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(71) Applicant: **Tubular Perforating Mfg
Conroe, TX 77301 (US)**

(72) Inventors:
• **The inventors have waived their right to be thus mentioned.**

(74) Representative: **Lecomte & Partners
76-78, rue de Merl
2146 Luxembourg (LU)**

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(54) **SHIELDING APPARATUS AND METHOD OF USE**

(57) A shielding system includes base pipe having one or more perforations through which fluid flows to an exterior of the base pipe; a filter assembly to secure around an exterior of a base pipe during use of the base pipe within a wellbore, the filter assembly having an InnerShield UniScreen apparatus integrally built into the filter assembly, the InnerShield UniScreen apparatus

having one or more shielded areas; the one or more shielded areas are selectively placed to block the one or more perforations when the filter assembly is secured around the exterior of the base pipe; and the one or more shielded areas selectively divert fluid flow to reduce erosion effects of fluid flow on the filter assembly

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Description

BACKGROUND

1. Field of the Invention

[0001] The present invention relates generally to well screen systems and assemblies as are used in the oil and gas industry, and more specifically to an apparatus to InnerShield the flow of well fluids to the outer screen, resulting in a drastic decrease of erosion of the screen.

2. Description of Related Art

[0002] High fluid velocities can create erosive conditions when the fluid containing fines produced from the formation. Under those conditions, the screen wears out and loses its ability to retain formation sands, creating potentially catastrophic wear conditions further up the hole and in surface equipment. Erosion studies reported in the literature (SPE 174837) identified that erosion conditions are created when the fluid accelerates to enter the perforation in the base pipe and creates a highly localized erosive cell that wears the screens outwardly.

[0003] The present invention provides for an inner shielded shroud apparatus that provides protection against erosion as explained above.

DESCRIPTION OF THE DRAWINGS

[0004] The novel features believed characteristic of the embodiments of the present application are set forth in the appended claims. However, the embodiments themselves, as well as a preferred mode of use, and further objectives and advantages thereof, will best be understood by reference to the following detailed description when read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a side view of an inner shielded UniScreen system in accordance with the present invention;

FIG. 2 is a side view depicting an inner shielded UniScreen apparatus placement on a support / base pipe in accordance with the present invention;

FIG. 3 is a side cross sectional view of an inner shielded UniScreen apparatus built into a filter assembly in accordance with the present invention; and

FIG. 4 is a side view of an inner shielded UniScreen apparatus built into a second filter assembly in accordance with the present invention.

[0005] While the system and method of use of the present application is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings

and are herein described in detail. It should be understood, however, that the description herein of specific embodiments is not intended to limit the invention to the particular embodiment disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present application as defined by the appended claims.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0006] Illustrative embodiments of the system and method of use of the present application are provided below. It will of course be appreciated that in the development of any actual embodiment, numerous implementation-specific decisions will be made to achieve the developer's specific goals, such as compliance with system-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure.

[0007] The system and method of use in accordance with the present application overcomes one or more of the above-discussed problems commonly associated with conventional fluid flow systems. Specifically, the present invention provides a means to protect filter screens against erosion. These and other unique features of the system and method of use are discussed below and illustrated in the accompanying drawings.

[0008] The system and method of use will be understood, both as to its structure and operation, from the accompanying drawings, taken in conjunction with the accompanying description. Several embodiments of the system are presented herein. It should be understood that various components, parts, and features of the different embodiments may be combined together and/or interchanged with one another, all of which are within the scope of the present application, even though not all variations and particular embodiments are shown in the drawings. It should also be understood that the mixing and matching of features, elements, and/or functions between various embodiments is expressly contemplated herein so that one of ordinary skill in the art would appreciate from this disclosure that the features, elements, and/or functions of one embodiment may be incorporated into another embodiment as appropriate, unless described otherwise.

[0009] The preferred embodiment herein described is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described to explain the principles of the invention and its application and practical use to enable others skilled in the art to follow its teachings.

[0010] Referring now to the drawings wherein like reference characters identify corresponding or similar elements throughout the several views, FIG. 1 depicts a side

view of an inner shielded UniScreen system 101 in accordance with the present invention. It will be appreciated that system 101 overcomes one or more of the above-listed problems commonly associated with conventional fluid flow systems.

[0011] In the contemplated embodiment, system 101 includes a base pipe 103 extending into a wellbore 102 and an inner shielded UniScreen apparatus 105 surrounding at least a portion of the base pipe 103. The inner shielded UniScreen apparatus 105 provides a new solution to protect filter screens against erosion, as the apparatus 105 creates InnerShields above the base pipe perforations (not shown in FIG. 1) to protect the screen from erosion as discussed above.

[0012] In FIG. 2, a side view depicts an InnerShield UniScreen apparatus 105 along with placement of the apparatus 105 such that perforations 201 of base pipe 103 are selectively shielded by shielded areas 203 of the apparatus 105. Again, these shielded areas are configured to direct a line of flow conditions that in conventional systems result in outward erosive patterns.

[0013] In FIG. 3, a close up cross sectional view depicts a filter assembly 301 in which the inner shielded UniScreen apparatus 105 is incorporated. As shown, the shielded areas 203a, 203b are built directly into the filter assembly 301 and provide for selective shielding of open/perforated area 201 of base pipe 103. As shown, the filter assembly may include a plurality of layers that provide for filtering as desired by the user/operator.

[0014] It should be appreciated that one of the unique features believed characteristic of the present application is that the inner shielded UniScreen apparatus 105 can be built directly as an integral part of a screen/filter assembly to provide for creating selective shielded spots above the perforations drilled in the base pipe.

[0015] FIG. 4 shows an embodiment of a filter assembly 401 with base pipe 403 having a shielded UniScreen apparatus 105 built in. Again, it should be appreciated that the present invention can be incorporated to known filter and screen assemblies known in the art to provide for improved erosion control. Further, this technology can be used with any filter medium providing universal solutions across ample industries.

[0016] It must be appreciated and understood that the filter assembly of the present invention may be adapted, as would be known by those skilled in the art, such as to be a wire mesh screen filter assembly, a wire ribbed screen filter assembly, and a laminated filter assembly.

[0017] In the present invention, different patterns of InnerShield screens are proposed to match the different patterns of base pipe perforations. The InnerShields screen may be constituted either by an unperforated area in the screen integral to the screen jacket or by InnerShield sleeves or shroud placed above the support pipe perforated locations. The particular embodiments disclosed above may be altered or modified, and all such variations are considered within the scope and spirit of the application.

[0018] It should further be appreciated that the present invention can be adapted for use in various industries in which erosion due to fluid flow is a concern and is not limited to the oil and gas industry. Automotive, biofuels, chemical industries, conventional and nonconventional energy production, food processing, paper and pulp processing, refineries, etc.

[0019] The particular embodiments disclosed above are illustrative only, as the embodiments may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. It is therefore evident that the particular embodiments disclosed above may be altered or modified, and all such variations are considered within the scope and spirit of the application. Accordingly, the protection sought herein is as set forth in the description. Although the present embodiments are shown above, they are not limited to just these embodiments, but are amenable to various changes and modifications without departing from the spirit thereof.

Claims

1. A shielding system, comprising:

a base pipe having one or more perforations through which fluid flows to an exterior of the base pipe;
a filter assembly to secure around an exterior of a base pipe during use of the base pipe within a wellbore, the filter assembly having an innershielded uniscreen apparatus integrally built into the filter assembly, the innershielded uniscreen apparatus having one or more shielded areas;
wherein the one or more shielded areas are selectively placed to block the one or more perforations when the filter assembly is secured around the exterior of the base pipe; and
wherein the one or more shielded areas selectively divert fluid flow to reduce corrosive effects of fluid flow on the filter assembly.

2. The shielding system of claim 1, wherein the filter assembly further comprises: a plurality of filter layers.

3. The shielding system of claim 1, wherein the one or more shielded areas are spaced apart along a length of the filter assembly.

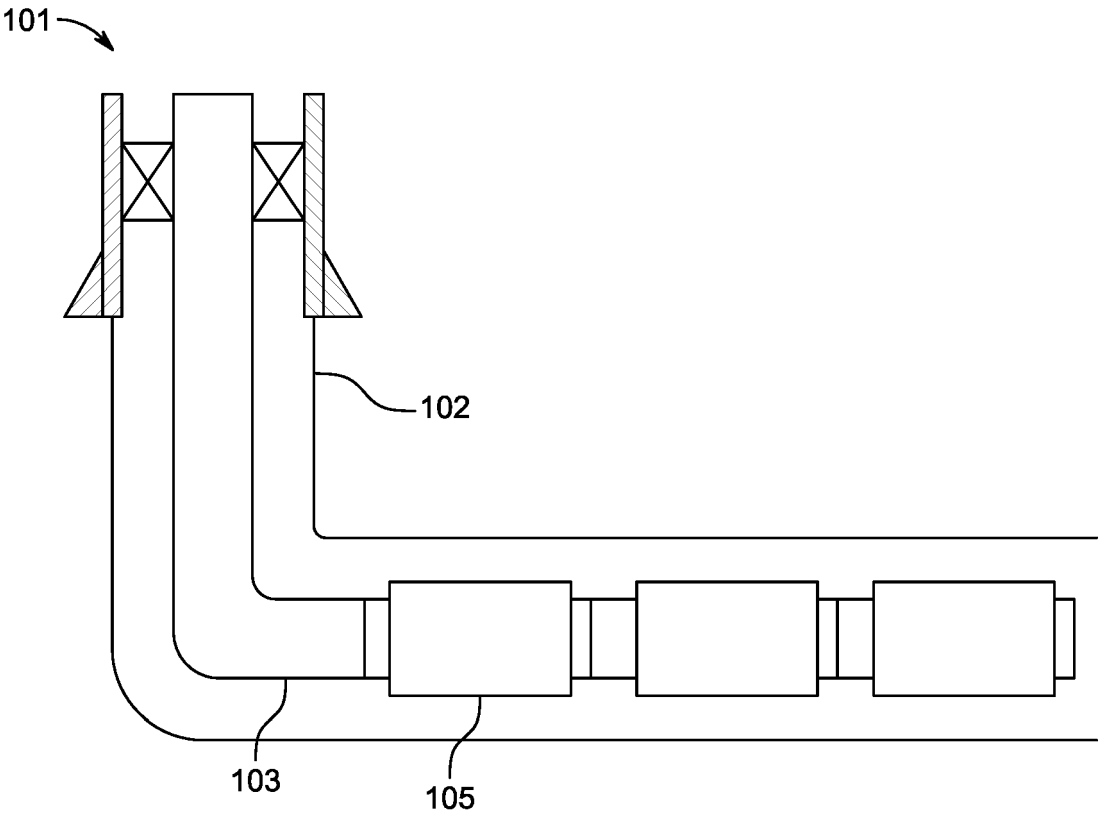


FIG. 1

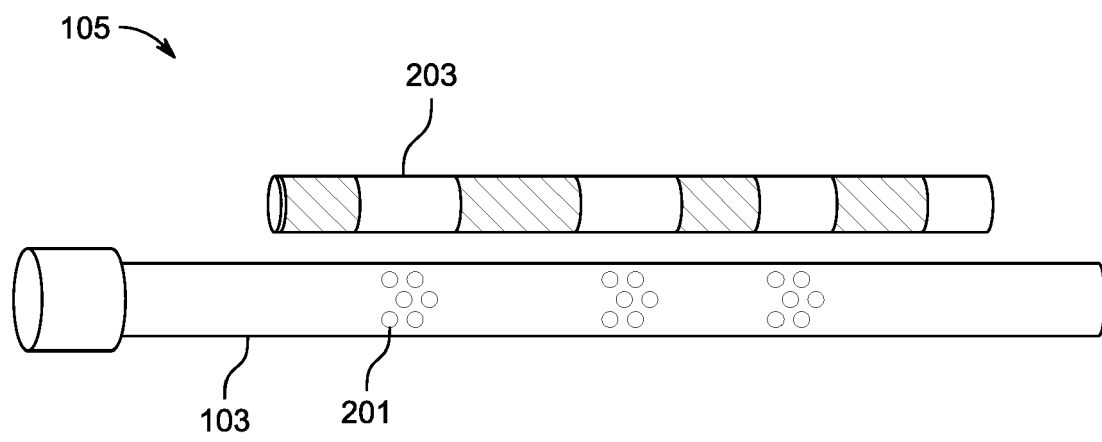


FIG. 2

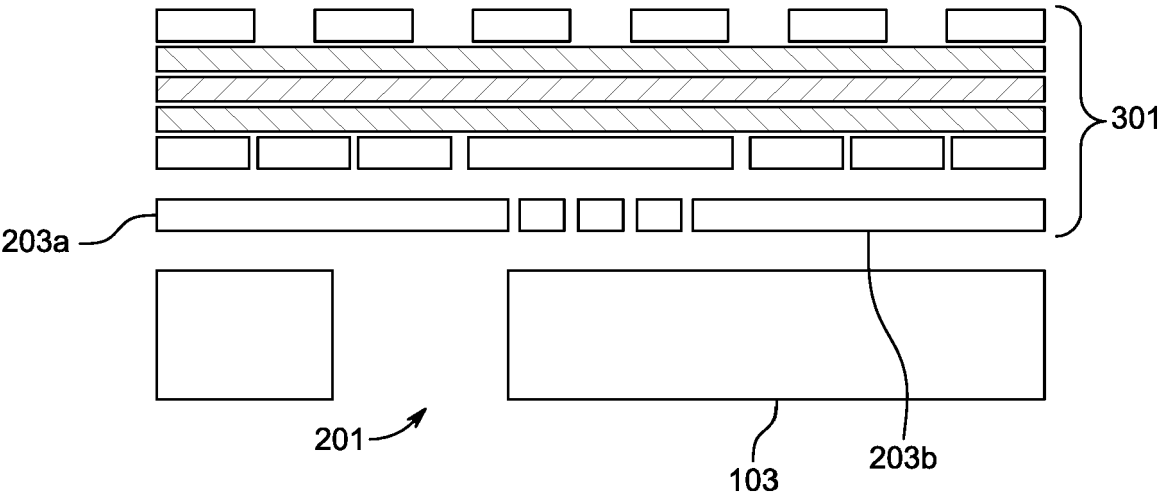


FIG. 3

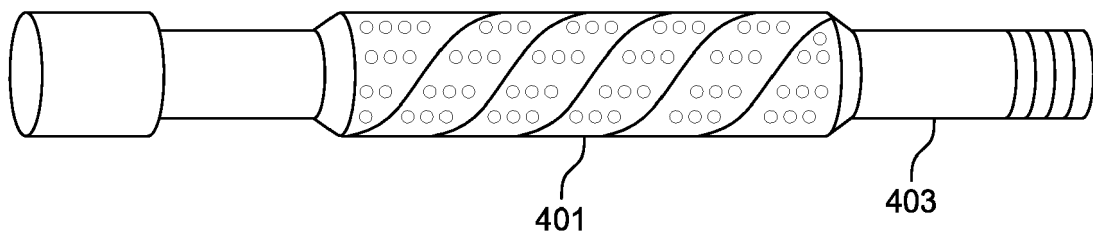


FIG. 4



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 1156

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EPO FORM 1503 03.82 (P04C01)

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			TECHNICAL FIELDS SEARCHED (IPC)
			E21B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 August 2022	Examiner Ott, Stéphane
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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