receiving and retaining the core.

3. A sample taking device comprising, an anchor having means thereon engageable with the walls of a well bore to support the anchor thereon, in a deflector connected to the anchor and downwardly movable relatively thereto, the connected parts of the deflector and anchor being provided one with a diagonal guideway and the other with a projection which extends into the guideway thus forming means for moving the deflector laterally relative to the anchor and adjacent one side of the bore, upon such downward movement, a core forming tool containing a sample chamber and having a universal connection with the deflector and arranged to be deflected by the deflector, into the side wall of the bore and means for rotating said tool to form a core of the well formation.

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