April 4, 1939. R. SVADLENAK 2,152,980

TESTING TOOL

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Fig. 2.

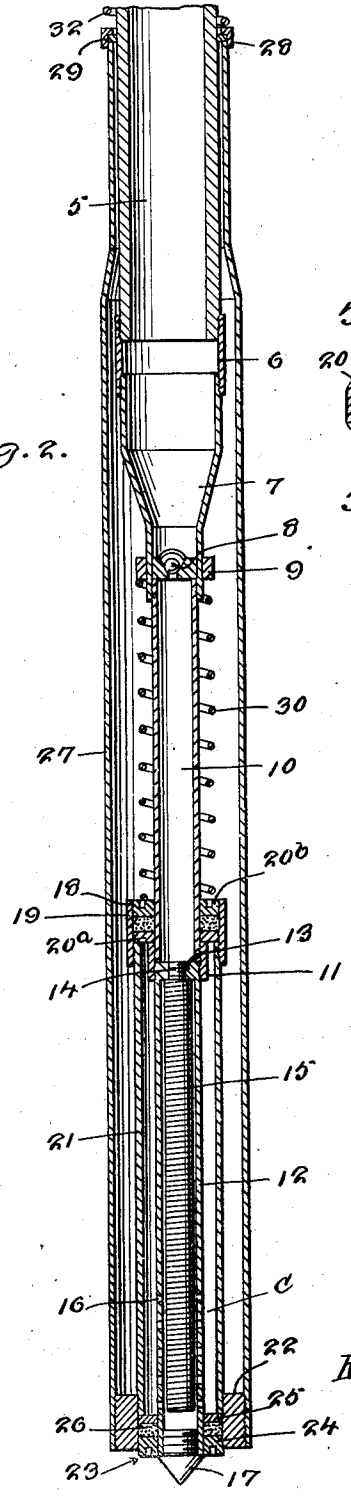


Fig. 1.

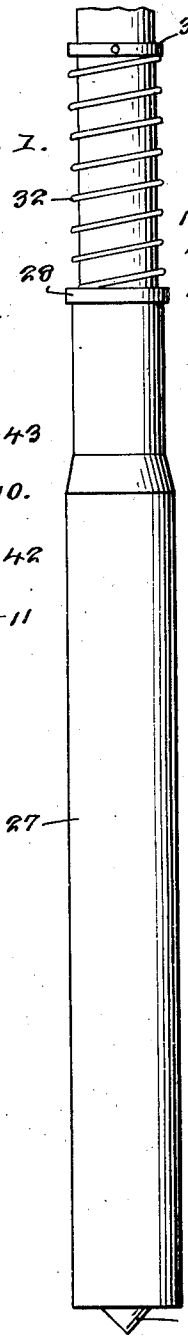


Fig. 9.

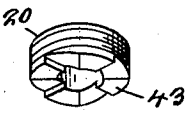


Fig. 10.

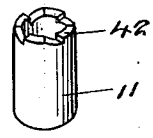
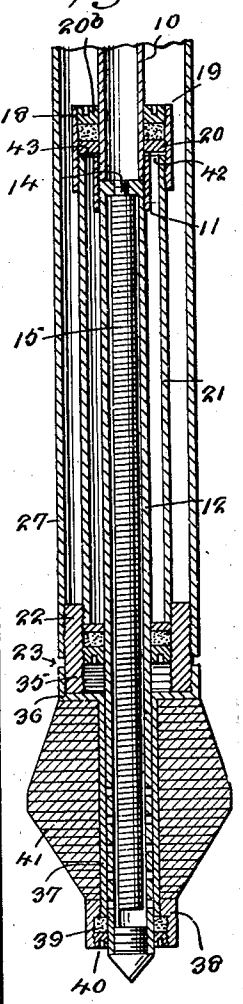


Fig. 8.



Rudolph Svadlenak INVENTOR

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Fig. 3.

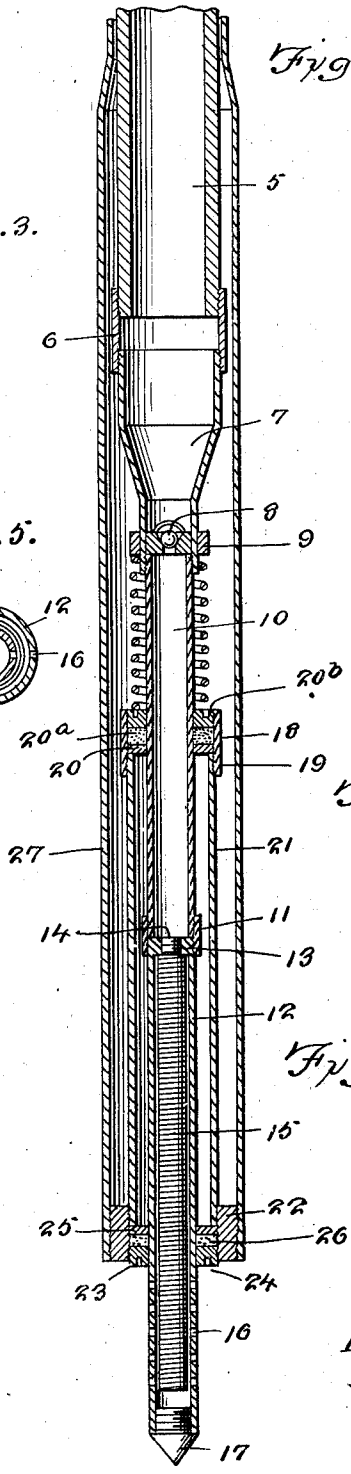


Fig. 4.

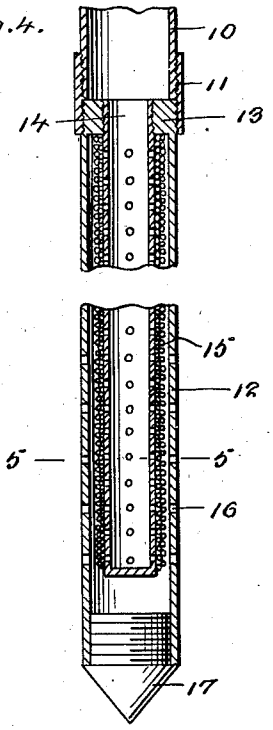


Fig. 11.

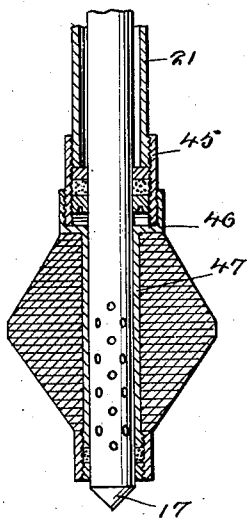


Fig. 5.

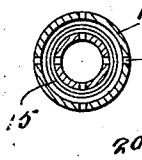


Fig. 6

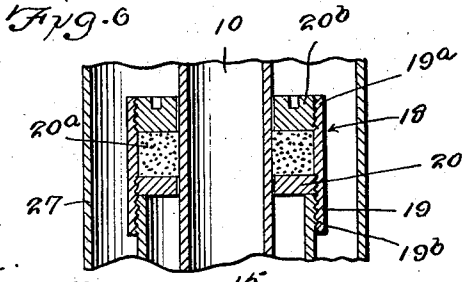
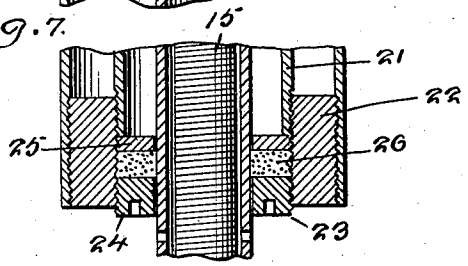


Fig. 7.



Rudolph Svadlenak INVENTOR

BY Victor J. Evans & Co.

ATTORNEYS

Patented Apr. 4, 1939 2,152,980

UNITED STATES PATENT OFFICE

2,152,980

TESTING TOOL

Rudolph Svadlenak, Taft, Tex.

Application July 5, 1938, Serial No. 217,579

4 Claims. (Cl. 166—1)

My invention relates to well tools and more particularly to testing tools for testing formations discovered in the process of drilling for oil, gas and water wells.

One of the principal objects of my invention is to provide a testing tool that can be readily attached to a standard drill pipe stem or tubing ordinarily used in the drilling of wells and operable by said pipe or tubing in a manner to permit samples of fluid to be tested to be brought to the surface for inspection and testing.

Another object of my invention is to provide a testing tool of the above described character equipped with means for receiving therein a sample of the fluid to be tested and operable in a manner to prevent other fluids from adjacent strata from becoming mixed with said first mentioned fluid as the tool is withdrawn from the hole for testing purposes, thereby permitting samples from desired depths to be obtained without having others mixed therewith.

A special object of my invention is to provide a tool of the above described character so constructed and arranged as to permit fluid to be introduced within the well for acidifying the same at a desired location therein.

A further object of my invention is to provide a tool of the above described character which is simple in construction, durable in use, highly efficient in operation, readily attachable to standard drill stem pipes or tubing without modifying the same, and economical in manufacture.

Other objects and advantages will be apparent from the following description, appended claims and annexed drawings.

Referring to the drawings wherein like reference characters designate like parts throughout the several views:

Figure 1 is a side elevation of my invention.

Figure 2 is a longitudinal sectional view thereof.

Figure 3 is a view similar to Figure 2 illustrating the tool in extended position.

Figure 4 is a detail sectional view illustrating the strainer construction.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4.

Figure 6 is an enlarged detail sectional view of the head construction.

Figure 7 is an enlarged sectional view of the seat block.

Figure 8 is a detail longitudinal sectional view of a modified form.

Figure 9 is a detail perspective view of the toothed disk of the head construction used in the modified form.

Figure 10 is a detail perspective view of the toothed sleeve which coacts with the disk illustrated in Figure 9.

Figure 11 is a detail longitudinal sectional view of another modified form.

In teaching my invention, in the preferred form illustrated in Figures 1 to 7, there is illustrated the lower end of a drill pipe tubing 5 having threaded on the lower end thereof a sleeve 6 which in turn has threaded in the lower end thereof a subjacently extending reducer 7 having arranged in the lower end section thereof a check valve 8 and exteriorly thereof a circumferentially extending collar 9 spaced above the lower end.

Threaded into the lower end of the reducer 7 is the upper end of an imperforate pipe 10. The lower end of the imperforate pipe 10 has threaded thereon a sleeve 11 in which is threaded the upper end of a perforated pipe 12. Said upper end of the pipe 12 is fashioned with a plug section 13 having a threaded bore extending therethrough in which is secured the upper end 14 of a downwardly extending filter or strainer 15, the latter preferably constructed of wire encircling a perforated pipe. The lower end section of the pipe 12 is provided with a plurality of perforations 16. Secured within the lower end thereof is a bit 17 effecting closure of the lower end of said pipe 12.

Slidably mounted on the pipe 10 is a head construction 18 comprising a sleeve 19 provided with upper and lower spaced threaded sections 19*a* and 19*b* respectively. Threaded within the lower section 19*b* is an apertured disk 20 about said pipe 10. Mounted on said disk 20 is a gasket 20*a* embracing the pipe 10 and is secured thereabout and on said disk by means of an adjustable packing nut 20*b* threaded into the upper section 19*a*.

The disk 20 is positioned within the upper part of the section 19*b* and effects a tight fit therewith to prevent accidental unthreading therefrom. The lower face of the disk 20 normally engages the upper end of the sleeve 11 as clearly illustrated in Figure 2 of the drawings when the pipe 12 is in retracted position as hereinafter more fully described. The lower section 19*b* of the sleeve 19 extends an appreciable distance subjacent the disk 20 and has threaded therein and in engagement with the disk 20 the upper end of a tube or pipe 21 extending downwardly about the pipe 12.

Said tube 21 is spaced from said pipe 12 to provide therebetween a sample receiving chamber C for a purpose hereinafter set forth. The lower

end of the tube or pipe 21 is threaded within the upper portion of a collar 22 forming part of a seat block construction 23. The lower portion of said collar has threaded therein a packing nut 24. Also threaded within said collar is a ring 25 abutting the lower end of the tube 21. Interposed between the nut 24 and ring 25 is a gasket 26 for engaging the outer wall of the pipe 12 to prevent fluid leaking therebetween. The nut 24 constitutes a means for adjusting the gasket 26 relative to the pipe 12. The outer face of the collar 22 has threaded thereon the lower end of a tubular shield 27, the upper end of which is provided with a collar 28 securing thereto a gasket 29 engaging the outer wall of the drill pipe 5 whereby to permit relative longitudinal movement.

Secured about the pipe 10 is a coil spring 30, the upper end of which engages the collar 9 and the lower end the nut 20b and thereby serves to normally urge the pipe 10 upwardly and maintain the sleeve 11 in engagement with the disk 20 of the head construction 18. Spaced above the upper end of the shield 27 is a collar 31 fixed on the drill stem pipe or tubing 5. Interposed between said collar 31 and collar 28 is a coil spring 32 normally urging said shield downwardly relative to the pipe 5.

In operation, the parts being in the position illustrated in Figure 2, the tool is lowered within the bore of the well until the seat block engages the floor of the bore. Upon engagement of the seat block by the floor of the well pressure is applied to the pipe 5 causing the lower end section of the perforated pipe 12 to extend downwardly into the formation below the seat block and thus permit liquid and the like to flow into the pipe 12 through the perforations 16. In this position liquid flowing therein, should it be under sufficient pressure, will flow upwardly to the surface and a sufficient quantity thereof obtained for testing purposes. When a sufficient quantity has thus been obtained, the pipe 5 is lifted thus causing the pipe 12 to be retracted upwardly through the seat block 23.

In instances where the pressure is not sufficient to force the fluid to be sampled upwardly through the pipes 12, 10 and 5, a sufficient sample may be obtained by permitting the pipe 12 to extend a partial distance below the seat block 23 thus permitting a sufficient quantity of the fluid to flow through the apertures 16 below the seat block into the pipe 12 and through the apertures above the seat block into the chamber between the tube 21 and pipe 12. Thus when the pipe 12 is actuated upwardly to closed or retracted position, a sufficient quantity of the fluid will be maintained within the lower end of the pipe 12 and tube 21 to permit a sampling thereof when the assembly or tool is withdrawn from the bore of the well. The strainer 15 serves to effect a screening of fluid flowing upwardly through the pipes 10 and 5 to prevent foreign matter and the like from clogging the latter. The check valve 8 serves to prevent back flow of said fluid. In some instances where it is sensed by the driller that the floor of the well is directly above gas, water or the like, the bit 17 may be used as a drilling tool to effect gradual penetration into the floor without breaking through the separating crust and at the same time permit a test to be taken therein. The tubular shield 27 serves to protect the tool from being covered by shale or any other caving material while said tool is at rest on the floor of the bore.

When it is desired to acidify a well, the check valve 8 may be removed and the tool lowered a desired distance and operated to extend the pipe 12 a sufficient distance downwardly beyond the seat block 23 to permit fluid pumped downwardly through the pipes to be separated outwardly through the perforations 16. By this means it can be readily understood that the bore of the well may be acidified at any desired location.

In some instances it becomes necessary to seal the "rat" hole and for this purpose I have provided a novel form of construction illustrated in Figures 8 to 10 inclusive. In said form the collar 22 of the seat block 23 is integrally fashioned with a subjacent section 35 provided with left-hand threads on the exterior face thereof. Said threads are spaced below the right-hand threads which secure the lower end of the shield 27 to said seat block. Threaded on said section 35 is the upper flanged end 36 of a tube 37, the lower end of which is threaded within the upper shouldered end of a coupling 38. The tube 37 embraces the lower perforated end of the pipe 12 as clearly illustrated in Figure 8. A gasket 39 and an adjustable packing nut 40 are provided in the lower end of the coupling 38 about the lower end of the pipe 12 to prevent leakage of fluid from within said pipe 12. Mounted on the tube 37 between the flanged end 36 thereof and the coupling 38 are a plurality of flexible packing washers or rings 41.

The various diameters of said rings 41 are such as to form a substantially pineal configuration when said rings are in assembled condition whereby to contact the bore of the well and seal the "rat" hole. In this form of construction the upper end of the sleeve 11 is provided with teeth 42 for engagement with similar formed teeth 43 fashioned on the lower face of the disk 20. Thus, when it is desired to seal the "rat" hole, the tool is lowered into the well until the rings 41 effect sealing position and the pipe 10 extending to testing position beyond the rings 41. Upon the test being taken the pipe is withdrawn to retracted position and should a cave-in occur and block the removal of the rings 41, the pipe is raised a sufficient distance to effect engagement of the teeth 43 with the teeth 42 whereupon the pipe 10 is rotated in a clockwise direction and which likewise rotates the tube 21 and seat block 23 in a like direction. Rotation of the seat block 23 in a clockwise direction effects unthreading of the section 35 from the flanged end 36 of the tube 37 due to said section 35 and flange 36 being connected thereto by means of left-hand threads. Upon disconnection of the seat block 23 from the tube 37, the seat block together with the pipe 12 may be readily withdrawn from the well thereby leaving the sealing member within the well. The sealing member comprising the rings 41 and tube 37 may be thereafter drilled out of the bore in the usual manner.

As illustrated in Figure 11, the shield 27 may be eliminated for use in connection with the modified form illustrated in Figures 8 to 10. In this instance, the lower end of the pipe 21 has threaded thereto a sleeve 45, the lower end of which is provided with left-hand threads for engagement with the upper flanged end 46 of the tube 47 of a similar construction as said tube 37.

When the tube 21 is rotated in a clockwise direction, the flanged end 46 of the tube 47 will be disconnected therefrom due to the left-hand threads as in the instance of the previously described modified form.

From the foregoing it will be apparent that I have provided a simple, durable and efficient tool whereby samples of fluid from the bore of a well may be readily obtained for inspection and testing purposes. Furthermore, my novel form of tool provides means whereby the well may be acidified and also means for sealing the "rat" hole thereof.

It is to be understood that various changes and modifications in the construction and arrangement of the parts may be resorted to without departing from the spirit of the invention or scope of the appended claims.

What I claim is:

1. In combination with a drill stem tube, a pipe coupled on said tube, a perforated pipe fixed on said first mentioned pipe, a head slidably mounted on said first mentioned pipe, a tubular member connected at the upper end thereof to said head and spaced relative to said perforated pipe, a seat block mounted on the lower end of said member and having an opening slidably receiving said perforated pipe whereby to permit said perforated pipe to extend beyond said block in a manner that fluid subjacent said block will flow into said perforated pipe upon downward movement of the latter by said drill stem tube, and a spring about said first mentioned pipe engaging said head to normally maintain said perforated pipe in raised position within said member.

2. In combination with a drill stem tube, a pipe coupled on said tube, a perforated pipe fixed on said first mentioned pipe, a head slidably mounted on said first mentioned pipe, a tubular member connected at the upper end thereof to said head and spaced relative to said perforated pipe, a seat block mounted on the lower end of said member and having an opening slidably receiving said perforated pipe whereby to permit said perforated pipe to extend beyond said block in a manner that fluid subjacent said block will flow into said perforated pipe upon downward movement of the latter by said drill stem tube, a spring about said first mentioned pipe engaging said head to normally maintain said perforated pipe in raised position within said member, and a shield carried by said drill stem tube and extending downwardly about said tubular member whereby to protect said assembled parts.

3. In combination with a drill stem tube, a pipe coupled on said tube, a perforated pipe fixed on said first mentioned pipe, a head slidably mounted on said first mentioned pipe, a tubular member connected at the upper end thereof to said head and spaced relative to said perforated pipe, a seat block mounted on the lower end of said member and having an opening slidably receiving said perforated pipe whereby to permit said perforated pipe to extend beyond said block in a manner that fluid subjacent said block will flow into said perforated pipe upon downward movement of the latter by said drill stem tube, a spring about said first mentioned pipe engaging said head to normally maintain said perforated pipe in raised position within said member, a sealing member carried by said block and adapted to seal a section of a bore of a well, and means operable by said drill stem tube for disconnecting said sealing member from said block to permit withdrawal of the latter from said well.

4. In combination with a drill stem tube, a pipe coupled on said tube, a perforated pipe fixed on said first mentioned pipe, a head slidably mounted on said first mentioned pipe, a tubular member connected at the upper end thereof to said head and spaced relative to said perforated pipe, a seat block mounted on the lower end of said member and having an opening slidably receiving said perforated pipe whereby to permit said perforated pipe to extend beyond said block in a manner that fluid subjacent said block will flow into said perforated pipe upon downward movement of the latter by said drill stem tube, a spring about said first mentioned pipe engaging said head to normally maintain said perforated pipe in raised position within said member, a shield carried by said drill stem tube and extending downwardly about said tubular member whereby to protect said assembled parts, a sealing member carried by said block and adapted to seal a section of a bore of a well, and means operable by said drill stem tube for disconnecting said sealing member from said block to permit withdrawal of the latter from said well.

RUDOLPH SVADLENAK.