

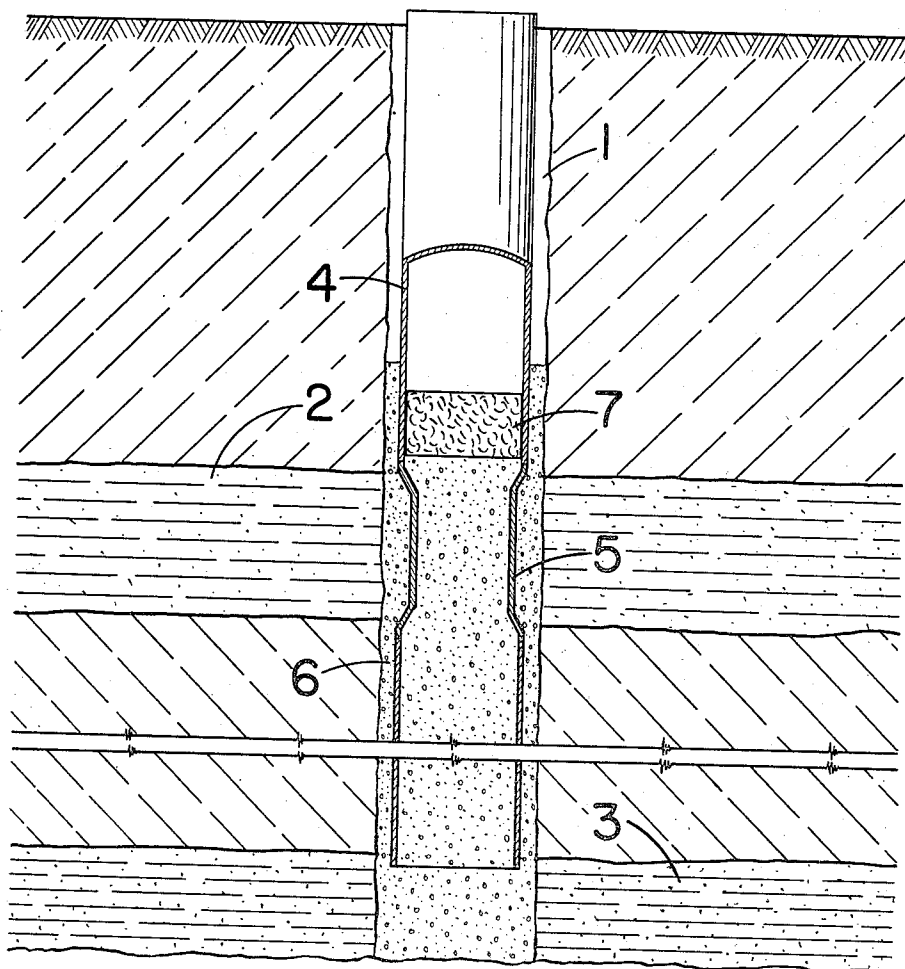
Oct. 22, 1940.

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2,219,022

METHOD FOR COMPLETING OIL WELLS

Filed July 25, 1939



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2,219,022

METHOD FOR COMPLETING OIL WELLS

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Application July 25, 1939, Serial No. 236,312

3 Claims. (Cl. 166—21)

The present invention is directed to a method for completing an oil well traversing a plurality of producing horizons, and has for its particular object the provision of a completion method which makes possible the production of oil from the various horizons simultaneously, if desired.

In the past it has been customary, in the completion of oil wells through a plurality of producing horizons, to set casing to the lowest producing horizon which was ordinarily produced first. In order to produce the higher horizons the casing was perforated by means of a gun perforator or other suitable means. This procedure had the drawback that the upper producing horizons were not made available to the operator for treatment for the improvement of production. Moreover, the perforations simply exposed a very small part of the available producing surface so that the rate of production was often much lower than the potential of the horizon.

According to the method of the present invention, a well traversing a plurality of producing horizons is completed by setting casing to the bottom producing horizon in the well and including in the string of casing opposite the various producing horizons a section or number of sections of drillable metal. The casing, including the drillable sections, is ordinarily set so as to permit production of the lowermost horizon. If it is desired to produce from a plurality of horizons at one time, the drillable sections opposite the upper horizons which it is desired to produce, are drilled out at the time the cement plug is drilled out to expose the lowermost horizon. If desired, however, the lowermost zone can be produced independently and then the higher zones can be produced in sequence, if desired, by simply drilling out the casing opposite them.

The present invention will be more clearly understood from the following detailed description of the accompanying drawing in which the single figure is a section through the well completed in accordance with the present invention.

Referring to the drawing in detail, numeral 1 designates a bore hole traversing a plurality of substrata including an oil bearing substratum 2 and a second oil bearing substratum 3. Set in the bore hole in the usual manner is a string of casing 4, the sections of which are made of the usual steels. Included in the string of casing opposite the producing zone 2 is a section 5 of casing made of drillable material and having a reduced diameter. It will be understood that it is not necessary to make this section of reduced diameter, but this represents the best practice

under the present invention. The material employed may be any of the known readily drillable metals, such as aluminum alloys of various types. In addition to aluminum alloys may be mentioned magnesium alloys, resins, hard rubber, and the like. A typical aluminum alloy suitable for this purpose is one containing 1% silicon, 1% Mg, 0.3% Cr, the remainder being aluminum. A suitable magnesium alloy is one containing 3.3-4.7% Al, 0.2% Mn, 0.3% Zn, 0.5% Si, the remainder being magnesium. One of the essential properties of this material is that it be of low specific gravity so that the cuttings can be floated out with drilling mud of ordinary weight.

In the drawing, the casing is shown just after it has been cemented. It will be noted that the casing was set just above the producing sand 3. The cement is designated by numeral 6, and the plug, which is customarily inserted in the casing to hold the cement in position until it sets, is indicated by numeral 7.

Ordinarily, in the completion of a well, after the cement is set, the plug 7 and the cement below it are drilled out and the hole is then underreamed opposite the producing sand 3. In the practice of the present invention, when it is desired to produce from sands 2 and 3 simultaneously, the section 5 of the casing is drilled out on the down trip to drill out the plug 7. Then the underreaming bit is put in and the bore hole opposite sand 2 is first underreamed and then the bore hole opposite sand 3 is underreamed. It will be understood that by the judicious use of packers and plugs it is possible, according to the present invention, to subject the producing sands individually to treatments, such as acidizing, which are calculated to increase their productivity. It is also contemplated that producing sand 3 may be produced until exhaustion and then the hole below section 5 is filled with cement and section 5 is drilled out, as hereinbefore described, for the production of oil from sand 2. When this is desired, the drillable section of casing used must have at least as great an internal diameter, as the rest of the casing. Of course, there may be any number of producing sands.

The nature and objects of the present invention having been thus described and illustrated, what is claimed as new and useful and is desired to be secured by Letters Patent is:

1. In the completion of an oil well traversing a plurality of producing horizons the steps which comprise setting casing of a selected diameter to a point adjacent the lowermost producing zone, including in said casing opposite each of the up-

per producing horizons a section of reduced diameter composed of a light drillable material, forcing cement behind said casing to a point above the uppermost producing horizon, setting a cement retaining plug in said casing above the uppermost section of reduced diameter, allowing the cement to set, drilling out the cement plug and all of the sections of reduced diameter, and underreaming the formation behind each of said

drilled-out sections to expose the surface of the producing horizon.

2. A method according to the preceding claim in which the drillable material employed is an aluminum alloy.

3. A method according to claim 1 in which the drillable material employed is a magnesium alloy.

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