June 17, 1952 B. R. McKINLEY 2,601,122

FORMATION TESTER AND PIPE PERFORATOR
WITH CONTROL MEANS THEREFOR
Filed March 29, 1947

Fig. 1.

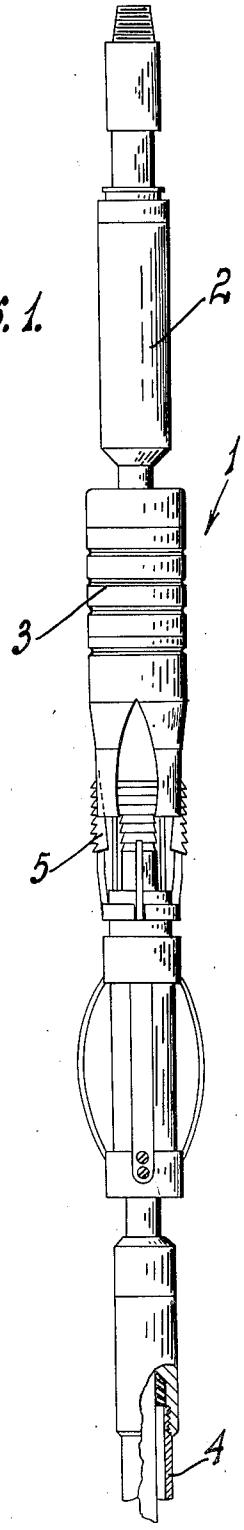


Fig. 2.

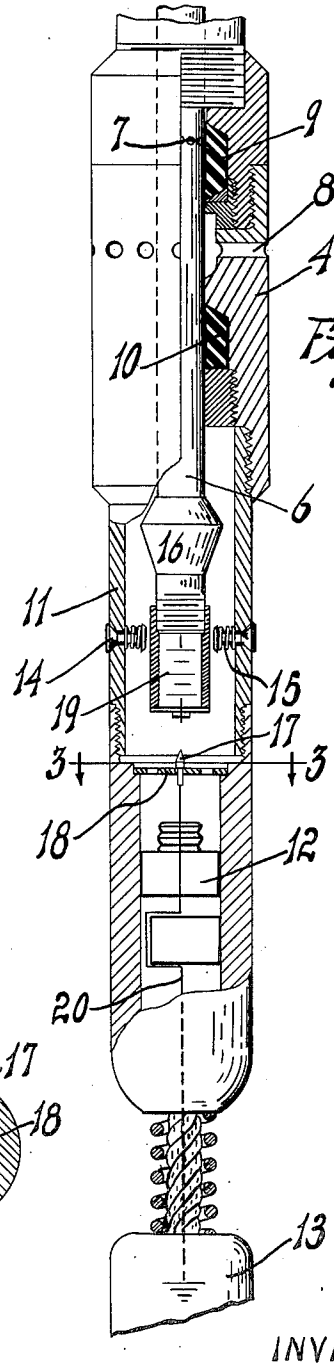
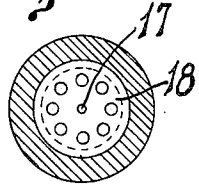


Fig. 3.



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2,601,122

FORMATION TESTER AND PIPE PERFORATOR WITH CONTROL MEANS THEREFOR

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Application March 29, 1947, Serial No. 738,189

4 Claims. (Cl. 166—1)

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This invention is a modification of my copending application on Formation Tester and Pipe Perforator, Serial Number 738,190, filed March 29, 1947, now Patent No. 2,588,746, granted March 11, 1952. This invention is used in conjunction with a formation tester, preferably of the type disclosed in my Patent No. 2,197,078, issued April 16, 1940.

An object of this invention is to provide a formation tester and pipe perforator with a self-contained firing means for the pipe perforator, said firing means being so arranged that the gun perforator is fired before the pressure valves are opened to admit fluid pressure to the pressure recorder.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a fragmentary side elevation of the formation tester.

Figure 2 is a side elevation of the lower part of my tool with parts broken away to show interior construction.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

The specific embodiment of my present invention as disclosed in this application is shown and described as placed in a formation tester disclosed in my prior patent, No. 2,197,078, but may be used with other tools in the oil industry of the same type and I do not regard my invention as limited to the exact details of construction disclosed.

Referring more particularly to the drawing, the formation tester 1 comprises a control head 2 which operates in substantially the same manner as described in my prior Patent No. 2,197,078. A packer 3 is arranged below the control head 2 and a ported intake sleeve 4 is mounted below the packer 3. This packer includes longitudinally slidable dogs 5, which operate in a usual and well known manner, and also as described in Patent No. 2,005,955, as well as in others.

A sampling tube 6 extends downwardly from the control head 2 and through the intake sleeve 4. The sampling tube is provided with ports 7 and these ports are alignable with the ports 8 in the intake sleeve, to permit fluid to enter the sampling tube and thus can be removed to the surface. Spaced packings 9 and 10 in the intake sleeve 4 surround the sampling tube 6 and also serve to seal off the port 7 when the sampling tube is in a position where the packings are on opposite sides of these ports. This construction is also described

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in detail in my prior patent above described. A pipe 11 screws into the intake sleeve 4 and extends downwardly a sufficient distance to enclose a pressure recorder 12.

A gun perforator 13 is mounted in pipe 11 below the pressure recorder and this gun perforator when operated drives bullets into the casing to perforate the same. This type of gun perforating is usual and well known in the art and the detailed construction of the same forms no part of this invention. The explosion of the shells in the gun perforator cause a considerable pressure in the well and it is desirable to prevent this pressure from being recorded on the recorder 12. One or more valves 14 are mounted in the pipe 11 and open outwardly. These valves are normally held closed by the springs 15. A cam 16 on the lower end of the sampling tube 6 engages the stems of the valves 14 to open the same when the sampling tube is lowered the distance necessary to align the ports 7 and 8.

A contact 17 is mounted in and projects upwardly from a frangible plate 18 which extends across the pipe 11 above the pressure recorder 12. A battery case 19 is mounted on the lower end of sampling tube 6 below the cam 16 and this battery case will engage the contact 17 to fire the gun perforator 13 before the cam 16 engages the valves 14. A wire or electrical conductor 20 connects the contact 17 with the gun perforator 13. Once the gun has been fired, the plate 18 will shatter or shear through, thus permitting the sampling tube 6 to be moved downwardly a predetermined distance and this further downward movement of the sampling tube will cause cam 16 to engage and open the valves 14 and at the same time will align the ports 7 and 8. Further downward movement of the sampling tube 6 will permit the valves 14 to close and will move the ports 7 out of registry with the ports 8.

Having described my invention, I claim:

1. A formation tester and pipe perforator, including an intake sleeve having a hole extending into the same, a sampling tube extending axially through the sleeve and slidable in the sleeve, said tube having an intake port therein, said hole and port being alignable to permit entrance of fluid into the tube, a control head on the upper end of the tester, means threadably coupling the sampling tube to the control head, said means imparting longitudinal movement to the sampling tube on rotation of the sampling tube relative to the control head to align the hole in the intake sleeve with the port in the tube, a pipe depending from the intake sleeve, a pressure re-

corder mounted in said pipe, valve means in the pipe opening from the exterior of the pipe to said pressure recorder and means on said sampling tool operable on said longitudinal movement of said sampling tube to engage and open said valve means, a pipe perforator attached to the pipe below said pressure recorder, said pipe perforator being of the gun type, a battery carried by said sampling tube, an electrical contact in said pipe engageable by the battery on said longitudinal movement of the sampling tube, and an electrical conduit connecting said contact and the pipe perforator.

2. A formation tester and pipe perforator, including an intake sleeve having a hole extending into the same, a sampling tube extending axially through the sleeve and slidable in the sleeve, said tube having an intake port therein, said hole and port being alignable to permit entrance of fluid in the tube, a control head on the upper end of the tester threadably coupling the sampling tube to the control head, said means imparting longitudinal movement to the sampling tube on rotation of the sleeve relative to the tube to align the hole in the sleeve with the port in the tube, a pipe depending from the intake sleeve, a pressure recorder mounted in said pipe, valve means in the pipe opening from the exterior of the pipe to said pressure recorder and means on said sampling tool operable on said longitudinal movement of said sampling tube to engage and open said valve means, a pipe perforator attached to the pipe below said pressure recorder, said pipe perforator being of the gun type, a battery carried by said sampling tube, an electrical contact in said pipe engageable by the battery on said longitudinal movement of the sampling tube, and an electrical conduit connecting said contact and the pipe perforator, said contact being mounted on a frangible disk, said frangible disk being engaged and broken by the battery after engaging said contact.

3. A formation tester and pipe perforator, including an intake sleeve having a hole extending laterally into the same, a sampling tube extending axially through said sleeve and longitudinally movable therein, said sampling tube having an intake port therein, said hole and port being alignable to permit entrance of fluid into the tube, a control head on the upper end of the tester wall gripping means coupled to the control head whereby said head is held against rotation in a bored hole, means threadably coupling the control head and the sampling tube, whereby rotation of said control head will impart longitudinal movement to said sampling tube in the control head, whereby said hole in the sleeve is opened and closed, a pipe connected to and extending below the intake sleeve, a pressure recorder mounted in said pipe, said pipe having ports in the wall thereof, valve means mounted in the ports in said pipe and opening to the pressure recorder, a cam on the sampling tube, said cam engaging the valve to open the same on said longitudinal movement of the sampling tube, a gun perforator attached to said pipe below the pressure recorder, a battery mounted on said sampling tube, an electrical contact in said pipe engageable by the battery on said longitudinal movement of the sampling tube, and an electrical conductor connecting said contact and the pipe perforator.

4. A formation tester and pipe perforator, including an intake sleeve having a hole extending laterally into the same, a sampling tube extending into said sleeve and longitudinally movable therein, said sampling tube having an intake port therein, said hole and port being alignable to permit entrance of fluid into the tube, a control head on the upper end of the tester, wall gripping means coupled to the control head whereby said head is held against rotation in a bored hole, means threadably coupling the control head and the sampling tube, whereby rotation of said sampling tube relative to said control head will impart longitudinal movement to said sampling tube, whereby said hole in the sleeve is opened and closed, a pipe connected to and extending below the intake sleeve, a pressure recorder mounted in said pipe, said pipe having ports in the wall thereof and valve means mounted in said ports to open and close them, a cam on the sampling tube, said cam engaging the valve to open the same on said longitudinal movement of the sampling tube, a gun perforator attached to said pipe below the pressure recorder, a battery mounted on said sampling tube, an electrical contact in said pipe and engageable by the battery on said longitudinal movement of the sampling tube, and an electrical conductor connecting said contact with the pipe perforator, said contact being mounted on a frangible disk in said pipe, said frangible disk being broken by the battery after engaging said contact.

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The following references are of record in the file of this patent:

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