A correction system for use in carrying out line-operations in an underwater borehole.

In recent years the search for petroleum has extended to underwater rock formations and this has necessitated drilling operations in offshore drilling platforms. The operation of the correction system is to eliminate this influence of tide and wave action except the conductor pipe.

According to the invention a correction system for use during line-operations is carried out from a floating vessel which has a winch for unwinding borehole lines and a series of one or more pulleys for directing the borehole line into a borehole, comprises a correction line connected to a point fixed relative to the earth and to a correction pulley and in engagement with the borehole line, the connection to the fixed point being such that a downward motion of the vessel tightens, and an upward motion slackens, the correction line and the connection to the correction pulley being such that the tightening of the correction line is transferred to the borehole line so as to take it in, and the slackening so as to pay it out, whereby the length of borehole cable paid out is adjusted to correct for the vertical motion of the floating vessel.
motion from the borehole line 11 will be explained by considering a downward motion of the vessel. This downward motion is equivalent to an upward motion of the point 17 while all other points remain stationary and the mode of operation will be explained from this point of view since this is easier to follow.

An upward motion of the point 17 through a distance 2x pulls this quantity of the correction line 16 out of the loop 21 so that the secondary correction pulley 19 is pulled upwards through a distance x. The upward motion of the secondary correction pulley 19 is transferred to the upper borehole line pulley 14, that is, a correction pulley, and this has the effect of increasing the size of the loop 20 to take in a quantity 2x of the borehole line 11. The borehole line is restrained from paying out by the winch and therefore a quantity 2x of borehole line is taken in on the borehole side of loop 20. Thus the borehole line 11 on the borehole side of loop 20 shares the motion of the point 17.

We will now consider a downward motion of the point 17 (actually an upward motion of the vessel) through a distance of 2x. The tension in the borehole line 11 due to the weight of the tool in the borehole maintains the tension in correction line 16 so that the amount of correction line paid into the correction system is taken into loop 21: this allows pulleys 19 and 14 to fall through a distance x, thus paying out a quantity 2x on the borehole side of loop 20. Again the borehole line 11 shares the motion of the point 17.

Reverting to the more conventional view point (in which the point 17 is fixed and all other points move) it can be seen that the correction system has the effect of correcting the borehole line 11 for the motion of the floating vessel.

FIGURE 2 shows a modification in which the borehole line 11 passes over the deck pulley 13 and around correction pulley 14 and then over the travelling block which guides the borehole line 11 into the conductor pipe 10 and therefore into the borehole.

The correction system comprises the correction line 16 which is made fast to fixed point 17 on conductor pipe 10. The correction line 16 passes around the adjustment pulley 18, is looped round the secondary correction pulley 19 and passed back to the mounting of the adjustment pulley 18 where it is secured. The secondary correction pulley 19 is connected to correction pulley 14 so that the tension in the borehole line 11 is applied to the correction line 16. With this arrangement the correction pulley 14 is situated below deck and functions in the same way as the upper logging pulley in the prior art arrangement. It will be apparent that this arrangement functions in the same way as that described in FIGURE 1.

I claim:

1. In a floatable rig for carrying out line operations in an underwater borehole, said rig comprising a borehole-line, a winch for unwinding the borehole-line and at least one pulley for directing the borehole-line into the borehole, a correction system which comprises a correction line connected to a point fixed relative to said rig and to a point fixed relative to earth, a correction pulley which engages with the borehole-line, and a secondary correction pulley which is connected to said correction pulley and engages with said correction line between said points such that a downward motion of the floatable rig tightens, and an upward motion slackens, the correction line and said tightening and slackening are transferred to the borehole-line by the correction pulley so as to take it in and pay it out whereby the length of borehole-line payed out is adjusted to correct for the vertical motion of the floatable rig said correction system includes a conductor pipe which provides the point fixed relative to the earth to which said correction line is connected and wherein an adjustment pulley is secured to the rig at a point which is always below the level at which the correction line is secured to the conductor pipe, said correction system includes a traveling block connected to said rig and providing the point fixed relative to said rig to which said correction line is connected, the correction line passing, in sequence from the conductor pipe, over the adjustment pulley, the traveling block and the secondary correction pulley before being connected to the traveling block, whereby a downward motion of the rig and hence the pulley tightens, and an upward motion slackens, the correction line.

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EDWARD A. SROKA, Primary Examiner.
EVON C. BLUNK, Examiner.
H. C. HORNBY, Assistant Examiner.