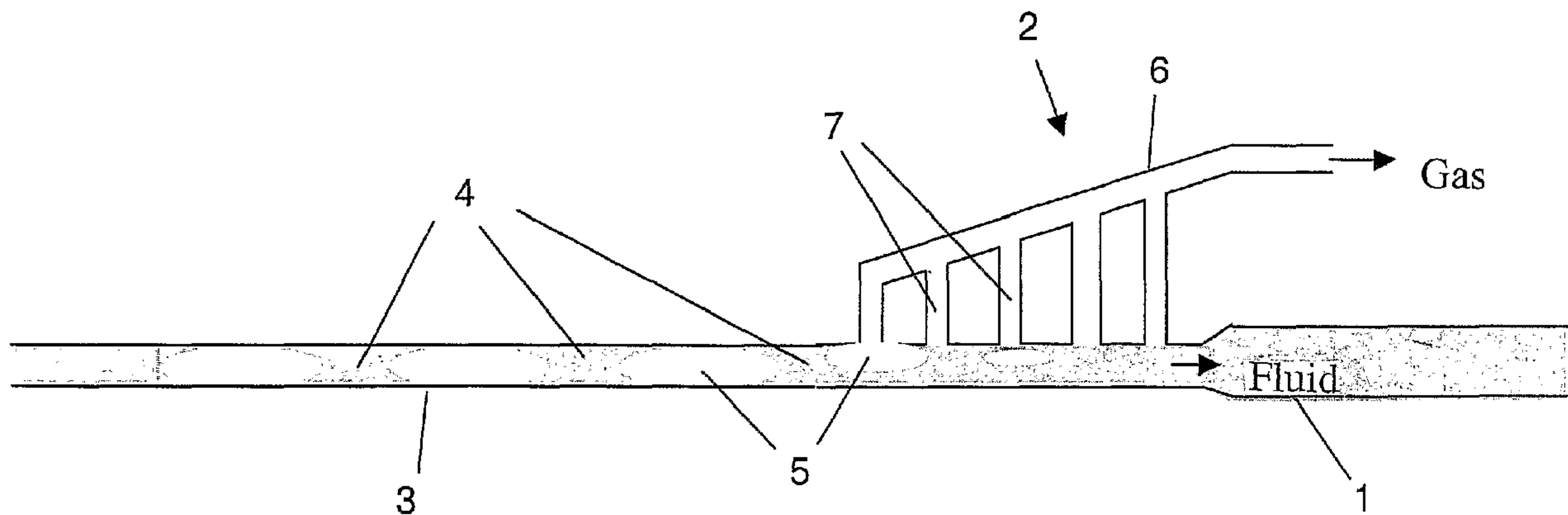




(86) Date de dépôt PCT/PCT Filing Date: 2006/03/15
(87) Date publication PCT/PCT Publication Date: 2006/09/21
(45) Date de délivrance/Issue Date: 2011/07/19
(85) Entrée phase nationale/National Entry: 2007/09/11
(86) N° demande PCT/PCT Application No.: NO 2006/000097
(87) N° publication PCT/PCT Publication No.: 2006/098637
(30) Priorité/Priority: 2005/03/16 (NO20051387)

(51) Cl.Int./Int.Cl. *E21B 43/34* (2006.01),
B01D 17/02 (2006.01)
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(54) Titre : ENTREE DE SEPARATEUR DE TUYAU
(54) Title: PIPE SEPARATOR INLET



(57) **Abrégé/Abstract:**

A device in connection with a pipe separator, comprising an extended tubular body (1) with a diameter that is principally the same as or slightly larger than the diameter of the inlet pipe (3)/outlet pipe of the separator. A separate gas manifold (2) is arranged in connection with the inlet. The manifold (2) comprises a number of vertical degassing pipes (7), which are connected to the inlet pipe (3) immediately ahead of the inlet to the separator and which end in an overlying, preferably slightly inclined gas collection pipe (6). The gas is designed to be diverted up through the vertical degassing pipes and collected in the gas collection pipe (6) for return to the outlet pipe after the separator or transport onwards to a gas tank or gas processing plant or similar.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
21 September 2006 (21.09.2006)

PCT

(10) International Publication Number
WO 2006/098637 A1(51) International Patent Classification:
E21B 43/34 (2006.01) *B01D 17/02* (2006.01)(21) International Application Number:
PCT/NO2006/000097

(22) International Filing Date: 15 March 2006 (15.03.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
20051387 16 March 2005 (16.03.2005) NO(71) Applicant (for all designated States except US): **NORSK HYDRO ASA** [NO/NO]; N-0240 Oslo (NO).

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

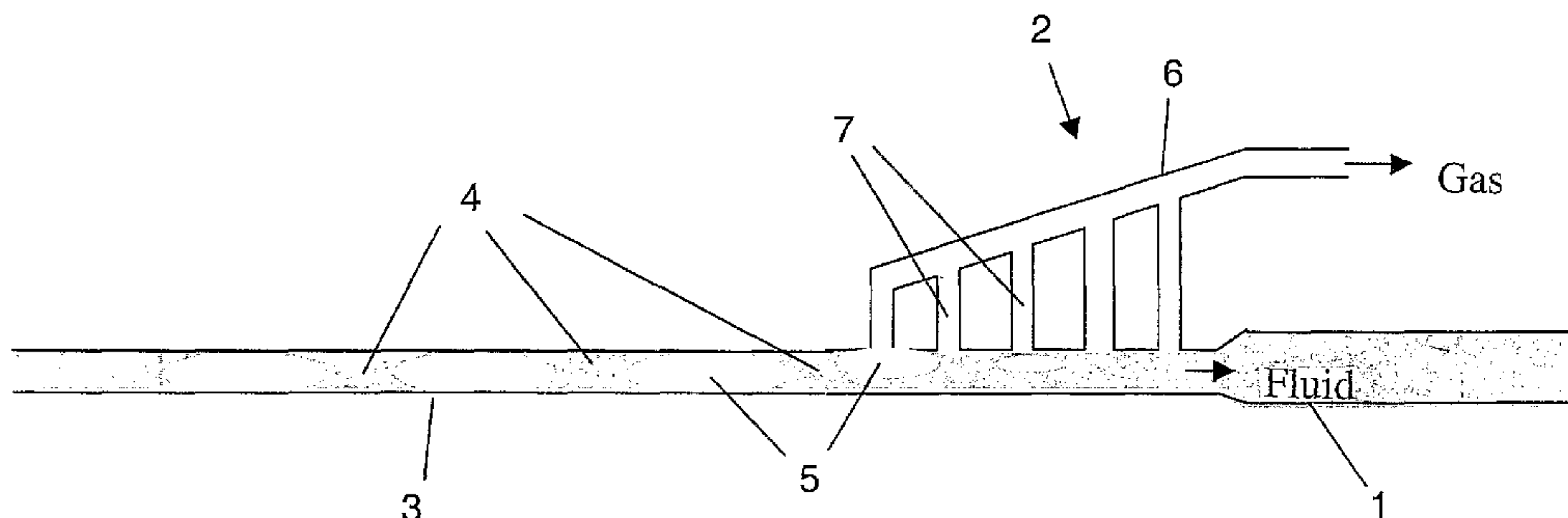
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PIPE SEPARATOR INLET



(57) Abstract: A device in connection with a pipe separator, comprising an extended tubular body (1) with a diameter that is principally the same as or slightly larger than the diameter of the inlet pipe (3)/outlet pipe of the separator. A separate gas manifold (2) is arranged in connection with the inlet. The manifold (2) comprises a number of vertical degassing pipes (7), which are connected to the inlet pipe (3) immediately ahead of the inlet to the separator and which end in an overlying, preferably slightly inclined gas collection pipe (6). The gas is designed to be diverted up through the vertical degassing pipes and collected in the gas collection pipe (6) for return to the outlet pipe after the separator or transport onwards to a gas tank or gas processing plant or similar.

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Pipe separator inlet

The present invention concerns a pipe separator or, more specifically, the inlet to such a separator, comprising an extended tubular body with a diameter that is principally the same as or slightly larger than the diameter of the inlet pipe/outlet
5 pipe of the separator.

Applications for patents for pipe separators of the above type were first submitted by the applicant in the present case in 1996. One of these patent applications is the applicant's own international patent application PCT/NO 03/00265, which shows such a separator. Pipe separators are very effective for separation of fluids
10 with non-mixable fluid components and also represent a simple, structurally light solution compared with conventional gravitation separators. In some situations in connection with the separation of fluids, for example an oil, gas and water flow with a high gas content, plug flow may occur, one reason being design-related conditions, which may reduce the separation in the separator. Some
15 embodiments of the present invention represent a solution that may completely eliminate such plug flow.

According to one aspect of the present invention, there is provided a device in connection with a pipe separator, the pipe separator having an extended tubular body, the device comprising: an inlet pipe, wherein the diameter of the pipe
20 separator is one of the same as and larger than the diameter of the inlet pipe; and a gas manifold connected to the inlet pipe, the manifold comprising a plurality of vertical degassing pipes connected to the inlet pipe immediately ahead of the pipe separator, the degassing pipes ending in an overlying gas collection pipe, wherein the gas manifold is arranged such that, in use, gas is diverted up through the
25 degassing pipes and collected in the gas collection pipe for one of: return to an outlet pipe after the pipe separator; and transport to one of a gas tank and a gas processing plant; wherein the inlet pipe has an extended diameter in a region adjacent the pipe separator and the last degassing pipe.

According to one aspect of the present invention, there is provided a device in
30 connection with a pipe separator, the pipe separator having an extended tubular body, the device comprising: an inlet pipe, wherein the diameter of the pipe

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separator is at least as large as the diameter of the inlet pipe; and a gas manifold connected to the inlet pipe, the manifold comprising a plurality of vertical degassing pipes connected to the inlet pipe immediately ahead of the pipe separator, the degassing pipes ending in an overlying gas collection pipe, wherein
5 the gas manifold is arranged such that, in use, gas is diverted up through the degassing pipes and collected in the gas collection pipe for transport to a gas tank; wherein the inlet pipe has an extended diameter in a region adjacent the pipe separator and the last degassing pipe.

According to one aspect of the present invention, there is provided a device in
10 connection with a pipe separator, the pipe separator having an extended tubular body, the device comprising: an inlet pipe, wherein the diameter of the pipe separator is at least as large as the diameter of the inlet pipe; and a gas manifold connected to the inlet pipe, the manifold comprising a plurality of vertical degassing pipes connected to the inlet pipe immediately ahead of the pipe
15 separator, the degassing pipes ending in an overlying gas collection pipe, wherein the gas manifold is arranged such that, in use, gas is diverted up through the degassing pipes and collected in the gas collection pipe for transport to a gas processing plant; wherein the inlet pipe has an extended diameter in a region adjacent the pipe separator and the last degassing pipe.

20 In some embodiments, the inlet pipe and the gas manifold are raised to a level above the pipe separator.

In some embodiments, the extended diameter is equal to the diameter of the pipe separator.

In some embodiments, the gas collection pipe is inclined with respect to the inlet
25 pipe.

In some embodiments, the diameter of the pipe separator is the same as the diameter of the inlet pipe.

In some embodiments, the diameter of the pipe separator is larger than the diameter of the inlet pipe.

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Some embodiments of the present invention will be described in further detail in the following using examples and with reference to the attached drawings, where:

- Fig. 1 shows a longitudinal section of part of a separator with an inlet in accordance with an embodiment of the present invention,
- 5 Fig. 2 shows a longitudinal section of part of a separator with an alternative embodiment in accordance with an embodiment of the present invention,
- Fig. 3 shows another example of an alternative embodiment of part of a separator in accordance with an embodiment of the present
- 10 invention.

15

Fig. 1 shows, as stated above, part of a pipe separator 1 with an inlet in accordance with the present invention arranged in connection with a supply pipe 3 for a multiphase flow, for example oil, water and gas.

The flow pattern in a multiphase flow upstream of the pipe separator is often gas/fluid plug flow if the gas/fluid composition and the design of the supply pipe are unfavourable. In the figure, the fluid plugs 4 are shown as darker parts, while the gas takes the form of gas bubbles 5 in a light colour or white.

20

The present invention involves "puncturing" the gas bubbles and removing them so that the gas phase is mainly collected in a gas collector and the fluid phase remains in the main pipe. This is achieved by means of a separate gas manifold 2, arranged in connection with the inlet. The manifold 2 comprises a number of vertical degassing pipes 7, which are connected to the transport pipe immediately ahead of the inlet to the separator and which end in a slightly inclined gas collection pipe 6. The gas is thus diverted up through the vertical degassing pipes and collected in the gas collection pipe

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30 6.

Tests have shown that this an effective way of eliminating plug flow while also ensuring that a constant fluid flow is supplied to the pipe separator 1.

The gas that is removed can bypass the pipe separator via the gas collection pipe 6 and be added to the oil phase straight after the separator, or it can be transported onwards
5 to a gas tank or similar. The system can be designed so that the gas removal is driven by the normal pressure drop in the system.

Fig. 2 shows an alternative solution in which the supply pipe 3 with the gas manifold 2 is raised to a level (in the area 9) above the pipe separator 1. By raising the gas manifold
10 above the pipe separator, as has been done here, the gas is forced along the gas path, i.e. up into the gas manifold 2.

Moreover, as shown in Fig. 3, the diameter of the transport pipe at the inlet to the separator, under (at 8) the last of the degassing pipes 7 of the manifold, may have an
15 extended diameter, for example equivalent to the diameter of the pipe separator. By increasing the pipe diameter in the last part of the gas manifold so that the fluid speed in the pipe is reduced, gas that is not separated can flow back to the last
degassing pipe 7.

20 The purpose of the design of the gas manifold in accordance with the present invention is to:

1. Separate out the gas phase from a gas/oil/water well flow in a simple manner that does not subject the multiphase flow to high shearing forces. High shearing
25 forces are normally negative for the separation.
2. Ensure the fluid flow has the correct phase in the separator, i.e. water-continuous flow for the water phase and oil-continuous flow for the oil phase. This reduces mixing in the separator inlet and reduces the formation of multiple dispersions in the mixing process in the inlet.

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CLAIMS:

1. A device in connection with a pipe separator, the pipe separator having an extended tubular body, the device comprising:

an inlet pipe, wherein the diameter of the pipe separator is at least
5 as large as the diameter of the inlet pipe; and

a gas manifold connected to the inlet pipe, the manifold comprising a plurality of vertical degassing pipes connected to the inlet pipe immediately ahead of the pipe separator, the degassing pipes ending in an overlying gas collection pipe, wherein the gas manifold is arranged such that, in use, gas is diverted up
10 through the degassing pipes and collected in the gas collection pipe for return to an outlet pipe after the pipe separator;

wherein the inlet pipe has an extended diameter in a region adjacent the pipe separator and the last degassing pipe.

2. A device in connection with a pipe separator, the pipe separator
15 having an extended tubular body, the device comprising:

an inlet pipe, wherein the diameter of the pipe separator is at least as large as the diameter of the inlet pipe; and

a gas manifold connected to the inlet pipe, the manifold comprising a plurality of vertical degassing pipes connected to the inlet pipe immediately ahead
20 of the pipe separator, the degassing pipes ending in an overlying gas collection pipe, wherein the gas manifold is arranged such that, in use, gas is diverted up through the degassing pipes and collected in the gas collection pipe for transport to a gas tank;

wherein the inlet pipe has an extended diameter in a region adjacent
25 the pipe separator and the last degassing pipe.

3. A device in connection with a pipe separator, the pipe separator having an extended tubular body, the device comprising:

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an inlet pipe, wherein the diameter of the pipe separator is at least as large as the diameter of the inlet pipe; and

a gas manifold connected to the inlet pipe, the manifold comprising a plurality of vertical degassing pipes connected to the inlet pipe immediately ahead
5 of the pipe separator, the degassing pipes ending in an overlying gas collection pipe, wherein the gas manifold is arranged such that, in use, gas is diverted up through the degassing pipes and collected in the gas collection pipe for transport to a gas processing plant;

wherein the inlet pipe has an extended diameter in a region adjacent
10 the pipe separator and the last degassing pipe.

4. A device in connection with a pipe separator, as claimed in any one of claims 1 to 3, wherein the inlet pipe and the gas manifold are raised to a level above the pipe separator.

5. A device in connection with a pipe separator, as claimed in any one
15 of claims 1 to 3, wherein the extended diameter is equal to the diameter of the pipe separator.

6. A device in connection with a pipe separator, as claimed in any one of claims 1 to 5, wherein the gas collection pipe is inclined with respect to the inlet pipe.

20 7. The device in connection with a pipe separator, as claimed in any one of claims 1 to 6 wherein the diameter of the pipe separator is the same as the diameter of the inlet pipe.

8. The device in connection with a pipe separator, as claimed in any one of claims 1 to 6 wherein the diameter of the pipe separator is larger than the
25 diameter of the inlet pipe.

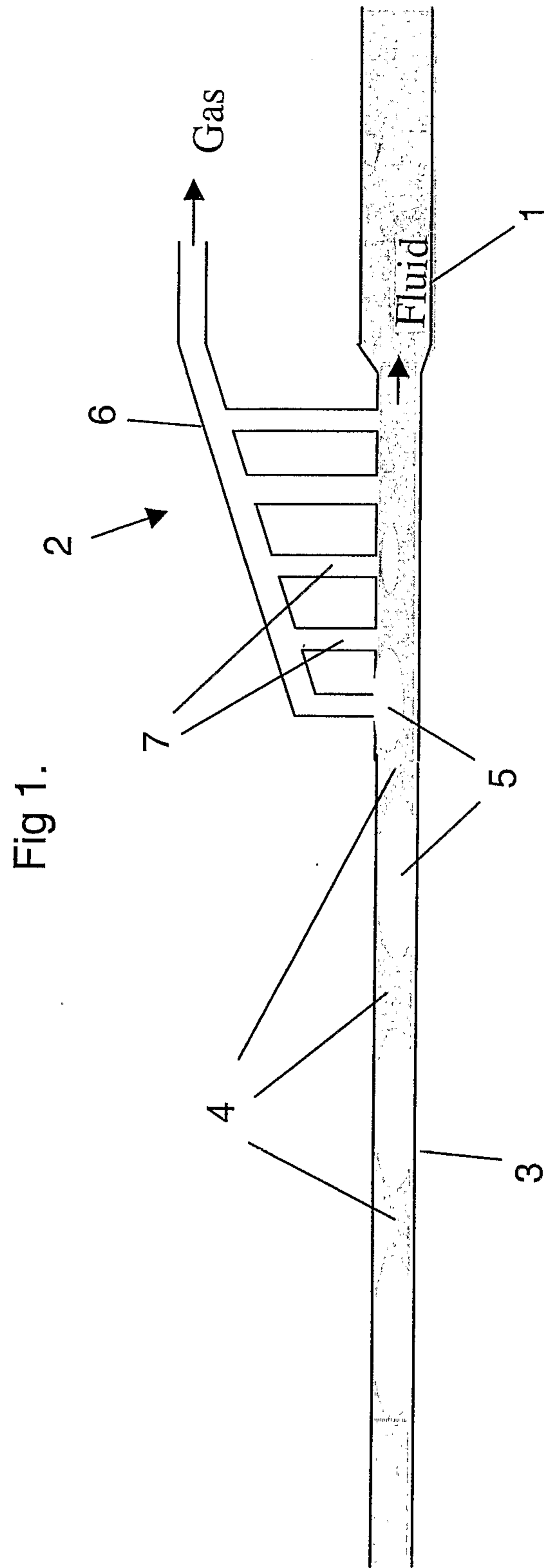


Fig 2.

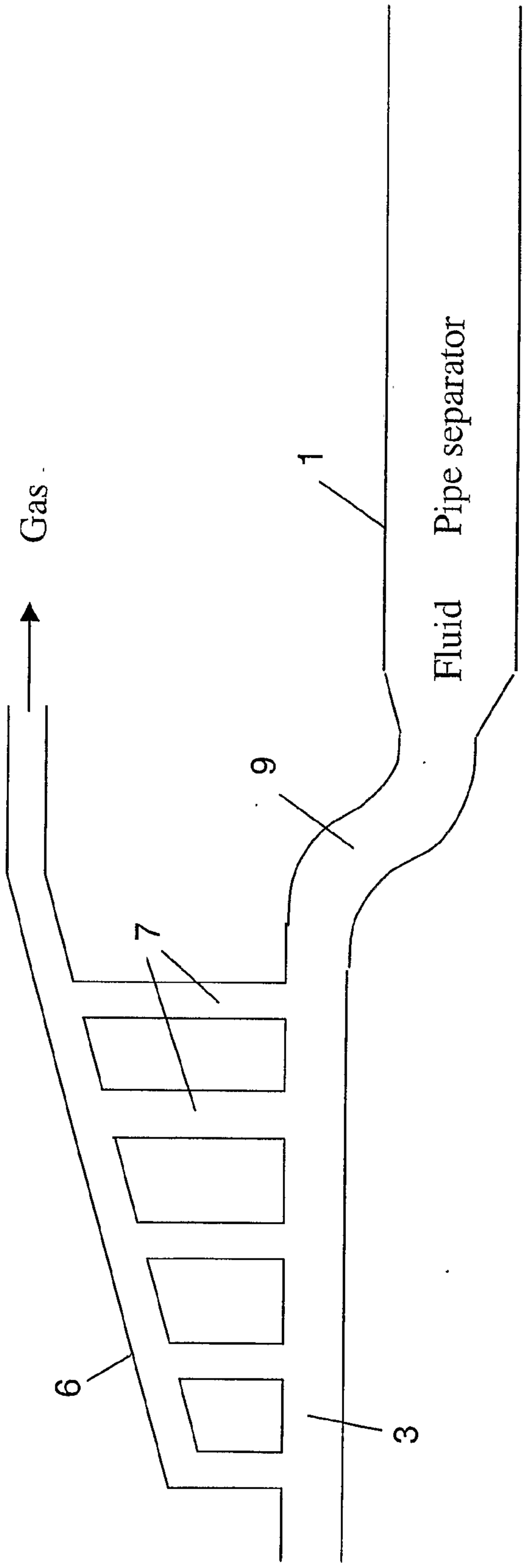


Fig 3.

