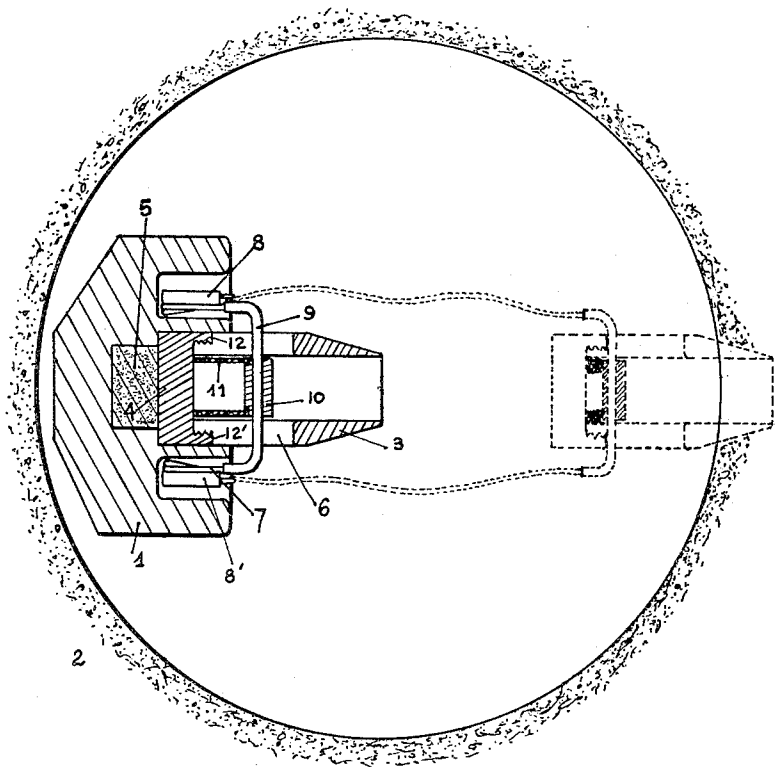
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CORE SAMPLING ARRANGEMENT FOR OPERATION INSIDE GEOLOGICAL LAYERS

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CORE SAMPLING ARRANGEMENT FOR OPERATION INSIDE GEOLOGICAL LAYERS

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4 Claims. (Cl. 175—4)

My invention has for its object improvements in core-sampling arrangements for operation in geological strata and, more particularly although not exclusively, in the side walls of bore holes.

It is a well-known fact that certain apparatus providing for core-sampling in geological layers fire hollow tubular missiles which are urged into the layers by a sort of gun which is brought into the immediate proximity of the layer from which a core is to be removed, the tubular missile being connected with the gun through a retaining cable. When the missiles are urged into layers, they engage and cut out of the latter the desired sample which is thereafter carried inside the tubular missile. When the gun is moved, it carries along with it through the agency of the cable the missile carrying the sample, the missile being finally returned to ground level, where it is an easy matter to remove the sample and to examine it.

It is an object of the invention to provide an improvement in the means connecting the cable with the missile forming the core-sampling tool.

To this end, there is provided a connection between the missile and the gun by means of a single cable secured at each end to the gun and passing through slots formed in the tubular core-sampling tool or missile, said cable being carried as it passes through the missile by a member adapted to be crushed or collapsed so that, at the moment of the firing of the missile and subsequently, the sudden stress exerted on the cable may be damped or reduced to prevent any breaking of the latter.

Further objects and features of my invention will appear in the reading of the following description, reference being made to the accompanying drawing illustrating diagrammatically by way of example and by no means in a limiting sense a preferred embodiment of my invention. The single figure of the accompanying drawing is a horizontal cross-section of a core-sampling apparatus operating with a charge of gunpowder inside a bore hole and incorporating the principle of my invention.

In said figure, 1 designates a gun-shaped section of a core-sampling apparatus lying inside the bore-hole 2 and adapted, as well known per se, to project transversely of the bore-hole a succession of core-sampling tools or missiles into the side wall of said bore-hole with a view to removing samples therefrom. The cross-section illustrated passes through one of the core-sampling tools or missiles.

Generally and as well known per se, a plurality of core-sampling tools are arranged at different levels and in superposed formation inside the body of the apparatus. The actual core-sampling tool is constituted by a tubular member 3 closed at its rear end by a socket 4 behind which is provided inside the gun-shaped section 1 a charge of gun-powder 5 adapted when fired in any known or suitable manner to project the tool into the ground.

According to my invention, the core-sampling tool is provided in its side wall with lateral slots 6 which serve, on the one hand, for the free flow of the borehole liquid out of the tubular member 3 when the tool enters the geological stratum to be examined, said slots serving on the other hand as a transverse passage for the tool-retaining cable 7 which is wound and secured in a conventional manner through its ends 8 and 8' inside corresponding recesses formed in the body of the core-sampling apparatus. Said cable passes through a copper tube 9 which has received previously the shape of a broad U, as illustrated, and which passes through a disc or plate 10 fitted inside the core-sampling tool 3, said disc being secured to the outer end of a tubular sleeve 11 made of a suitable synthetic resin, such as that sold under the name of Bakelite for instance, and housed coaxially inside the tubular section of the missile tube 3.

The arrangement described operates as follows: when the gun has been fired and under the action of inertia, the cable 7 has a tendency to hold back the missile so that the sleeve 11 collapses slightly under the action of the section of the cable passing through the core-sampling missile and when the latter has entered the side wall of the bore-hole, as illustrated in dotted lines in the drawing, the copper tube 9 engages the rear ends 12 and 12' of the slots 6 closed by the socket 4. By reason of the presence of the shock-damping means including the collapsible sleeve 11, there is no risk of the cable 7 breaking. The core-sampling tool is removed simply by drawing outwardly and upwardly the body of the apparatus 1 through action on the main cable supporting the apparatus, the cable 7 remaining attached to the apparatus carrying along with it the missile enclosing the desired sample.

The arrangement according to the invention ensures furthermore the advantage consisting in that, during the removal of the apparatus and its raising up to ground level, the cable 7 engaging the rear section of the missile draws the latter along through its rear end, which condition, for certain samplings, is more favorable than the condition according to which the missile is drawn along forwardly.

Obviously, many modifications may be brought to the arrangement, without unduly widening its scope as defined in the accompanying claims.

What I claim is:

1. In a core-sampling arrangement, the combination of at least one gun-shaped section including a charge-carrying chamber, a missile to be inserted in said section and including a tubular body open at its front end and having a closed rear end which is adapted to be subjected to the firing of the charge in the charge-carrying chamber, said body being provided in its side wall with two longitudinal slots on opposite sides thereof extending rearwardly to a point adjacent the rear end of said tubular body, a cable the ends of which are operatively connected to the gun-shaped section on each side of the missile therein and the medial portion of which passes through said missile slots and across the interior of said tubular body of the missile, and collapsible means positioned rearwardly within said tubular body and in front of and in longitudinally spaced apart relation to the rear ends of said slots for supporting that portion of said cable passing across the interior of said tubular body, said means being capable of rearward collapse in a direction toward the rear ends of said slots to damp the thrust exerted on the cable upon firing of the missile.

2. In a core-sampling arrangement, the combination of at least one gun-shaped section including a charge-carrying chamber, a missile to be inserted in said section and including a tubular body open at its front end and having a closed rear end which is adapted to be subjected to the firing of the charge in the charge-carrying chamber, said body being provided in its side wall with two longitudinal slots on opposite sides thereof extending rearwardly to a point adjacent the rear end of said tubular body, a cable the ends of which are operatively connected to the gun-shaped section on each side of the missile therein and the medial portion of which passes

through the missile slots, a collapsible tubular member carried by the rear end of the tubular body and extending forwardly inside the latter clearly beyond the rear ends of the slots and capable of collapse in a direction towards the rear end of the slots, a transversely perforated cover carried by the front end of the collapsible member for supporting the medial section of the cable within the transverse perforation, the collapsible member being adapted to damp the thrust exerted on the medial portion of the cable upon firing of the missile by allowing said medial portion to recede into contact with the rear ends of the slots.

3. The apparatus of claim 2 wherein said tubular member comprises a frangible material.

4. The apparatus of claim 2 further comprising a metallic sheath surrounding said medial section of said cable.

References Cited in the file of this patent

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,016,959 January 16, 1962

Bruno Pierre Berthelin

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, between lines 7 and 8, insert the following:

Claim priority, application France June 24, 1957

Signed and sealed this 8th day of May 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents