METHOD AND MEANS FOR IMPLANTING CASING

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ABSTRACT
A method and means for implanting intermediate casing, or production casing, or the like, in a drilled hole having drilling fluid. A plurality of bracelet members are attached to the casing. Each of the bracelet members have a covering and an elastomeric material for expanding which is encased in the covering.

22 Claims, 8 Drawing Figures
METHOD AND MEANS FOR IMPLANTING CASING

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention is related to a method and means for implanting casing. More specifically, this invention provides a method and means for implanting intermediate casing, production casing, or the like, in a drilled hole having drilling fluid.

2. Description of the Prior Art

Conventional means and methods for implanting oil well casing, or the like, include continuously mixing a cement with water on the surface of the earth to produce a cement slurry which is pumped down the inside of the casing and up the annulry situated between the drilled hole and the outside of the casing. Such prior art means and methods make use of cement pumps, a cementer, at least one helper (known as a driver), and various connection pipes, hoses, or the like, interconnecting the cement pumps with the top of the casing. These conventional means and methods are uneconomical because of the cost of the quantity of cement needed, the leasing of the cement pumps, the cementer and driver, and the rig time while performing the cementation and waiting for the cement slurry to set-up. Good cement jobs are not guaranteed by conventional implanting means and methods and quite often additional cement jobs are necessitated because of excessive channeling, communications between pay zones, squeezing, and etc. Prior art means and methods also have a deficiency in that open hole completions can not be obtained with them. Therefore, what is needed and what has been invented by me is a method and means for implanting casing without the deficiencies associated with the prior art.

SUMMARY OF THE INVENTION

The present invention accomplishes its desired objects by broadly providing a method and means for implanting intermediate casing, or production casing, or the like, in a drilled hole having drilling fluid which comprises a plurality of bracelet members attached to the casing. Each of the bracelet members include a covering and an elastomeric means for expanding. The elastomeric means for expanding is encased in the covering.

It is therefore an object of the present invention to provide a method and means for implanting intermediate casing, or production casing, which generally produces no "bad" cement jobs.

It is another object of the present invention to provide a method and means for implanting casing which allows "open hole" completions for all zones.

It is yet another object of the present invention to provide a method and means for implanting casing which is much more economical than conventional methods and means.

These, together with various ancillary objects and features which will become apparent to those artisans possessing ordinary skill in art as the following description proceeds, are attained by this novel method and means for implanting casing, a preferred embodiment being shown in the accompanying drawings, by way of example only wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an enlarged perspective view of a bracelet member having a casing or cover enclosing a swelling or an elastomeric agent;

FIG. 2 is a partial vertical sectional view of an oil well casing having a plurality of bracelet members attached thereto which include a covering having a protective coating thereon;

FIG. 3 is a partial vertical sectional view similar to FIG. 2 but showing the bracelet members in an expanded situation after the protective coating has been dissolved by the drilling fluid allowing same to pass through the covering and mix with the swelling agent;

FIG. 4 is a partial vertical sectional view of an oil well casing having in a compressed position a pair of bracelet members attached thereto, one bracelet having a protective coating enclosing cement and the other bracelet including the protective coating enclosing a sponge or rubber;

FIG. 5 is a partial vertical sectional view of the oil-well casing of FIG. 4 with the protective coating of each bracelet dissolved by the drilling fluid or bottom hole temperature, allowing the cement to mix with the drilling fluid to produce a cement slurry and the sponge or rubber to expand against the side of the hole and uphold the cement slurry until same has hardened;

FIG. 6 is a horizontal sectional view taken along the line 6—6 in FIG. 2;

FIG. 7 is a horizontal sectional view taken along the line 7—7 in FIG. 4; and

FIG. 8 is a horizontal sectional view taken along the line 8—8 in FIG. 5.

DETAILED DESCRIPTION OF THE INVENTION

Referring in detail now to the drawings wherein like or similar parts of the invention are identified by the same reference numerals, a casing 10, having a plurality of bracelet members 12 and centralizers 14 attached thereto, is situated within a hole 16 drilled in a subterranean 18. Each bracelet 12 includes a perforate (e.g. burlap) or imperforate covering 20 and or a protective coating or wrapping 22 with a swelling or elastomeric agent 24 encased therein. Hole 16 contains a drilling fluid 26 which may include water, acid, drilling chemicals, or the like, for reacting and/or dissolving the protective coating 22 after a predetermined time has elapsed to allow the swelling agent 24 to come into contact with the drilling fluid 26 and expand to hold the casing 10 firmly in place in the hole 16. Swelling agent 24 may be a cement which forms a cement slurry 28 after mixing with the drilling fluid 26.

With continual reference to the drawings for operation of the invention, bracelets 12 are attached to the casing 10 as it is being run into the hole 16. The bracelet covering 22 may be either perforate or imperforate.

FIGS. 2 and 3 disclose one preferred covering embodiment of the bracelets 12 wherein casing 10 is wrapped with a 4 to 6 inch wide burlap, or similar, covering 20 having a swelling agent compound 24 encased therein which will expand to at least twice its size when exposed to the drilling fluid 26 used to drill the hole 16. The swelling agent compound 24 may be any means for expanding which are well known to those skilled in the art of oil-well drilling such as the following: kaolin, gel, sodium montmorillonite or any montmorillonite clay, salts including sodium or calcium chloride, plastics.
which swell upon heating, cement, and mixtures of the foregoing.

In this perforate covering embodiment of the invention bracelets 12 include a protective coating which will dissolve at a certain bottom hole temperature and pressure or after a predetermine time in order for the drilling fluid (i.e., water, acid, drilling chemicals, etc. or mixtures thereof) to seep through the perforate covering 20 and come into contact with the swelling agent 24 which expands to either enlarge or burst the covering 20. The protective coating may be any suitable coating which deforms or melts to allow seepage of the drilling fluid through the perforate covering 20. In a preferred embodiment of the invention the protective coating is a wax having a predetermined melting temperature. Any wax species well known to those in the art may be utilized such as those found in the various editions of Kirk-Othmer Encyclopedia of Chemical Technology, by Interscience Publishers, a division of John Wiley & Sons, Inc., New York—London.

After the swelling agent 24 has expanded it will "set up" and be able to hold and implant the casing 10 in the hole 16 to withstand any pressure required in completing the well. The tensile strength of the bracelets 12 will be supplemented by the pressure strength of the compressed drilling fluid 26 entrapped between the expanded bracelets 12 which are preferably spaced 4 to 6 inches apart. This can be clearly seen in FIG. 3.

FIGS. 4 and 5 disclose another preferred covering embodiment of the bracelets 12 wherein bracelets 12 include a material expansion means 24 which can be wrapped around the casing tightly in a compressed manner. In a preferred embodiment of the invention the material expansion means is either sponge or soft rubber which is capable of being held in a compressed position (as seen in FIG. 4) while running the casing 10 in the hole 16 by some sort of a protective coating (or some sort of wrapping) which is capable of being dissolved by pumping an acid (e.g., sulphuric, hydrochloric, etc.) to react with the coating or wrapping to dissolve same in a predetermined time. After the protective coating or coating is dissolved, the compressed material expansion means 24 expands against the side of the drilled hole 16 as illustrated in FIG. 5. Also illustrated in FIG. 5 is a cement slurry 28 being upheled by the expanded means 24 after the protective coating or covering of cement swelling agent 24 in FIG. 4 has been dissolved to allow the dry cement to mix with the drilling fluid 26 preferably water, to form the slurry 28. The entire joint of casing 10 above material expansion bracelet 12 in FIG. 4 can be wrapped with protected dry cement if deemed necessary.

There are various embodiments of use for the bracelets 12. One use embodiment is to utilize a swelling agent 24 including a mixture of a clay, such as bentonite which swells to 12 or 14 times its original volume when water is added, in conjunction with a cement. This mixture will harden after expanding. Another use embodiment is to use alternating layers of the swelling agent 24 having bentonite and the swelling agent 24 consisting of cement. This method of using depends on the expansion of the bentonite swelling agent to compress the cement swelling agent out against the side of the drilled hole before setting up. Still yet another use is to have, as aforementioned, the sponge, rubber, or bentonite swelling agent at the bottom of the casing 10 for swelling against the wall, and the bracelet or bracelets 12 above containing only dry cement in order to produce a cement slurry (after dissolution of the bracelet coating) which settles downward where it will be upheld by the bottom bracelet until it sets up between the casing 10 and the side of the hole 16. Of course the setting time of the cement can be either retarded or accelerated by additives well known to those skilled in the art.

While the present invention has been described herein with reference to particular embodiments thereof, a latitude of modification, various changes and substitutions are intended in the foregoing disclosure, and it will be appreciated that in some instances some features of the invention will be employed without a corresponding use of other features without departing from the scope of the invention as set forth.

1 claim:

1. A means for implanting intermediate casing, or production casing, or the like, in a drilled hole having drilling fluid which comprises a plurality of bracelet members attached to said casing, each of said bracelet members include a covering and an elastomeric means for expanding, said means for expanding being encased in said covering, and said covering including a protective coating which will dissolve in said drilling fluid after a predetermined time has elapsed to allow said means for expanding to come into contact with said drilling fluid and expand to hold said casing firmly in place in said hole.

2. The means of claim 1 wherein said covering is a perforate covering.

3. The means of claim 2 wherein said perforate covering includes burlap.

4. The means of claim 2 wherein said means for expanding is selected from the group consisting of kaolin, gel, sodium montmorillonite, sodium chloride, calcium chloride, montmorillonite clay, plastics which swell upon heating, cement, and mixtures thereof.

5. The means of claim 2 wherein said protective coating includes a wax means which melts at a predetermined temperature and pressure.

6. The means of claim 1 wherein said covering dissolves in said drilling fluid after a predetermined time has elapsed to allow said means for expanding to expand against the side of said drilled hole.

7. The means of claim 6 wherein said drilling fluid includes an acid which will react with said covering and dissolve it in a predetermined time.

8. The means of claim 6 wherein said means for expanding is selected from the group consisting of sponge and rubber, said sponge and rubber being held in a compressed position while said casing is being run into said drilled hole for implantation.

9. The means of claim 6 wherein at least one of said plurality of bracelet members include said elastomeric means comprising dry cement, said dry cement after said covering dissolves mixes with said drilling fluid to produce a cement slurry to be hardened around said casing.

10. A process for implanting intermediate casing, or production casing, or the like, in a drilled hole having a drilling fluid which comprises a plurality of bracelet members to said casing as same is being run into said hole, each of said bracelet members include a perforate covering and an elastomeric means for expanding, said means for expanding being encased in said covering.
11. The process of claim 10 wherein said covering additionally includes a protective coating.

12. The process of claim 11 additionally including dissolving said protective coating in said drilling fluid after a predetermined time has elapsed to allow said means for expanding to come into contact with said drilling fluid and expand to hold said casing firmly in place in said hole.

13. The process of claim 11 additionally including melting said protective coating at a predetermined temperature and pressure.

14. The process of claim 13 wherein said protective coating comprises a wax.

15. The process of claim 10 wherein said perforate covering includes burlap.

16. The process of claim 10 additionally including selecting said means for expanding from the group consisting of kaolin, gel, sodium montmorillonite, sodium chloride, calcium chloride, montmorillonite clay, plastics which swell upon heating, cement, and mixtures thereof.

17. A process for implanting intermediate casing, or production casing, or the like, in a drilled hole which comprises attaching a plurality of bracelet members to said casing as same is being run into said hole, each of said bracelet members including an imperforate covering and an elastomeric means for expanding, said means for expanding being encased in said covering, and dissolving said imperforate covering in said drilling fluid after a predetermined time has elapsed thereby allowing said means for expanding to expand and such expanding against the side of said drilled hole.

18. The process of claim 17 additionally including reacting said covering with an acid to dissolve same in a predetermined time, said acid being contained within said drilling fluid.

19. The process of claim 17 additionally including holding said means for expanding in a compressed position while said casing is being run into said drilled hole for implantation.

20. The process of claim 19 wherein said means for expanding is selected from the group consisting of sponge and rubber.

21. The process of claim 17 wherein at least one of said plurality of bracelet members include said elastomeric means comprising dry cement.

22. The process of claim 21 additionally including mixing said dry cement with said drilling fluid to produce a cement slurry to be hardened around said casing.

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