

May 15, 1956

M. A. GARRISON

2,745,189

HYDRAULIC CONTROL MECHANISM FOR DRIFT RECORDERS

Filed Jan. 10, 1955

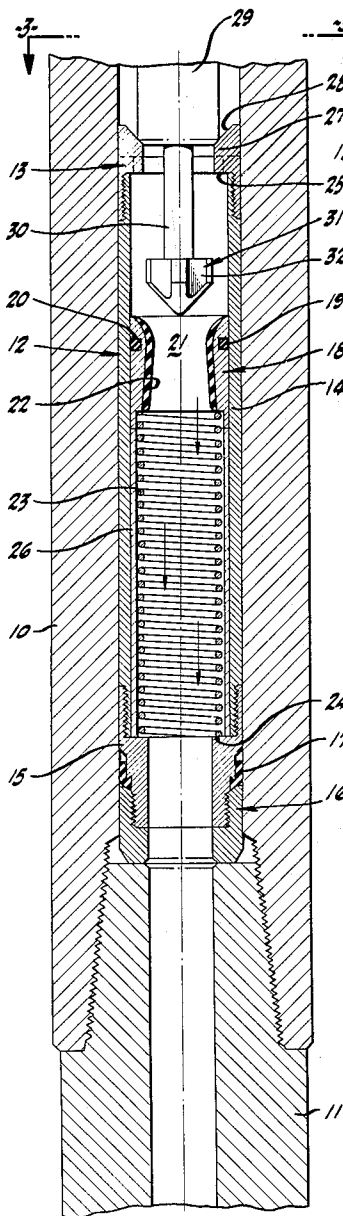


FIG. 1

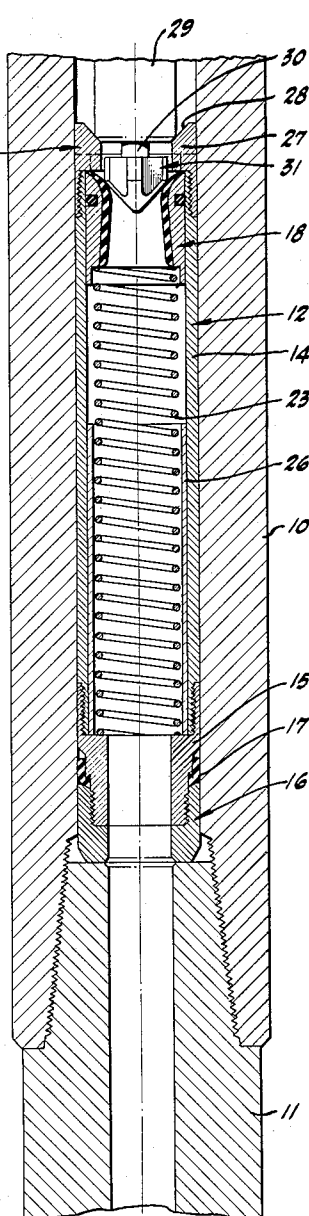


FIG. 2

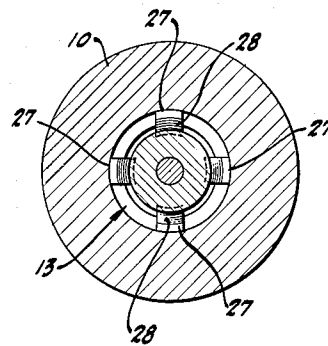


FIG. 3

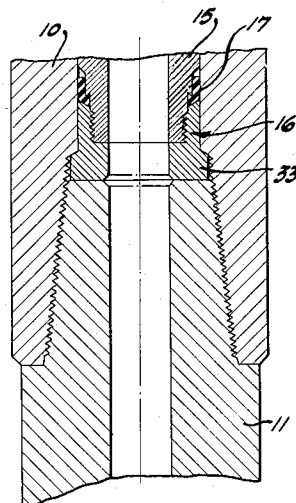


FIG. 4

INVENTOR.
MARION A. GARRISON

BY

Mellin and Hanson
ATTORNEYS

1

2,745,189

HYDRAULIC CONTROL MECHANISM FOR DRIFT RECORDERS

Marion A. Garrison, South Pasadena, Calif., assignor, by mesne assignments, to Johnston Testers, Inc., Houston, Tex., a corporation of Texas

Application January 10, 1955, Serial No. 480,784

6 Claims. (Cl. 33—205.5)

This application relates to a hydraulic control unit for actuating a drift recording instrument. More particularly, the invention relates to a hydraulic control unit for actuating a resettable drift recording instrument of the type having an actuating spear point projecting downwardly therefrom, wherein the instrument is actuated by upward movement of the spear point relative to the remainder of the recording instrument. A typical drift recording instrument of this type is shown in Figs. 6 and 7 of Patent No. 2,563,359 issued to E. G. Peebles on August 7, 1951.

In the prior use of instruments of this type, the recording unit was lowered through the well string on a wire line, until the spear point contacted and was supported by a suitable seat formed in the lower end of the drill collar. Multiple recordings were made by raising the instrument to permit resetting thereof and subsequently lowering to again actuate the spear point to record the drift angle.

It is the principal object of this invention to provide a control unit which may either be inserted in the drill string during the make-up thereof, or may be pumped down through the string to seat in the lower end thereof, wherein the drift recording instrument may be lowered or dropped through the string into contact therewith, and the spear point thereof actuated by stopping the mud pumps and the device reset by starting the pumps.

A preferred form of the invention is described in the following detailed specification and illustrated by way of example in the accompanying drawings, wherein:

Fig. 1 is a sectional view of a device embodying the principles of the invention, shown with the mud pumps operating.

Fig. 2 is a similar view to that shown in Fig. 1, but with the mud pumps stopped.

Fig. 3 is a plan view of the upper end of the control unit per se.

Fig. 4 shows a modified form of the lower end of the device.

Referring now to the drawings, wherein similar reference numerals denote the same elements throughout the various views shown, 10 indicates a drill collar adapted to be connected to the lower end of a drill string (not shown), and 11 indicates a drill bit threadedly connected to the lower end thereof.

The control device, generally indicated at 12, comprises an annular cap 13, an intermediate tubular member 14, a lower tubular member 15, and a tubular nosepiece 16 all threadedly connected together. A cup-shaped packer 17 is mounted on the lower member 15 and held thereon by the upper end of the nosepiece 16. A sleeve 18 is slidably mounted within the intermediate section 14. An O-ring seal 19 is mounted in a suitable groove 20 in the exterior of the sleeve 18 and contacts the inner wall of the intermediate section 14 to seal therebetween. The sleeve 18 is provided with a venturi-shaped longitudinal passage 21 lined with a resilient abrasion resistant material 22. One end of a spring 23 abuts the lower end of the sleeve 18, and the other end abuts an upwardly facing shoulder 24 on the lower section 15, urging the sleeve to-

2

ward its uppermost position against the downwardly facing shoulder 25 on the cap 13, in the manner illustrated in Fig. 2. A sleeve 26 surrounds the spring 23 within the intermediate section 14. The sleeve 26 also rests on the shoulder 24 and acts both as a spring guide and as a stop member to limit the downward movement of the sleeve 18, in the manner illustrated in Fig. 1.

The cap 13 is provided with a plurality of inwardly extending fingers 27. The fingers 27 extend upwardly from the cap 13 and the upper end of each is formed with a downwardly and inwardly tapered upper surface 28 adapted to receive the lower end of the housing 29 of a drift recorder. As best seen in Fig. 3, the external diameter of the recorder housing 29 is smaller than the internal diameter of the cap 13, thus permitting fluid to flow downwardly therepast between the fingers 27 even when said housing is seated on the surfaces 28. An actuating rod 30, terminating in a spear point 31, extends downwardly from the bottom of the housing 29. The spear point 31 is relieved at several points, as indicated at 32, to permit fluid to flow therepast as the well string is withdrawn from the well, even when the spear point is in contact with the sleeve 18. The major diameter of the spear point 31 is less than the distance between the opposing faces of the inwardly extending fingers 27, thus permitting the spear point 31 to pass therethrough.

When it is desired to make a drift recording, the hydraulic control unit 12 is inserted in the upper end of the well string and pumped down until the bottom of the nosepiece 16 seats against the upper end of the bit 11. It will be noted that the outer surface of the control unit 12 forms a sliding fit within the tubular drill collar 10, which is usually of smaller internal diameter than the remainder of the well string. In view of the sliding fit, the control unit 12 will be concentric with the collar 10. The size of the venturi passage 21 and the strength of the spring 23 are chosen so that the normal pressure drop through the venturi 21 is insufficient to compress the spring 23 and move the sleeve 18 downwardly away from the bottom of the fingers 27.

After the control unit 12 is seated, the drift recorder is inserted in the well string and lowered or dropped there-through until the housing 29 rests on the fingers 27. As the spear point 31 approaches the throat of the venturi 21, the restriction therethrough is increased, and the pressure drop thereacross increases to force the sleeve 18 downwardly compressing the spring 23. When the mud flow is stopped or materially reduced, the spring 23 forces the sleeve 18 upwardly, raising the spear point 31, and moves the rod 30 upwardly relative to the housing 29 to actuate the recorder. If it is desired to make a multiple record, it is merely necessary to restart the pumps to force the sleeve 18 downwardly again to permit the rod 30 to extend and reset the recorder, and subsequently again stop the pumps. In this manner, several recordings may be made by merely starting and stopping the mud pumps.

In the modified form of the invention shown in Fig. 4, the nosepiece 16 is provided with an outwardly extending flange 33 adapted to be confined within the joint between the upper end of the drill bit and the lower end of the collar, when the string is initially made up. The operation of this modified form is the same in all respects as that described above, with the exception that the hydraulic control unit 12 is already in place within the collar 10.

From the above description it may be seen that I have provided a simple efficient hydraulic control unit for actuating a drift recorder within a drill collar, wherein multiple recordings may be made by merely starting and stopping the mud pumps.

While I have shown the preferred form of my invention, it is to be understood that various changes may be

made in its construction by those skilled in the art, without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a control unit for use with a drift recorder having a housing and an actuating spear point extending downwardly therefrom, a tubular member adapted to be received within a drill collar, means adjacent the upper end of said tubular member adapted to be contacted by and support the lower end of said housing with said spear point extending downwardly through said means, a sleeve slidably mounted in said tubular member below said annular seat, a restricted passageway extending through said sleeve, said passageway being smaller in diameter than the external diameter of said spear point, means yieldably urging said sleeve toward its uppermost position, whereby fluid moving downwardly through said drill collar will urge said sleeve downwardly out of contact with said spear point and whereby stopping the downward movement of said fluid will permit said yieldable means to urge said sleeve upwardly to raise said spear point and actuate said drift recorder.

2. In a control unit for use with a drift recorder having a housing and an actuating spear point extending downwardly therefrom, a tubular member adapted to be received within a drill collar, a plurality of inwardly extending fingers at the upper end of said tubular member, said fingers being adapted to be contacted by and support the lower end of said housing with said spear point extending downwardly therebetween, a sleeve slidably mounted in said tubular member below said fingers, a restricted passageway extending through said sleeve, said passageway being smaller in diameter than the external diameter of said spear point, means yieldably urging said sleeve toward its uppermost position, whereby fluid moving downwardly through said drill collar will urge said sleeve downwardly out of contact with said spear point, and whereby stopping the downward movement of said fluid will permit said yieldable means to urge said sleeve upwardly to raise said spear point and actuate said drift recorder.

3. In a control unit for use with a drift recorder having a housing and an actuating spear point extending downwardly therefrom, a tubular member adapted to be received within a drill collar, a plurality of inwardly extending fingers at the upper end of said tubular member, said fingers being adapted to be contacted by and support the lower end of said housing with the spear point extending downwardly therebetween, a sleeve slidably mounted in said tubular member below said fingers, said sleeve having a venturi-shaped central passage therethrough, the throat of said venturi passage being smaller in diameter than the external diameter of said spear point, means yieldably urging said sleeve toward its uppermost position, whereby fluid moving downwardly through said drill collar will urge said sleeve downwardly out of contact with said spear point, and whereby stopping the downward movement of said fluid will permit said yieldable means to urge said sleeve upwardly to raise said spear point and actuate said drift recorder.

4. In a control unit for use with a drift recorder having a housing and an actuating spear point extending downwardly therefrom, a tubular member adapted to be received within a drill collar, a plurality of inwardly extending fingers at the upper end of said tubular member,

said fingers being adapted to be contacted by and support the lower end of said housing with the spear point extending downwardly therebetween, a sleeve slidably mounted in said tubular member below said fingers, said sleeve having a venturi-shaped central passage therethrough, said venturi-shaped passage being lined with a resilient abrasive resistant material, the throat of said venturi passage being smaller in diameter than the external diameter of said spear point, means yieldably urging said sleeve toward its uppermost position, whereby fluid moving downwardly through said drill collar will urge said sleeve downwardly out of contact with said spear point, and whereby stopping the downward movement of said fluid will permit said yieldable means to urge said sleeve upwardly to raise said spear point and actuate said drift recorder.

5. In a control unit for use with a drift recorder having a housing and an actuating spear point extending downwardly therefrom, a tubular member adapted to be received within a drill collar, an upwardly facing cup-shaped packer on said tubular member adapted to seal against the inner wall of said collar, means adjacent the upper end of said tubular member adapted to be contacted by and support the lower end of said housing with the spear point extending downwardly through said means, a sleeve slidably mounted in said tubular member below said supporting means, a restricted passageway extending through said sleeve, said passageway being smaller in diameter than the external diameter of said spear point, means yieldably urging said sleeve toward its uppermost position, whereby fluid moving downwardly through said drill collar will urge said sleeve downwardly out of contact with said spear point, and whereby stopping the downward movement of said fluid will permit said yieldable means to urge said sleeve upwardly to raise said spear point and actuate said drift recorder.

6. In a control unit for use with a drift recorder having a housing and an actuating spear point extending downwardly therefrom, a tubular member adapted to be received within a drill collar, an external flange on the lower end of said tubular member adapted to be confined within the joint between the lower end of said drill collar and a bit connected thereto, a plurality of inwardly extending fingers at the upper end of said tubular member, said fingers being adapted to be contacted by and support the lower end of said housing with the spear point extending downwardly therebetween, a sleeve slidably mounted in said tubular member below said fingers, a restricted passageway extending through said sleeve, said passageway being smaller in diameter than the external diameter of said spear point, means yieldably urging said sleeve toward its uppermost position, whereby fluid moving downwardly through said drill collar will urge said sleeve downwardly out of contact with said spear point, and whereby stopping the downward movement of said fluid will permit said yieldable means to urge said sleeve upwardly to raise said spear point and actuate said drift recorder.

References Cited in the file of this patent

UNITED STATES PATENTS

1,593,150	Von Wursterberger	July 20, 1926
1,930,832	Wickersham et al.	Oct. 17, 1933
2,128,352	Creighton	Aug. 30, 1938
2,482,224	Swearingen	Sept. 20, 1949