

May 31, 1927.

J. H. McEVoy, JR

1,630,666

WASH PLUG

Original Filed March 25, 1926 2 Sheets-Sheet 1

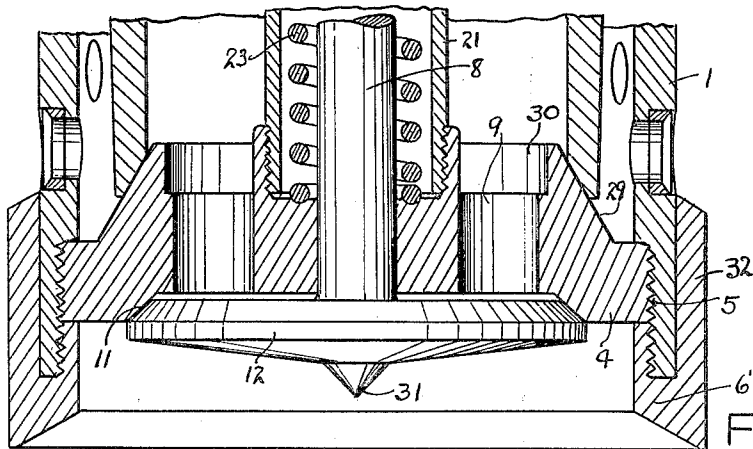


Fig. 2.

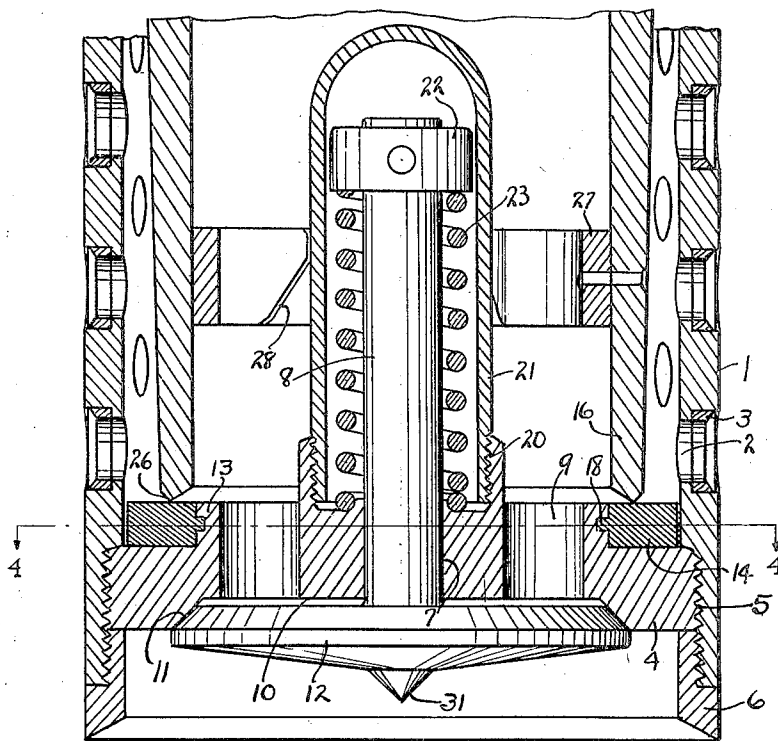


Fig. 1.

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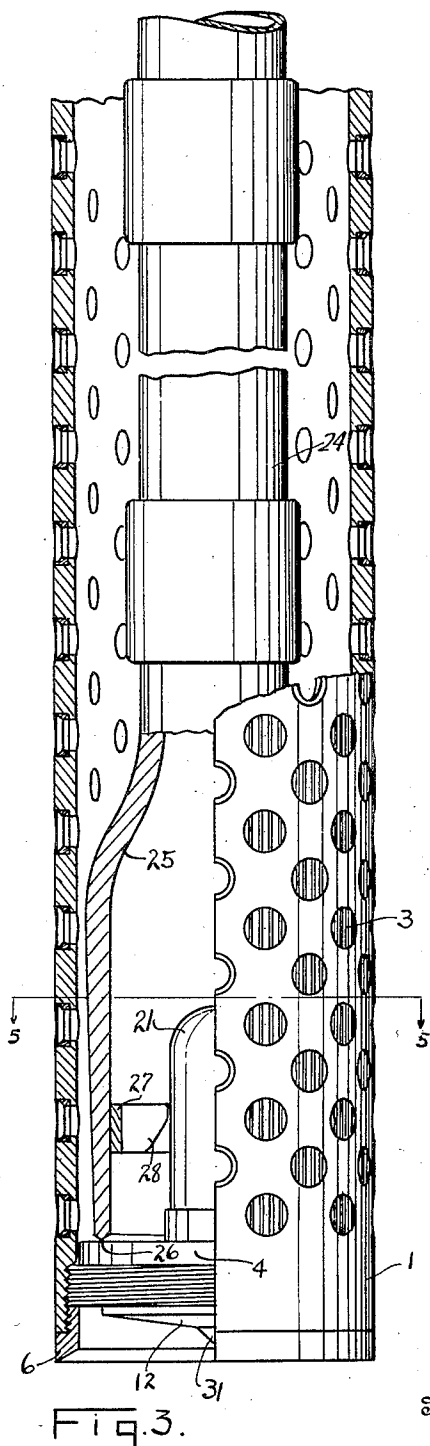
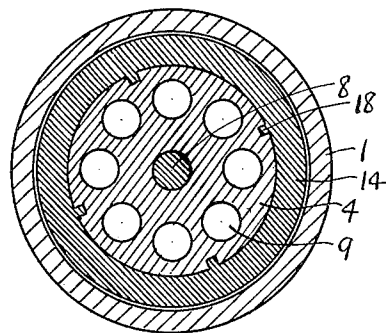
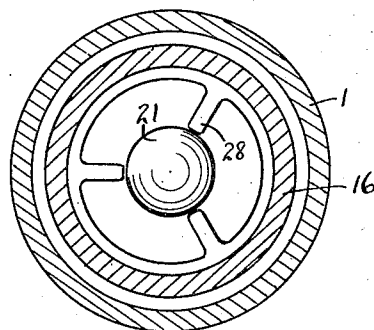
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UNITED STATES PATENT OFFICE.

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WASH PLUG.

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My invention relates to wash plugs to be employed in well strainers to close the lower end thereof when the strainer is being set, and acting as a support for a back pressure valve in the washing operation.

It is common practice in equipping a well for the production of oil or water to equip the lower end of the strainer or perforated pipe with a shoe extending in advance of the strainer and to place therein a downwardly opening back pressure valve, the stem of which extends forwardly so as to contact with the bottom of the hole. The difficulties encountered in the use of the old type of construction are that the strainer is spaced upwardly from the bottom of the hole by the valve shoe, thus often cutting off part of the producing stratum, and also that the valve stem may be bent by contact with the bottom of the hole and rendered inoperative. Furthermore, a separate wash ring is necessary to receive the end of the wash pipe and protect the valve from injury thereby.

It is an object of my invention to provide a wash plug which is constructed to occupy but a small portion of the lower end of the strainer pipe so that the strainer openings may extend to the bottom of the pipe, and in which the back pressure valve is protected from injury.

It is also desired to construct a plug in which a separate wash ring is unnecessary and in which a fluid tight seal with the wash pipe can be readily made. The invention also includes the construction of the shoe for the wash pipe to interfit with the seat upon the wash plug and also constructed so that it may be readily withdrawn even when packed about with sand. The cooperation of the valve guard and the wash pipe shoe to properly seat said shoe is also an element of value.

Other objects and the construction by means of which they are accomplished will more clearly appear from the description which follows.

Referring to the drawing herewith, wherein two embodiments of the invention are illustrated, Fig. 1 is a central vertical section through the lower end of a well strainer equipped with my invention. Fig. 2 is a similar section illustrating a slightly different embodiment of my invention. Fig. 3 is broken view of a well strainer employ-

ing my invention and showing the wash pipe therein. Fig. 4 is a reduced transverse section on the plane 4-4 of Fig. 1. Fig. 5 is a transverse section on the plane 5-5 of Fig. 3. Like numerals of reference designate like parts in all the views.

The strainer to which I have shown my invention attached is indicated at 1. It is a screen of the button type with openings 2 therein in which are fitted screen buttons 3. The lower end of the screen is threaded on its interior to provide a seat for a wash plug 4.

It is an important feature of my invention to construct a wash plug which will be comparatively thin and thus take up but a short portion of the strainer and enable the strainer openings to come close to the bottom of the well. I therefore construct the wash plug of a disc of metal threaded to screw in the seat 5 of the pipe. A short shoe 6 may be screwed into said seat below the valve to act as a lock nut, and also as a protection for the end of the pipe.

The plug 4 has a central opening 7 therein to receive a valve stem 8. A plurality of other openings 9, are formed in the disc adjacent the central opening to allow passage of liquid. The lower face of the disc is formed with a shallow recess 10 of sufficient diameter to include the lower end of the fluid openings 9, said recess having a tapered wall 11 to form a seat for the valve head 12 secured upon the lower end of the stem 8.

The upper face of the disc or plug 4 is increased in thickness at 13 to allow space for a ring 14 of lead or other soft metal upon which the wash pipe shoe 16 may seat. Said lead ring may be secured fast to the plug by any desired expedient such as soldering, or by tongues of metal 18 thereon engaging within the side openings 19 in the disc.

Centrally of the plug the body of the plug is extended to form a threaded attachment 20 for the valve housing 21.

The valve stem 8 has a nut or head 22 on its upper end and between the lower recessed face thereof and the wash plug 4 is a spring 23 tending to hold said valve resiliently upwards. The housing 21 forms a sort of bull plug enclosing the valve stem and spring 23 and acting to protect the same from wear and from obstructions. It also forms a container for a lubricating grease with which I

fill said housing so as to lubricate the valve stem and also to prevent the passage into the housing of water and other foreign material.

5 The wash pipe employed in combination with my plug is shown at 24 in Fig. 3. It has a shoe 16 at its lower end. Said shoe is swedged outwardly at 25 to increase the diameter thereof and has the outer periphery
10 below the swedged portion tapered slightly as shown in the drawing. Its lower end is brought to a sharp edge 26 to engage and bite into the lead ring 14.

I prefer to place a guide ring 27 on the
15 interior of the wash pipe adjacent its lower end. Said ring has a plurality of guide fingers 28 thereon spaced apart to engage with the housing 21 which acts as a guide to center the wash pipe and assure its accurate engagement with the seal ring 14.
20

In Fig. 2 I have shown a modification of the seat formed between the wash pipe and the wash plug. In this form the body of the plug is tapered upwardly within the screen
25 to form a frusto-conical boss, having a tapered ring 29 thereon of soft metal. The wash pipe is likewise flared on its lower end to fit the seat thus formed. An annular recess 30 within said boss connects with the
30 fluid passages 9 through the wash plug.

A further change is noted in the formation of the shoe 6' at the lower end of the screen. Said shoe is like the one previously described, with the exception of the outer
35 sleeve 32 thereon which is extended upwardly about the lower end of the strainer to strengthen it and protect it from injury in going into the hole.

In the operation of my device the strainer
40 is introduced into the well and seated upon the bottom of the well. While the strainer is lowered the wash water pumped down through the same passes through the valve covered openings 9 and clears the well of mud and detritus. When the strainer is
45 seated the lower sharpened point 31 upon the valve head contacts with the central mound ordinarily left by the drill at the bottom of the hole and is thus forced firmly into its
50 seat, thus by stopping the flow of wash water, indicating to the driller that the strainer is set. The wash pipe may be inserted after the screen has been lowered, where desired, and the guide fingers 28 will guide the shoe
55 16 accurately into place. When the screen is set the wash pipe may be withdrawn.

The main advantages of this construction lie in the formation of a wash plug allowing the strainer to be set in shallow oil
60 strata by taking up but little room at the end of the strainer and allowing the strainer openings to be formed close to the bottom of the pipe. Also an efficient housing is formed for the valve stem, which housing
65 also acts as a guide for the wash pipe. The

tapering of the wash pipe shoe allows it to be withdrawn without difficulty even when packed about with sand.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:

1. In combination with a well strainer perforated to a point closely adjacent the lower end, and having an internally threaded seat at said lower end, the combination
75 of a wash plug comprising a disc of metal threaded to fit said seat, said disc having a central guide opening and fluid opening adjacent thereto, a valve plate closing the lower sides of said openings, a guide on said plate
80 slidable in said guide opening, means to hold said valve resiliently in its seat, and means in the path of the fluid to house said guide for the purpose described.

2. In a well strainer perforated to a point
85 closely adjacent its lower end and having its lower end interiorly threaded, the combination of a wash plug comprising a metal disc threaded to engage said threaded end, said
90 disc having a central guide opening and adjacent fluid openings therein, a valve plate closing the lower ends of said openings, a guide stem thereon extending upwardly through said guide opening, means to hold
95 said valve plate resiliently seated and a housing for said stem secured to said plug and adapted to be filled with lubricant.

3. In combination with a well strainer perforated to a point closely adjacent its
100 lower end, a wash plug adapted to fit within the said lower end of said strainer, said plug having a guide opening therein and water passages adjacent thereto, a valve below said openings, a valve stem, a spring on
105 said stem, a housing for said stem and said spring, said housing extending upwardly centrally of said plug and acting as a guide for a wash pipe.

4. In a device of the character described, a wash plug comprising a disc adapted to be
110 secured to the lower end of a strainer, an upwardly closing valve therein, a valve stem thereon, a housing for said valve stem secured centrally on the upper side of said
115 plate, a wash pipe seat on said plug, a wash pipe and means on said wash pipe engaging said housing to guide said pipe into said seat.

5. In a device of the character described a wash plug comprising a comparatively thin disc adapted to be secured in the lower
120 end of a strainer and having fluid openings therein, a valve resiliently closing said openings, a soft metal seat on the upper side of said disc and means to guide a wash pipe
125 on to said seat.

6. In a device of the character described a wash plug comprising a comparatively thin disc adapted to be secured in the lower end
130 of a strainer and having fluid openings therein, a valve resiliently closing said open-

ings, a valve stem extending above said plug, a soft metal seat on the upper side of said disc and means to guide a wash pipe on to said seat, said guide also serving to house
5 said valve stem.

7. In a device of the character described including a well strainer, a wash plug in the lower end thereof and a soft metal seat on said plug, the combination of a wash pipe,
10 having its lower end tapered inwardly and formed to engage said seat and make a fluid tight contact therewith.

8. In a device of the character described including a well strainer, a wash plug in the
15 lower end thereof and a ring of soft metal on the upper side of said plug, the combination of a wash pipe having a sharpened edge at said lower end, and means to guide said wash pipe to seat on said ring.

20 9. In a device of the character described including a well strainer, a wash plug in the lower end of said strainer, a valve in said plug, a stem on said valve extending above said plug, a housing on said stem, and a soft
25 metal ring on said plug, the combination of a wash pipe and guide fingers on the inside thereof to engage said housing and guide said pipe into contact with said ring.

30 10. In a device of the character described, a perforated pipe, the lower interior end being threaded, a wash plug in said threaded

end, a valve in said plug, a head on said valve having a central sharpened point directed downwardly to engage the bottom of the well, a guide stem extending through
35 said plug, and a housing for said stem on said plug.

11. In a device of the character described, a back pressure valve comprising a threaded disc having fluid openings therein, a valve
40 closing said openings, a valve stem on said valve extending through said disc, a nut adjustable on said stem, a spring on said stem to hold said valve resiliently in its seat, a
45 nipple on the side of said disc opposite said valve, and a housing secured to said nipple and enclosing said stem and spring.

12. In a device of the character described, a back pressure valve comprising a threaded
50 disc having fluid openings therein and a central valve stem opening, a valve seat on one side of said disc, a valve in said seat closing said openings, a valve stem on said disc extending through said valve stem opening, a
55 spring on said stem to hold said valve in its seat, and a housing for said stem and spring, said housing being secured to said disc.

In testimony whereof I hereunto affix my signature this 17th day of March, A. D. 60
1926.

JOSEPH HENRY McEVOY, JR.