Jan. 14, 1930. F. J. SHAVER ET AL 1,743,626

CEMENTING HEAD

Filed July 11, 1925

Fig 1

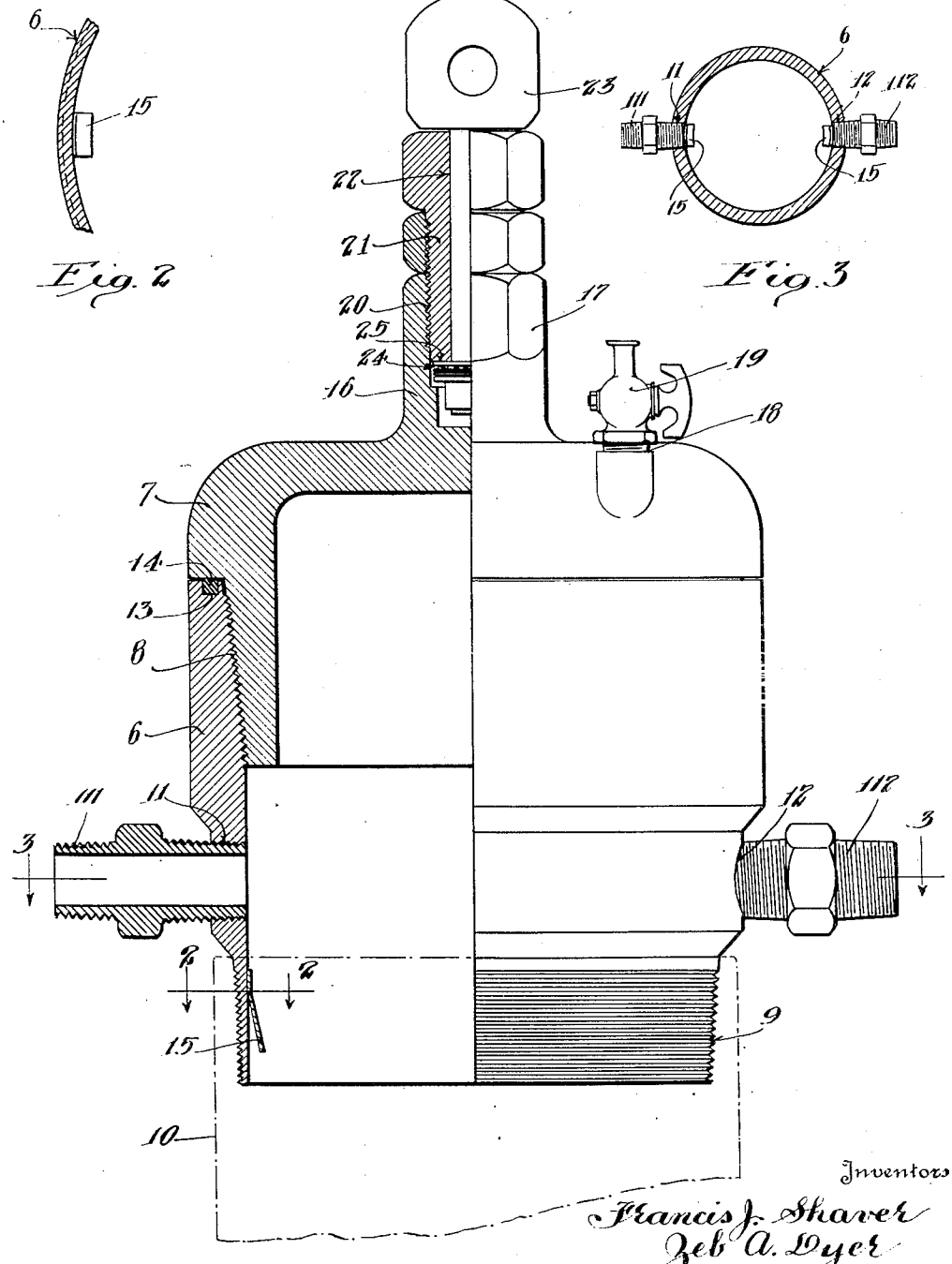


Fig. 2

Fig. 3

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UNITED STATES PATENT OFFICE

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CEMENTING HEAD

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This invention relates to cementing heads for use in oil well drilling, and an object of the invention is to facilitate the operation commonly termed "cementing".

The exclusion of water from an oil well is effected by a cementing operation, which consists in placing a quantity of cement grout inside of a string of casing hanging in the hole and extending to the depth at which the cementing operation is to be performed, then forcing the cement down through the casing and out at the bottom thereof and up around said casing.

The cement grout which has been pumped into the casing will begin to harden in a comparatively short time and the hardening is preferably accelerated by the addition of a chemical to the cement. Because of the comparatively quick setting of the grout, it is essential that it be pumped into position around the casing as quickly as possible. When cementing a well by the process known as the "Perkins four-day process", the casing is run in the hole until the casing shoe is at the desired cementing depth and a circulating head of prior known construction is screwed in the collar at the top of the casing. Connection is made between the circulating head and the slush pump by a hose termed the "rotary hose" and mud is pumped into the casing. This mud returns to the surface around the outside of the casing.

The well is now ready to have the cement pumped into the casing. The present general practice is to disconnect the rotary hose, remove the circulating head and then place the bottom plug in the casing. The head is then replaced in position and is connected with the cement pump, which is operated to pump in the cement. After the desired amount of cement has been pumped into the casing, it is necessary to disconnect the cement pump from the circulating head, remove said head and place the top plug in the casing. The circulating head is again replaced, the rotary hose connected with the head, and the sludge pump operated to pump mud into the casing to force the cement through the casing and out at the lower end thereof. It will be apparent from the foregoing, that much time is consumed in unscrewing and replacing the circulating head and making and breaking the hose connections thereto, and an object of this invention is to save time by eliminating some of this work.

This invention provides a head that has permanent connections with the rotary hose and the cement hose and provides a cap that can be removed and replaced, without disturbing the hose connections, so that the plugs mentioned above can be placed in the casing without the necessity of unscrewing and replacing the head and uncoupling and coupling the mud hose and cement hose.

The accompanying drawings illustrate the invention:

Fig. 1 is an elevation, partly in midsection, of a cementing head constructed in accordance with the provisions of this invention, the collar on which it is mounted being indicated in broken lines.

Fig. 2 is an enlarged plan section on the line indicated by 2—2, Fig. 1.

Fig. 3 is a reduced plan section on the line indicated by 3—3, Fig. 1.

The cementing head comprises two sections, one section constituting a ported tubular member 6 and the other a cap 7 which is threaded at 8 into the member 6. The member 6 is provided at its lower end with an externally threaded portion 9 adapted to screw into the upper casing collar indicated in dot and dash lines at 10 in Fig. 1. Ports 11, 12 are provided in the member 6 at opposite sides thereof and said ports are threaded for nipples 111, 112, by which the cement carrying hose and the rotary hose are connected with the member 6. The upper end of the member 6 is provided with an internal annular recess 13 in which is a packing ring 14 that prevents the cap 7 from being screwed too tightly into the member 6.

The member 6 is provided internally near its lower end with an abutment or abutments 15 which are preferably in the form of inwardly bent arms constructed of spring steel or the like. The arms 15 are connected at their upper ends to the inner face of the member 6 and normally extend aslant downwardly

and inwardly and the lower ends thereof are free and spaced from the member 6 so that, when the cementing plugs are inserted in the member 6 and forced downwardly, said plugs will bend the arms 15 outwardly and readily pass downwardly by said arms to a position below the level of the ports 11, 12. The arms then swing inwardly and prevent the plugs from floating back to the level of the ports, thus closing said ports, or to a position above the level of the ports, which would permit the mud being pumped beneath the plugs. The cap 7 is provided with an upwardly projecting central stem 16 preferably having a wrench seat 17 to facilitate screwing and unscrewing of the cap.

Preferably the cap 7 is provided above the member 6 with a port 18 controlled by a petcock 19, the purpose of which is to admit atmospheric air to the cap to avoid the creation of a partial vacuum in the cap when the heavier cement is descending and forcing the lighter mud ahead of it out of the hole. The hole 18 may also be used for connecting a pressure gage or a plug measuring device in a manner well understood in this art.

The stem 16 is hollow and is internally threaded at 20 to engage and hold a gland 21 which is provided with a bore 22. Extending through the bore 22 is an eyebolt 23 provided at its lower end with a bearing 24 which seats against a shoulder 25 formed by the lower end of the gland 21. Thus the bearing 24, gland 21 and eyebolt constitute means to rotatably suspend the cap from a suitable hoisting tackle, not shown, when it is desired to remove and replace the cap.

To use the invention, assuming that the mud and cement hose connections have been made as hereinbefore described, the slush pump will be operated to circulate the mud. Then a hoisting tackle will be connected with the eyebolt 23 and the cap 7 will be unscrewed. Then the bottom plug, used in the Perkins process, will be placed in the member 6 and forced down beneath the abutments 15, and the cap will be replaced. Then the cement pump will be operated to pump in the required amount of cement. After the cement pumping operation is completed, the cap 7 will again be removed, as before, and the top plug, used in the Perkins process, will be placed in the member 6 and forced down beneath the abutments 15. Then the cap 7 will be replaced and the slush pump operated to force the cement into place in a manner well understood in the art relating to the cementing of oil wells.

The cement drops very quickly in the casing as it is being pumped in, since it is so much heavier than the mud upon which it rests, accordingly the petcock 19 will be opened to admit air from the atmosphere so as to prevent the creation of a partial vacuum above the cement which might be severe enough to collapse the casing.

From the foregoing, it will be clear that this invention does away with repeated disconnecting and connecting of the mud hose and cement line, thus saving a large amount of time at a critical point in the operations of sinking an oil well. Also, that by the use of this invention, in case a relatively higher pressure is necessary during or at the completion of the cementing operation, there is no packing to blow out.

We claim:

A cementing head comprising a tubular member adapted for connection with a casing collar and provided with a port, closure means for the upper end of the tubular member, and spring arms connected at their upper ends to the tubular member below the level of the port and extending aslant inwardly and downwardly.

Signed at Ventura, California, this 16th day of June 1925.

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