

WELLHEAD DEVICE FOR THE ISOLATION OF SOLID PARTICLES CARRIED BY THE PRODUCTION FLUID

solid particles carried by this fluid.

This invention relates to a device designed to equip the fluid production wellhead, in order to isolate the solid particles carried by this fluid. In particular, the invention relates to a device of this type that can be used for example on a gaseous or liquid hydrocarbon production well, when brought into production, or for the filtering of the completion fluid.

In various situations such as perforations through the "tubing", the start-up of a well or certain areas of a well is accompanied by the production of cuttings and, more generally, solid particles. These may damage the valves of the production shaft and of the production collector, as well as the overall installations through which flows the fluid in circulation. Furthermore, the fluids that are produced (completion fluid, effluent, etc...) must be eliminated or treated while they contain the cuttings or particles.

Therefore, it would particularly advantageous to have a system that is capable of ensuring the separation by filtration of the fluids that are produced in such situations, even before they pass through the valves of the production shaft, so as to protect the installations through which the fluid travels. Thus it would be possible to recycle the completion fluids and send the effluents directly to production.

The purpose of the invention is to answer this need by proposing a device designed to equip the production wells, upstream from the valves of the production shaft, and to isolate the solid particles present in the produced fluid before it passes through these valves.

With this end in view, the object of the invention is a device designed to equip the fluid production wellhead, upstream from the valves through which this fluid passes, in order to

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isolate the solid particles it carries, where this device comprises:

- a closed casing capable of being made integral with an element of the wellhead;
- a sleeve attached, and made watertight, on the internal wall of fluid the production body upstream from the equipped lateral exit(s) of said valves, where this sleeve is separated from the internal wall of the tube by a first annular space and projects inside the casing so as to lead the fluid produced by the well to it;
- a cylindrical partition arranged inside the casing around said sleeve, from which it is separated by a second annular space, where this partition rests, in a watertight fashion, against the upper part of the sleeve and against the base of the casing and is arranged in such a way in relation to the latter that the first and second annular spaces are in communication;
- the first openings arranged in the upper part of the partition above the sleeve, in order to allow for the passage of the fluid brought through the latter into the volume that separates the partition from the external part of the casing;
- the second openings, arranged in the lower part of the partition, where these second openings are separated, in a watertight fashion, from those arranged in the upper part of this partition and where they allow for the passage of the fluid from the volume that separates the partition from external part of the casing to the second annular space;
- and a filter arranged inside the casing on the periphery of the lower part of the partition, facing the second openings, where this filter is arranged so that all the fluid that enters through the first openings of the partition into the volume that separated this partition from the external part of the casing passes through the filter before entering the second annular volume through the second openings of the partition, the debris and solid matter transported by the fluid that is produced thus being isolated by the filter and

settling by gravity at the base of the volume that separates the filter from the external part of the casing.

This device could be mounted by any means known in the field on any wellhead element, for example above the cleaning valve of the production shaft.

The filter could be made of any type of screen and its mesh size will be adapted to the size of the solid particles that we wish to eliminate. Preferably it will be removable.

Advantageously a drilling will be provided on the lower part of the casing to eliminate the debris and solid particles that have accumulated at the base of the volume that separates the partition from the external part of the casing.

The latter may also be equipped with any auxiliary measuring device, for example pressure gauges that make it possible to check the pressure before starting the operations and before dismantling the equipment.

Lifting lugs can be provided on the casing to make it easier to handle the device.

One form of operation of the latter will be described hereafter in further detail, as an example, while referring to the only figure of the attached drawing, which is a view of a wellhead equipped with a device as set forth in the invention, partially an elevation drawing and partially a vertical axial sectional view.

On the drawing, we can see that, on the internal partition of the production shaft 1, upstream from the lateral exit 2 through which this fluid must pass, is attached a sleeve 3, that projects out of the upper extremity of the body 1, inside a casing 4. This casing 4 comprises a cylindrical body 5, coaxial to the sleeve 3, a base 6, integral with the body 5, and a removable cover 7, that tops the body 5. The sleeve 3 is separated from the body 1 by a first annular space 8, that communicates with the lateral exit 2.

A cylindrical partition 9 is arranged inside the casing 4, on the periphery of the sleeve 3 and coaxial to it,

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from which it is separated by a second annular space 10, that communicates with the first annular space 8. This partition 9 projects, on the one hand, on the outside of the base of the casing 4, in order make it possible to attach the device on the wellhead, and, on the other hand, on the outside of the cover 7, to also make it possible to attach the latter on the body 5, as will be explained hereafter.

The partition 9 is bored with the first openings 11, above the upper extremity of the sleeve 3, to as to let the fluid brought by the sleeve 3 into the casing 4 through the space that separates the partition 9 from the body 5. On its lower section, the partition 9 is bored with second openings 12, designed to allow for the passing of the fluid into the second annular space from the space that separates the partition 9 from the body 5.

A filter 13 is arranged in the casing 4 on the outside of the cylindrical partition 9, coaxial to it, and facing the second openings 12. This filter 13 rests, in a watertight fashion, against the base 6 of the casing 4 and/or the contiguous part of the partition 9 and against the median of this partition between the openings 11 and 12. It can be held in place in a removable way using collars that encircle it around the protrusions of the partition 9, against which it rests. Before penetrating through the openings 12 into the second annular space 10 and being evacuated through the by-pass 12, the fluid produced by the well must therefore necessarily pass through the filter 13, which isolates the solid particles it may carry. The latter are deposited in 14, on the bottom of the casing 4, and can be evacuated by a drain 15 provided on the lower part of the body 5. As indicated above, the mesh of the sieve 13 is naturally adjusted to the size of the solid particles to be eliminated.

The device can be attached by any means known in the field on an element 16 of the wellhead. In the example described, the element 16 is comprised of

a part that is threaded on the outside, on which is screwed a nut 17, that rests on a flange of the lower extremity of the partition 9, below the base 6.

Similarly, a nut 18, screwed on the threaded part 19 of the upper extremity of the partition 9, on the outside of the cover 7, rests on the latter and keeps it resting on the body 5 of the casing 4.

The nut 18 further requires a projecting part 6a of the base 6 of the casing 4 that rests against a shoulder or a flange of the partition 9.

As represented, a coupling 20, equipped with a shutter, can be provided on the upper extremity of the partition 9.

The device as set forth in the invention is therefore of great simplicity and acts through a process that is purely mechanical, which makes it particularly well adapted to a use under the harsh operating conditions of hydrocarbon production wells.



CLAIMS

1. Device designed to equip a fluid production wellhead, upstream from the valves through which the fluid passes, in order to isolate the solid particles it carries, where this device is comprised of :

- a closed casing (4) capable of being made integral with an element (16) of the wellhead;

- a sleeve (3) attached, in a watertight fashion, to the internal wall of the body (1) that produces the fluid upstream from the lateral exit(s) (2) equipped with said valves, where this sleeve (3) is separated from the internal wall of the tube (1) by a first annular space (8) and projects inside the casing (4) so as to lead the fluid produced by the well therein;

- a cylindrical partition (9) arranged inside the casing (4) around said sleeve (3), from which it is separated by a second annular space (10), where this partition (9) rests in a watertight fashion against the upper part of the sleeve (3) and against the base of the casing and is arranged in such a way in relation to the latter that the first and second annular spaces (8, 10) are in communication;

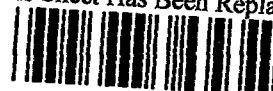
- the first openings (11) arranged in the upper part of the partition (9) above the sleeve (3), in order to allow for the passing of the fluid brought through it into the volume that separates the partition (9) from the external part (5) of the casing;

- the second openings (12) are arranged in the lower part of the partition (9), and these second openings (12) are separated in a watertight fashion from those (11) arranged in the upper part of this partition and allow for the passing of the fluid from the volume that separates the partition (9) from the external part (5) of the casing (4) toward the second annular space (10);

- and a filter (13) arranged inside the casing (4) on the periphery of the lower part of the partition (9) facing the second openings (12), this filter (13) being

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arranged in such a way that any fluid that penetrates through the first openings (11) of the partition into the volume that separates this partition from the external part (5) of the casing passes through the filter (13) before penetrating into the second annular space (10) through the second openings (12) of the partition, the debris and solid matter carried by the fluid produced thus being isolated by the filter (13) and being deposited through gravity (in 14) at the base of the volume that separates the filter (13) from the external part (5) of the casing.

2. Device as set forth in claim 1, characterized by the fact that the filter (13) rests in a watertight fashion against the base of the casing (4) and/or the contiguous part of the partition (9) and against a part of this intermediary partition between the first openings (11) and the second openings (12).

3. Device as set forth in one of claims 1 and 2, characterized by the fact that the filter (13) is mounted in a removable way on the partition (9).

4. Device as set forth in one of claims 1 through 3, characterized by the fact that a drain (15) is provided at the base of the casing (4) to evacuate the solid particles isolated by the filter (13) and deposited on the base (6) of the casing.

5. Device as set forth in one of the claims 1 through 4, characterized by the fact that the partition (9) projects outside the casing (4) below the base (6) of the latter and is capable of being made rigidly integral with an element (16) of the wellhead.

6. Device as set forth in claim 5, characterized by the fact that the element (16) of the wellhead comprises a threaded part on which is screwed a nut (17) that rests on a flange of the part of the partition (9) that projects below the casing (4).

7. Device as set forth in one of claims 1 through 6, characterized by the fact that the partition (9) projects outside the casing (4) above a cover (7) that tops the body (5) of the casing, and by the fact that a nut (18), screwed on the threaded part (19) of the projecting part of the partition

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(9) rests on the external face of the cover (7) to hold it in position.

8. Device as set forth in claims 6 and 7 combined, characterized by the fact that the base (6) of the casing (4) comprises a part (6a) that projects to the exterior, and comes to rest on a shoulder or a flange of the part of the partition (9) that projects below the casing (4), by request of the securing nut (18) of the cover (7).

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