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H. S. SMITH

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APPARATUS FOR CLEANING WELL CASING SCREENS

Filed March 1, 1928

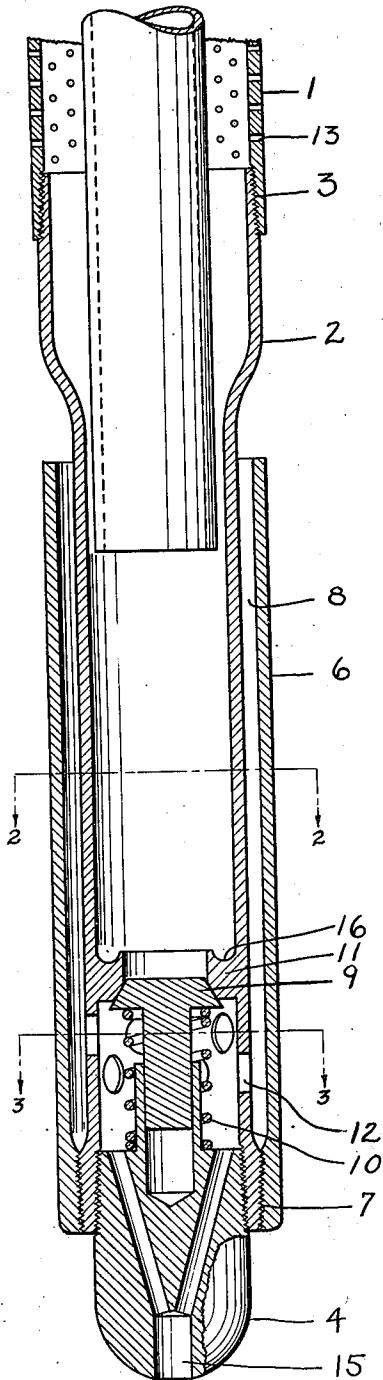


Fig. 1.

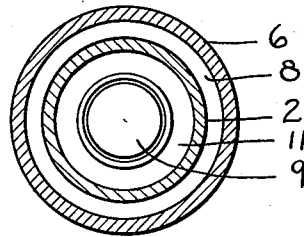


Fig. 2.

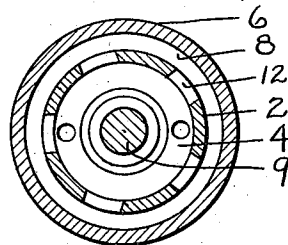


Fig. 3.

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APPARATUS FOR CLEANING WELL-CASING SCREENS

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This invention relates to deep well casings, and more particularly to devices adapted to clean the screens thereof.

The usual well casing embodies a plurality of pipe sections, the lower-most of which has a screen attached thereto through which fluid enters the casing.

Various devices have heretofore been provided to clean such screens. The usual devices comprise a pipe section adapted to be attached to the screen and having a back pressure valve therein normally held in closed position by a spring or the like and adapted to be opened by water under pressure pumped into the pipe. The most serious of the many objections to the devices now in use is that the water is permitted to rush downwardly against the bottom of the hole and laterally against the wall of the hole, and thereby cut away the formation to produce an objectionable cavity, and the screen is not properly cleaned.

This invention has for its object the provision of a device attachable to a screen, and provided with new and improved means whereby the water passing through the device is directed upwardly to effectively clean the screen. Another object of the invention is to provide a water out-let through which water may be discharged when the casing is being lowered into the hole to remove "bridges" caused by portions of the hole caving in.

Various other objects will hereinafter appear.

In the accompanying drawings, which are illustrative of the preferred embodiment of the invention, Fig. 1 is a sectional elevation showing the device attached to a screen; Fig. 2, a horizontal section on the line 2—2 of Fig. 1; and Fig. 3, a horizontal section on the line 3—3 of Fig. 1.

Referring more specifically to the drawings, 1 indicates a screen of the usual type. The inner-pipe 2 of my device may be screwed into the screen 1 as shown at 3, or otherwise secured thereto. A plug 4 is screwed into the lower end of the pipe 2 as indicated at 5 and an outer pipe 6 is threaded on said pipe as indicated at 7.

It will be observed that the ends of the pipe 2 are somewhat enlarged. Or, stated differently, the intermediate portion of the pipe 2 is reduced. The pipe 6 is thereby made substantially flush with the screen 1, and an annular chamber 8 is formed between the pipes 6 and 2.

A valve 9 is reciprocable in the plug 4 and a spring 10 normally holds said valve against the seat 11. That portion of the pipe 2 adjacent to the valve 9 has a number of openings 12 therein. These openings may be made considerably larger than are the openings 13 in the screen 1.

When the casing is being lowered into the hole with my device attached to the lower end thereof, should any obstacle be encountered, that is, caved in formation and the like, water may be pumped through the casing and into the pipe 2. It will overcome the resistance of the spring 10 and unseat the valve 9, a part of it passing through the openings 12 and part of it being discharged through the duct 15. That part of the water discharged through the duct 15 will impinge upon the obstacle and remove the same.

It will be noted that the lower end of the plug 4 is rounded and when it is lowered into contact with the hole the great weight of the casing will bury it. The burial of the plug 4 will prevent further passage of water therethrough, and so when water is pumped downwardly into the pipe 2 after the burial of the plug 4, it will unseat the valve 9 and pass through the openings 12 into the annular chamber 8 and will rush upwardly in the form of an annular column about the screen 1 and thoroughly clean the same.

The great advantage in thus directing the water upwardly about the screen 1 will be apparent to those skilled in the art.

An annular groove 16 may be cut in the upper side of the valve seat 11 for the reception of a wash pipe, should the use of a wash pipe be desired. The cutting of the groove 16 results in the formation of the upwardly projecting annular flange shown, which enters the end of the wash pipe. It will be understood that wash pipes are in common use. They are lowered through the casing until

the lower end thereof is adjacent the back pressure valve.

I have disclosed the preferred embodiment of my invention. My invention is not limited, however, to this embodiment, and various changes may be made without departure from the scope of the hereinafter appearing claims.

I claim:

10 1. The combination with a well casing screen, of a substantially cylindrical inner pipe forming an extension of said screen and having a cleaning fluid opening, and a substantially cylindrical outer pipe on said inner pipe adjacent said opening and forming with said inner pipe an annular cleaning fluid channel open adjacent the outer surface of said screen, whereby cleaning fluid issuing from said opening is directed toward the outer surface of said screen.

20 2. The combination with a well casing screen, of a substantially cylindrical inner pipe forming an extension of said screen and having a reduced end provided with a cleaning fluid opening, a substantially cylindrical outer pipe on said end adjacent said opening and forming with said end an annular cleaning fluid channel open adjacent the outer surface of said screen, whereby cleaning fluid issuing from said opening is directed toward the outer surface of said screen, the external diameter of said outer pipe being substantially equal to the external diameter of said screen.

35 3. The combination with a well casing screen, of an inner pipe forming an extension of said screen and having a cleaning fluid opening, a valve in said pipe to control the passage of fluid through said opening, an outer pipe on said inner pipe adjacent said opening and forming with said inner pipe an annular cleaning fluid channel open adjacent the outer surface of said screen, whereby cleaning fluid issuing from said opening is directed toward the outer surface of said screen.

40 4. The combination with a well casing screen, of an inner pipe forming an extension of said screen and having a cleaning fluid opening, a plug in the lower end of said pipe, and an outer pipe on said inner pipe adjacent said opening and forming with said inner pipe an annular cleaning fluid channel open adjacent the outer surface of said screen, whereby cleaning fluid issuing from said opening is directed toward the outer surface of said screen.

50 5. The combination with a well casing screen, of an inner pipe forming an extension of said screen and having a cleaning fluid opening, a plug in the lower end of said pipe, said plug having a duct, and an outer pipe on said inner pipe adjacent said opening and forming with said inner pipe an annular cleaning fluid channel open ad-

6. The combination with a well casing screen, of an inner pipe forming an extension of said screen and having a cleaning fluid opening, a plug in the lower end of said pipe, said plug having a duct, a valve to control the passage of cleaning fluid through said opening and duct, and an outer pipe on said inner pipe adjacent said opening and forming with said inner pipe an annular cleaning fluid channel open adjacent the outer surface of said screen, whereby cleaning fluid issuing from said opening is directed toward the outer surface of said screen.

In testimony whereof, I hereunto affix my signature.

HARVEY S. SMITH.

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